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Technical docs

AUTOMATION - LIMIT AND MICRO SWITCHES



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AUTOMATION
LIMIT AND MICRO SWITCHES



REV. 00_21

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www.giovenzana.com



GIOVENZANA INTERNATIONAL B.V.® is one of the world's leading suppliers of **industrial safety technology**.

With our wide range of limit switches and microswitches, we offer our customers **effective and versatile solutions**.

Our long-standing experience, our in-depth knowledge of the market and our daily proximity to our customers are reflected in our production.

High quality and compliance with major international standards characterize our products which are custom designed to meet all the specific needs of end users.

Our goal is safety first of all for the operators, the machines and the industrial processes.



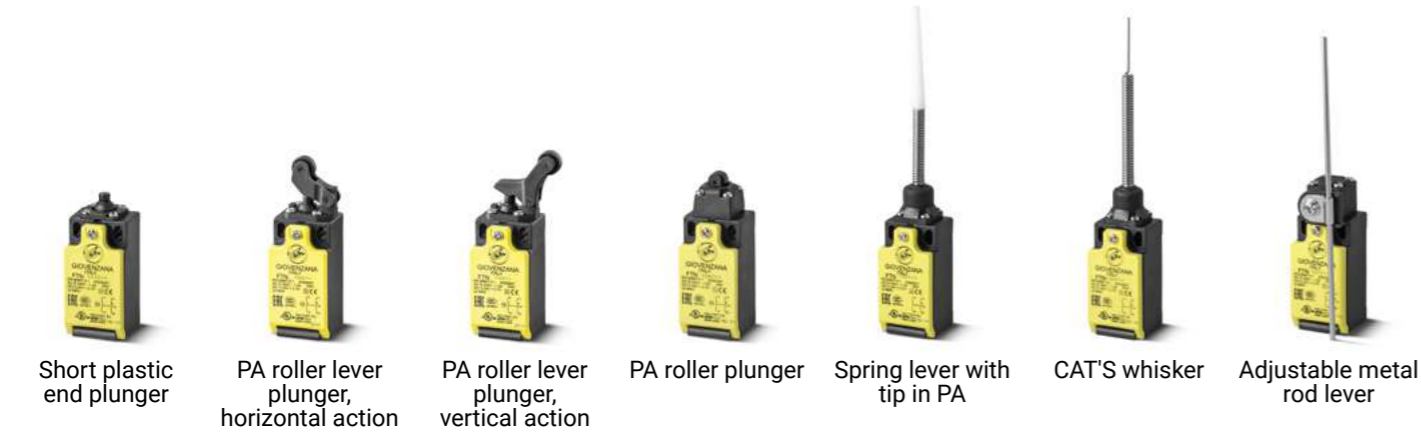
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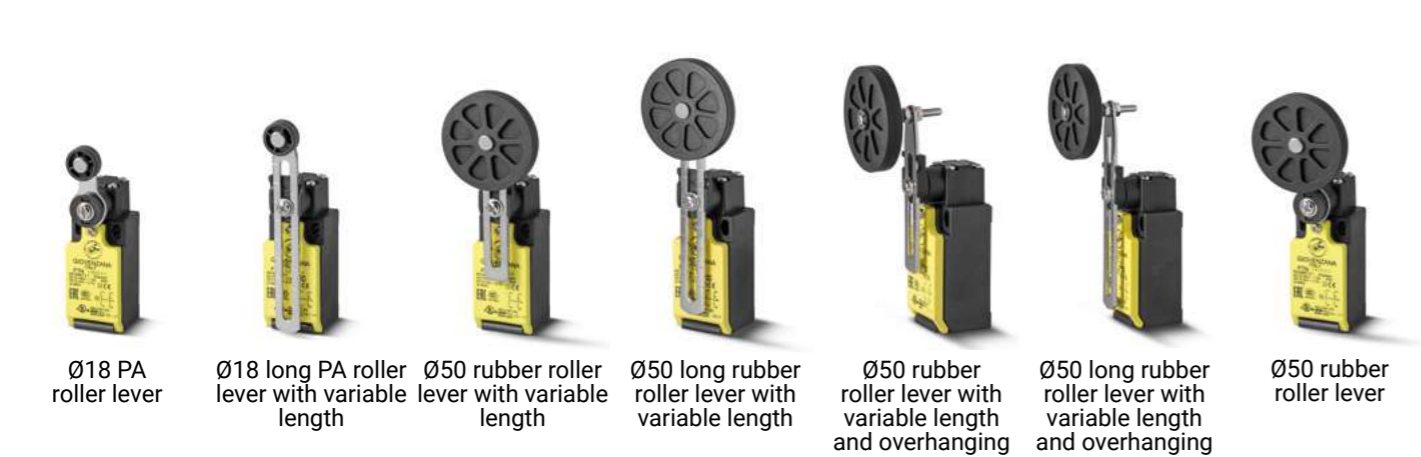
LIMIT AND MICRO SWITCHES
GIOVENZANA INTERNATIONAL B.V.®

A **FTN SERIES**
thermoplastic limit switches **10 - 41**

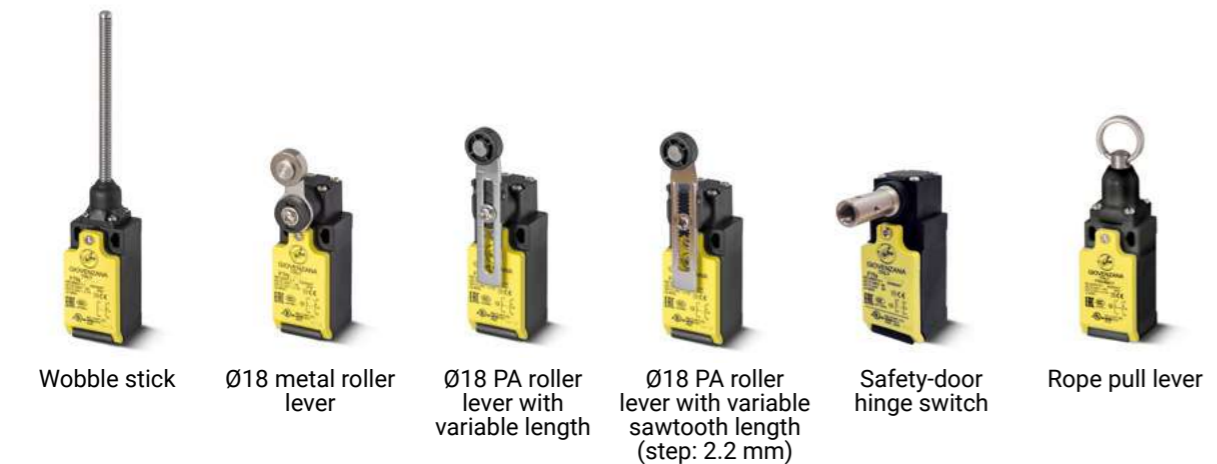
FTN131 Pag. 21	FTN132 Pag. 22	FTN133 Pag. 23	FTN134 Pag. 24	FTN135 Pag. 25	FTN136 Pag. 26	FTN137 Pag. 27
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FTN138 Pag. 28	FTN139 Pag. 29	FTN140 Pag. 30	FTN140L Pag. 31	FTN140R Pag. 32	FTN140RL Pag. 33	FTN141 Pag. 34
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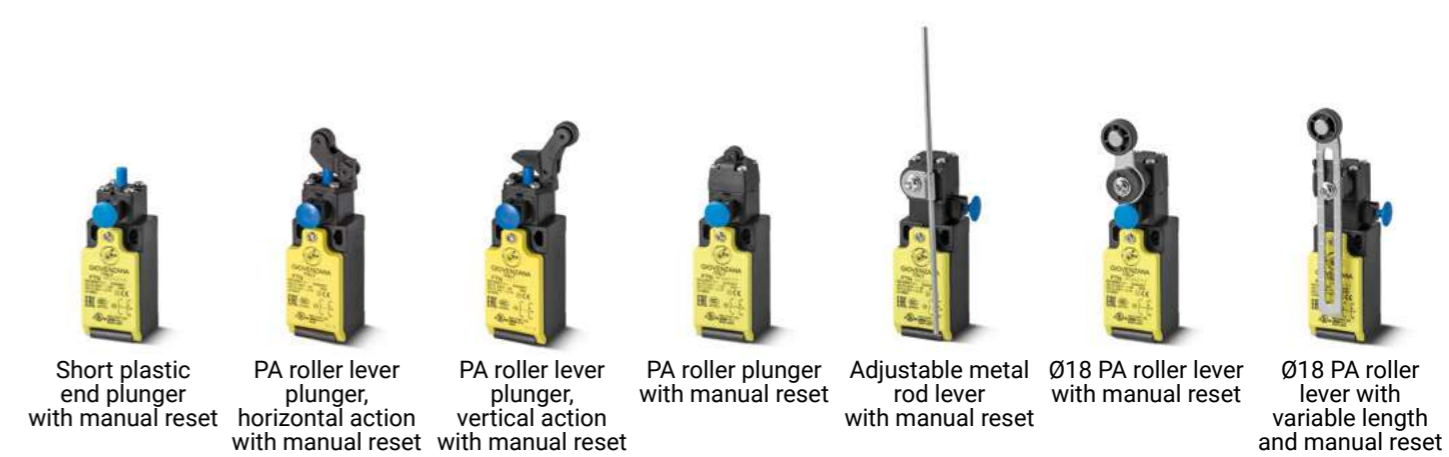


FTN142 Pag. 35	FTN143 Pag. 36	FTN144 Pag. 37	FTN144S Pag. 38	FTN146 Pag. 39	FTN198 Pag. 40 - 41
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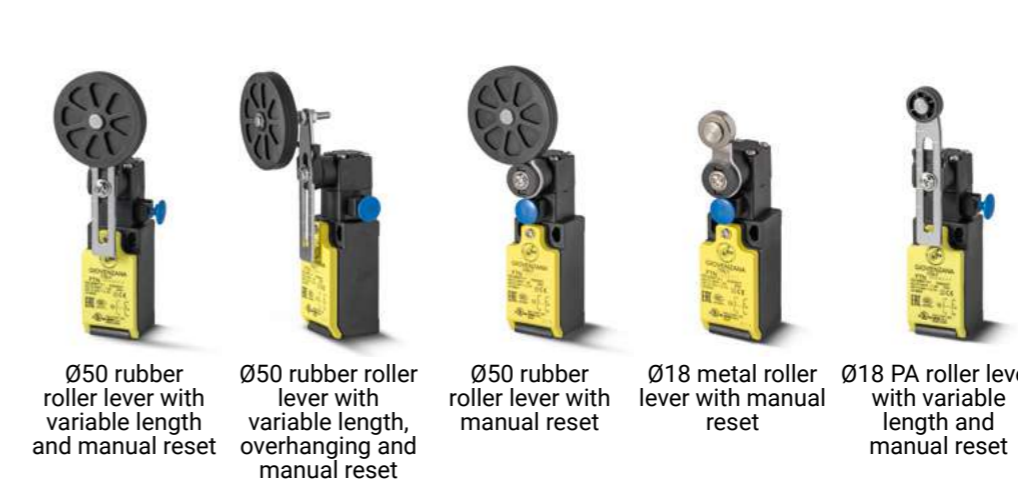


B **FTN1R SERIES**
thermoplastic limit switches with manual reset **42 - 65**

FTN1R31 Pag. 53	FTN1R32 Pag. 54	FTN1R33 Pag. 55	FTN1R34 Pag. 56	FTN1R37 Pag. 57	FTN1R38 Pag. 58	FTN1R39 Pag. 59
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FTN1R40 Pag. 60	FTN1R40R Pag. 61	FTN1R41 Pag. 62	FTN1R43 Pag. 63	FTN1R44 Pag. 64
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C FTNG SERIES
40 mm thermoplastic limit switches for heavy applications **66 - 83**

FTNG131 Pag. 77	FTNG134 Pag. 78	FTNG138 Pag. 79	FTNG139 Pag. 80	FTNG140 Pag. 81	FTNG141 Pag. 82	FTNG172 Pag. 83
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D STNK SERIES
thermoplastic safety switches with separate actuator **84 - 99**

STNK01 Pag. 93 - 94	STNK02 Pag. 95 - 96	STNK03 Pag. 97 - 99
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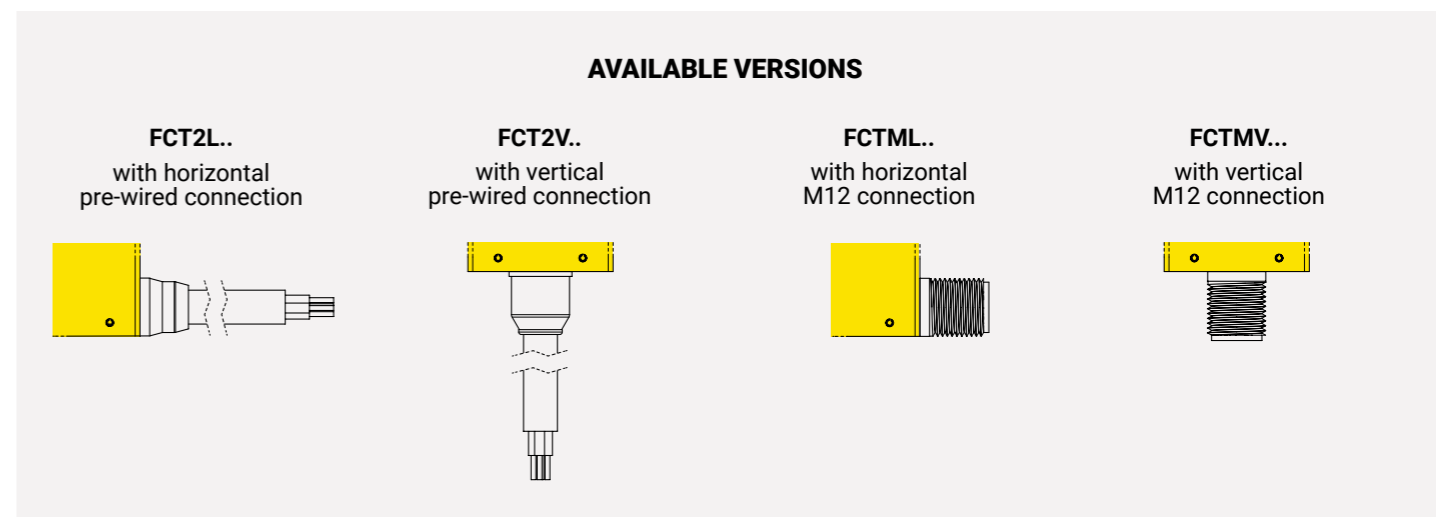


E FCT SERIES
M12-connected and pre-wired thermoplastic limit switches **100 - 117**

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FCT07 Pag. 113	FCT08 Pag. 114	FCT09 Pag. 115	FCT10 Pag. 116	FCT11 Pag. 117
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F **MFI SERIES**
micro switches **118 - 123**

FASTON TERMINALS 6.3 x 0.8 mm

MFI **MFI.1** **MFI.2** **MFI.3** **MFI.4** **MFI.5** **MFI.6** **MFI.7**



SOLDER TERMINALS

MFI.S **MFI.1S** **MFI.2S** **MFI.3S** **MFI.4S** **MFI.5S** **MFI.6S** **MFI.7S**



SCREW TERMINALS

MFI.ST **MFI.1ST** **MFI.2ST** **MFI.3ST** **MFI.4ST** **MFI.5ST** **MFI.6ST** **MFI.7ST**



SCREW TERMINALS + PLATE PROTECTION

MFI.STP **MFI.1STP** **MFI.2STP** **MFI.3STP** **MFI.4STP** **MFI.5STP** **MFI.6STP** **MFI.7STP**



Pin plunger Long roller lever Simulated roller lever Roller lever Long lever Medium lever Short lever 16 mm roller lever

FASTON TERMINALS 6.3 x 0.8 mm + TOWER ACTUATOR WITH THREADED FLANGE

MFI.T



Tower actuator

G **MZ SERIES**
micro switches **124 - 136**

S 13 **SCREW TERMINALS**

MZS1300 **MZS1301** **MZS1303** **MZS1305** **MZS1306** **MZS1307** **MZS1308** **MZS1318**

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Pin plunger Hinge lever Short hinge roller lever Slim spring plunger Short spring plunger Panel mount plunger Panel mount roller plunger Panel mount cross roller plunger

S 17 **SCREW TERMINALS**

MZS1701 **MZS1702** **MZS1703** **MZS1704** **MZS1744**

Pag. 130 - 131



Hinge lever Short hinge roller lever Hinge roller lever Short hinge roller lever Unidirectional short hinge roller lever

ACCESSORY

MZA8000

Pag. 136



Terminal enclosure

W 13 **SOLDER TERMINALS**

MZW1300 **MZW1301** **MZW1303** **MZW1305** **MZW1306** **MZW1307** **MZW1308** **MZW1318**

Pag. 132 - 133



Pin plunger Hinge lever Short hinge roller lever Slim spring plunger Short spring plunger Panel mount plunger Panel mount roller plunger Panel mount cross roller plunger

W 17 **SOLDER TERMINALS**

MZW1701 **MZW1702** **MZW1703** **MZW1704** **MZW1744**

Pag. 134 - 135



Hinge lever Short hinge roller lever Hinge roller lever Short hinge roller lever Unidirectional short hinge roller lever

ACCESSORY

MZA8000

Pag. 136



Terminal enclosure



OVERVIEW



The thermoplastic limit switches of the **FTN series** comply with EN 50047 and are designed to provide a wide range of switch variants (slow action or snap action basic switches) and a variety of actuating heads and levers suitable for safety applications.

The thermoplastic bodies have two fixing holes with distance of 20 or 22 mm and one hole for cable entry on the bottom of the switch. Various types of threaded cable entry are available to cover the main requirements of the international market.

The maximum product versatility is guaranteed by the adjustable actuators in 90° steps, allowing easy mounting and lever adjustment every 18° for 360°. They can be used in applications other than protective doors, e.g. on moving machinery benches, crane arms, hoists, elevators, etc...

They are also suitable for use in the harshest environmental conditions with an **operating temperature range of -25°C to +80°C**.

All models in the series are **IP67 rated except code FTN146 which is IP65 rated**.

The actuators are made of metal or thermoplastic material, while the housing is made of thermoplastic glass-filled polybutylene terephthalate.

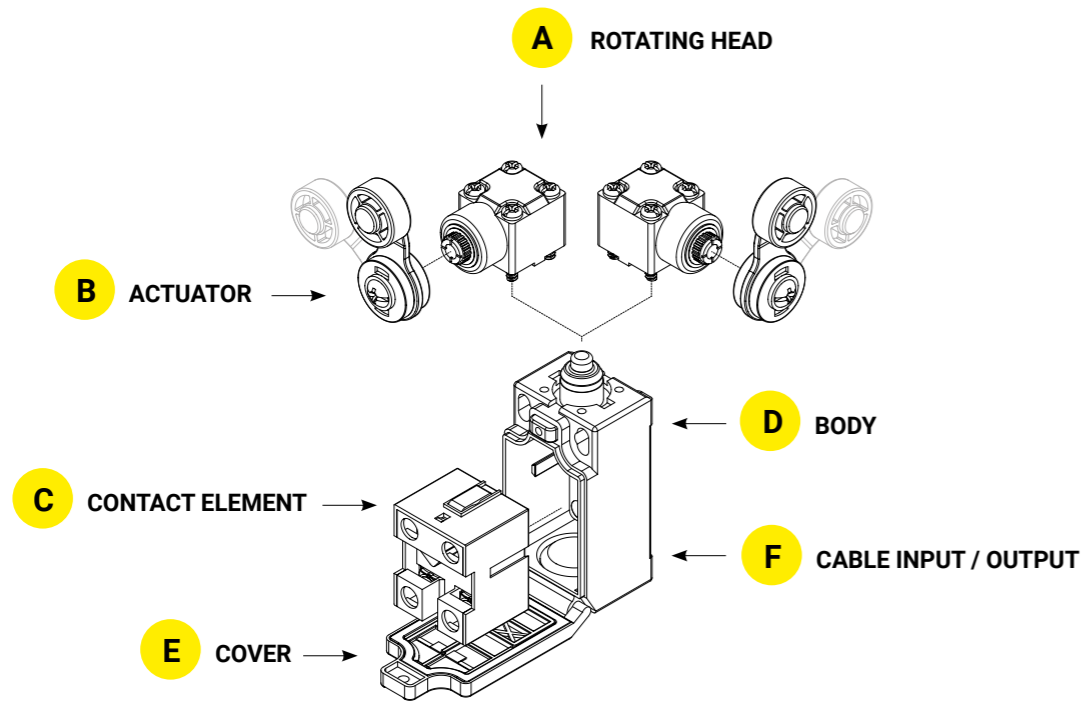
Giovenzana limit switches offer solutions for every need and are suitable for the most varied sectors of use.



SPECIFICATIONS

Standards		EN 60947-5-1, UL 508, EN 50047, EN 1088, EN 60204-1
Approvals		cULus, CCC, EAC and CE marked for all applicable directives
Positive opening operation		NC contact conforming to IEC /EN 60947-5-1 ⊕
Minimum current		5 mA - 5 V DC
Thermal current	I _{th}	10 A
Rated insulation voltage	U _i	500 V
Rated impulse withstand voltage	U _{imp}	6 kV
Insulation resistance	min	100 MΩ (DC 500 V)
Contact resistance	max	25 mΩ (initial)
Switching speed	max	250 mm/s
Switching frequency	max	6000 operations per hour
Enclosure material		UL approved glass-filled polybutylene terephthalate
Enclosure protection		IP67 (all models except for code FTN146 which is IP65 rated)
Operating temperature		-25 ... +80°C (-13 ... +176°F)
Pollution degree		3
Protection against electric shock		Class II (double Insulation) □ Double insulation makes ground terminal unnecessary.
Electrical life expectancy	min	150.000 cycles
Mechanical life expectancy	min	1 × 10 ⁷ cycles
Vibration	IEC 68-2-6 excursion	10 - 55 Hz ± 1Hz 0.35 mm, 1 octave/min
Conduit entry		Various international conduit sizes (see product selection table pag. 19)
Fixing		2 × M4 screws

STRUCTURE DESCRIPTION

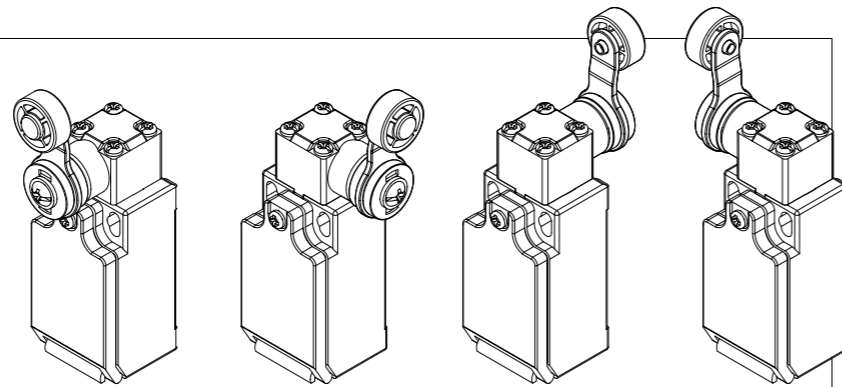


A - ROTATING HEAD

The heads are made of UL approved glass-filled polybutylene terephthalate.

All heads can be adjusted in steps of 90° over 360°, compared to the body.

The direction of the switch head can be varied in one of four directions by loosening the screws at the four corners of the head.



B - ACTUATOR

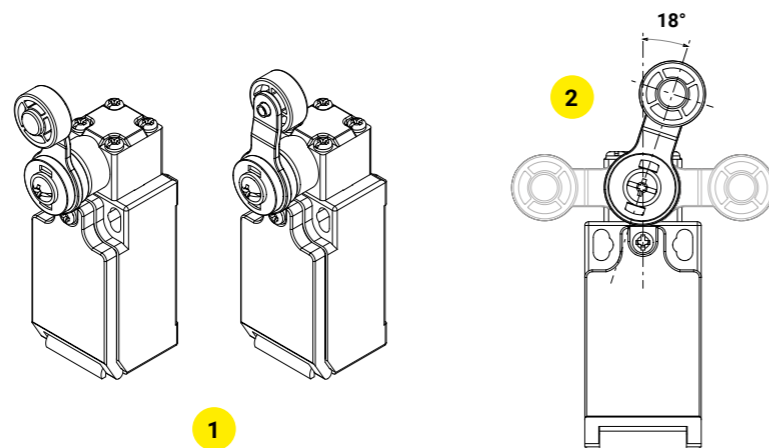
Available different types of actuators: plungers, levers, rollers and rods.

1. Tilting levers

Possibility to fix the lever on the observe or on the reverse, keeping the positive opening of the NC contact. In this way is possible to obtain two different lever work plans.

2. Adjustable levers

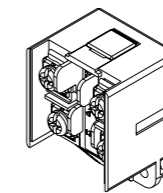
All levers are adjustable in steps of 18° over 360°, compared to the horizontal axis of the head. The positive movement transmission is always guaranteed thanks to the particular geometric coupling between the lever and the rotation shaft.



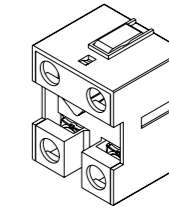
C - CONTACT ELEMENT

The built-in switch has a direct opening mechanism that forcibly separates the NC contact even when there is a contact deposit.

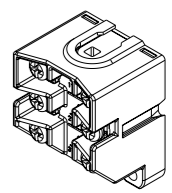
Different contact elements are available, both fast-acting and slow-acting according to different application requirements.



X11: 1NO+1NC
Slow action (Zb)



Z11: 1NO+1NC
Snap action (Zb)



W12: 1NO+2NC
Slow action (Zb)

W02: 2NC
Slow action (Zb)

Z02: 2NC
Snap action (Zb)

W03: 3NC
Slow action (Zb)

W20: 2NO
Slow action (Zb)

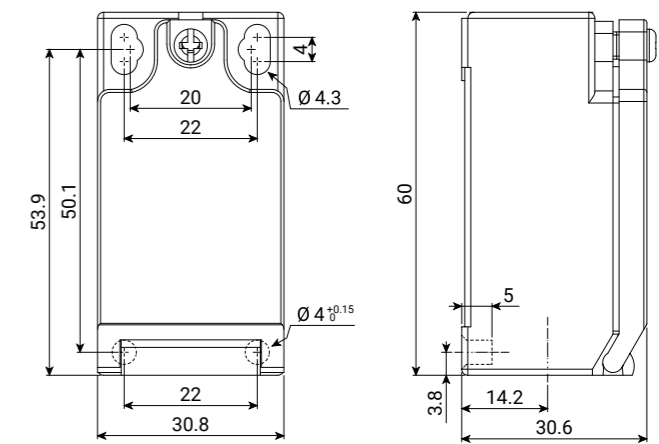
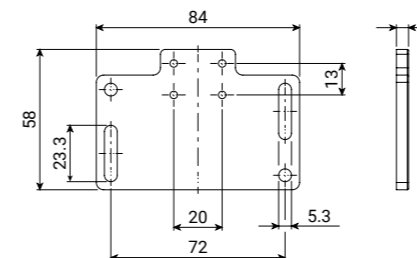
→ Not suitable for safety applications!

D - BODY

The body complies with EN 50047, with a distance of 20/22 mm between the fixing holes.

It is available a fixing plate with slots to adjust the operating point, developed for backward compatibility with old products. The plate is sold in kits (code: **KIT-FTN**) comprising:

- 1 plate;
- 2 self-tapping screws 4 × 28 mm;
- 2 washers Ø4 mm.



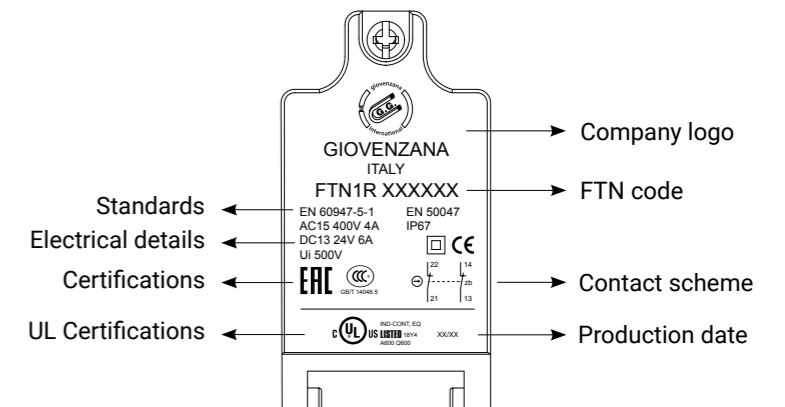
In order to provide more fixing stability, it is possible to use the basic holes of the device with dowel insertion.

E - COVER

Material conforming to the RoHS Directive.

The lid is laser marked to ensure branding, coding and information on product specifications such as technical data, production date, stock or lot number, revision or control date. Lasering ensures the complete traceability of our products and components and is essential for compliance with ISO quality standards.

Some of the advantages:
- clear and precise text legibility;
- guaranteed lifetime unlike ink which deteriorates over time.



F - CABLE INPUT / OUTPUT

A threaded cable input/output is provided at the bottom of the switch.

6 standard and customised cable input/output models are available in order to cover the major international markets.

Standard: Blank: M16 × 1.5

On request: M: M20 × 1.5

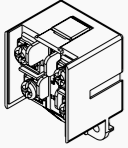

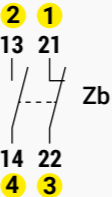

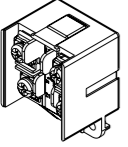

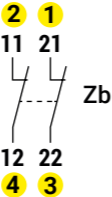

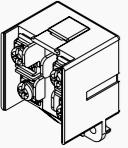
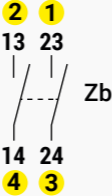

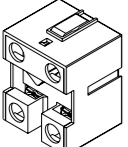

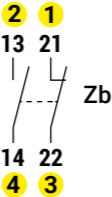

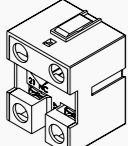

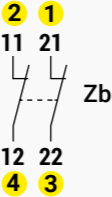

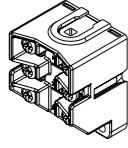

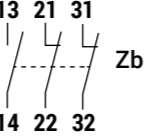
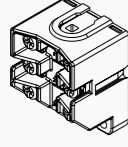

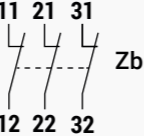
N: 1/2" NPT

G1: Pg 11

G3: Pg 13.5

C: M12 connector

CONTACT ELEMENT - SPECIFICATIONS

CONTACT TYPES	CONTACT FORM	ELECTRICAL SCHEMES	CONNECTOR PIN ARRANGEMENT
X11 	1NO+1NC Slow action Zb 	 Zb	
W02 	2NC Slow action Zb 	 Zb	
W20 	2NO Slow action Zb Not suitable for safety applications!	 Zb	
Z11 	1NO+1NC Snap action Zb 	 Zb	
Z02 	2NC Snap action Zb 	 Zb	
W12 	1NO+2NC Slow action Zb 	 Zb	No connector
W03 	3NC Slow action Zb 	 Zb	No connector

NOTE: FTN135, FTN136, FTN142 and FTN198 have no positive opening regardless of the contact installed.

CONTACT ELEMENT - OPERATING PRINCIPLE

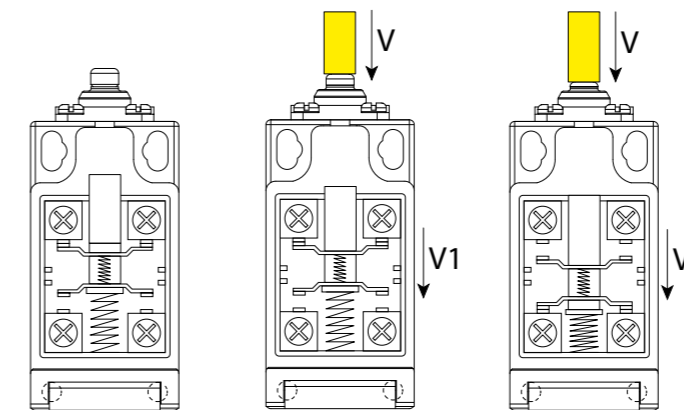
SLOW ACTION - Contact elements direct acting

Slow-acting contact blocks are characterized by identical intervention and restoration points (no differential travel).

The speed of contact motion (V1) is equal to, or proportional to, the actuator speed (V).

This type of contact is suitable for fast movements.

The opening distance depends on the distance travelled by the operator.



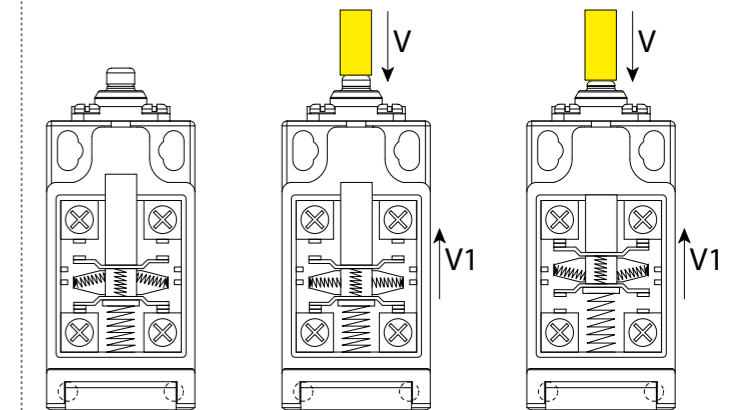
SNAP ACTION - Contact elements acting independently

Snap-action contact blocks are characterised by non-coincidental switching and resetting points (differential travel).

The speed of the contact motion (V1) is not related to the speed of the actuator (V).

This type of contact is also suitable for slow movements.

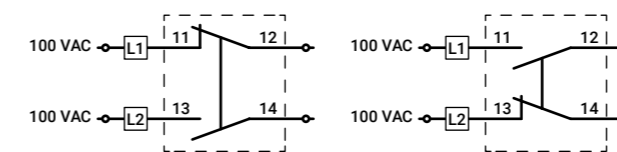
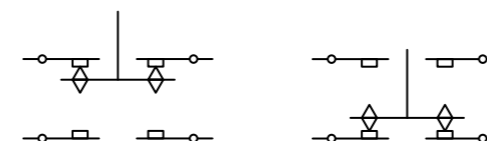
This feature ensures satisfactory electrical performance in applications involving low speed actuators.



CONTACT ELEMENT - CLASSIFICATION (ACCORDING EN 60947-5-1)

Za contact type

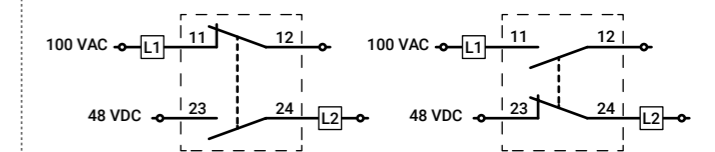
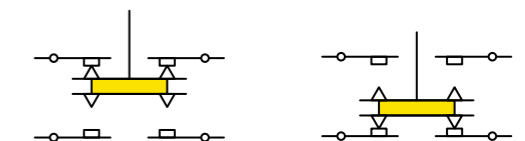
A single blade opens and closes the contacts. With this type of contact it is NOT possible to power the circuit with different voltages and polarity.



L1: load 1
L2: load 2

Zb contact type

In this case there are two blades that open and close the contact. The two blades are electrically isolated from each other. Therefore, with this type of contact it is possible to power the circuit with different voltages and polarity.



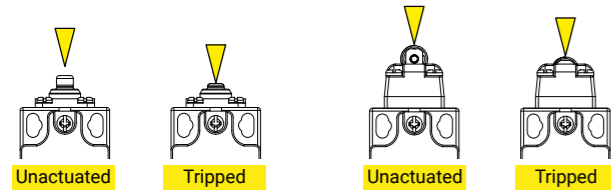
L1: load 1
L2: load 2

FTN series of thermoplastic limit switches is equipped with Zb contacts.

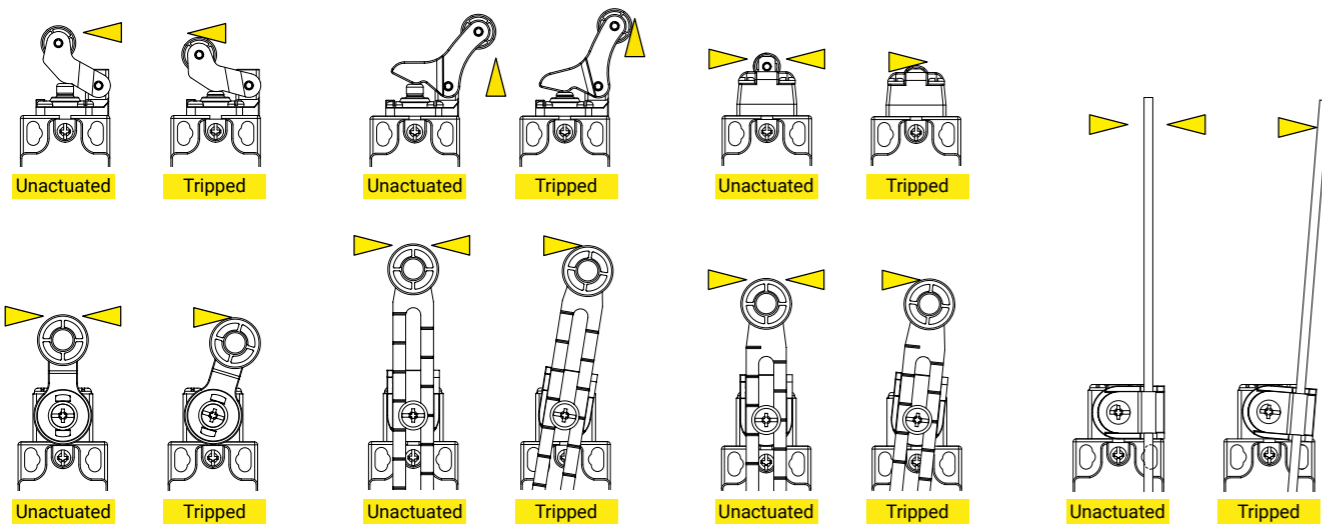
DETECTION MOVEMENTS

Limit switches are used in all automated installations and also in a wide variety of other applications. They transmit data to the logic processing system regarding: presence/absence, passage, positioning and end of travel. They have different detection movements: linear, rotary and multidirectional.

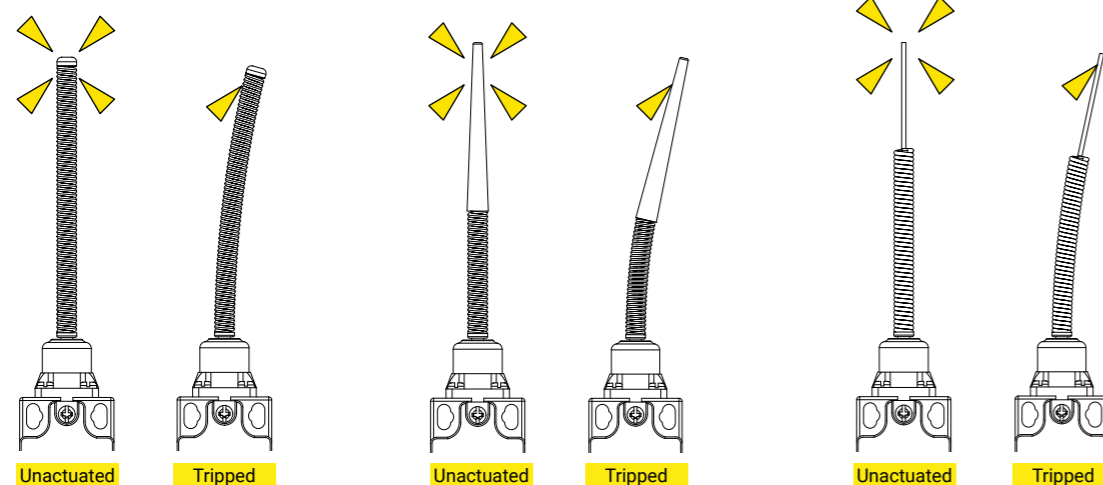
1. Linear detection movement - Plunger



2. Rotary detection movement - Lever



3. Multi-directional detection movement - Spring



SAFETY INTEGRITY LEVEL ACCORDING TO IEC 61508

IEC 61508: Functional safety of electrical/electronic/programmable electronic safety systems

IEC 61508 is the international technical-legislative reference for Functional Safety. The seven parts that make up the **SIL standard** are the guideline that must be applied to the safety function that an object must perform.

The standard provides a set of mandatory requirements and best practices aimed at determining the reliability of a safety system. In this sense, it is possible to say that reliability is the measure of risk reduction. The IEC states that any safety-related control system must function properly or fail predictably and safely.

Therefore, there are at least three requirements that a safety system must meet in order to comply with the SIL standard:

- **Systematic Capability**, i.e. the degree of reliability in terms of product design, both hardware and software (where applicable).
- **Architecture Constraints**, i.e. constraints on the architecture of the object that affect its level of security
- **PFDavg or PFH**, i.e. the probability of dangerous random failures, whether on demand or on an hourly basis.

The safety system meets each requirement with a different SIL level (with SIL 1 to 4).

Safety Integrity Level (SIL) is the quantification of the reliability (or degree of reliability) achieved by any object that performs a safety-related function. The greater its reliability, the greater its ability to perform safety-critical functions or machine or plant availability. The determination of a SIL is based on quantitative and qualitative factors such as the development process and safety lifecycle management.

FTN SERIES: thermoplastic limit switches IP67

Configuration 1oo2 (redundant) 2NC or 2NO or NC + NO positive opening/closing with diagnostics on the two contacts (consistency and crossing check).

λ_{SD}	$1.79 \cdot 10^{-8}$	h^{-1}	λ_S	$2.18 \cdot 10^{-7}$	h^{-1}
λ_{SU}	$2.00 \cdot 10^{-7}$	h^{-1}	λ_D	$1.20 \cdot 10^{-7}$	h^{-1}
λ_{DD}	0.00	h^{-1}			
λ_{DU}	$1.20 \cdot 10^{-7}$	h^{-1}	λ_{TOT}	$3.39 \cdot 10^{-7}$	h^{-1}

SFF	64.48%	MTTR	4	h
		TID	0.0016667	h

TI	1	2	5	years
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PFDv	$5.27 \cdot 10^{-4}$	$1.05 \cdot 10^{-3}$	$2.64 \cdot 10^{-3}$
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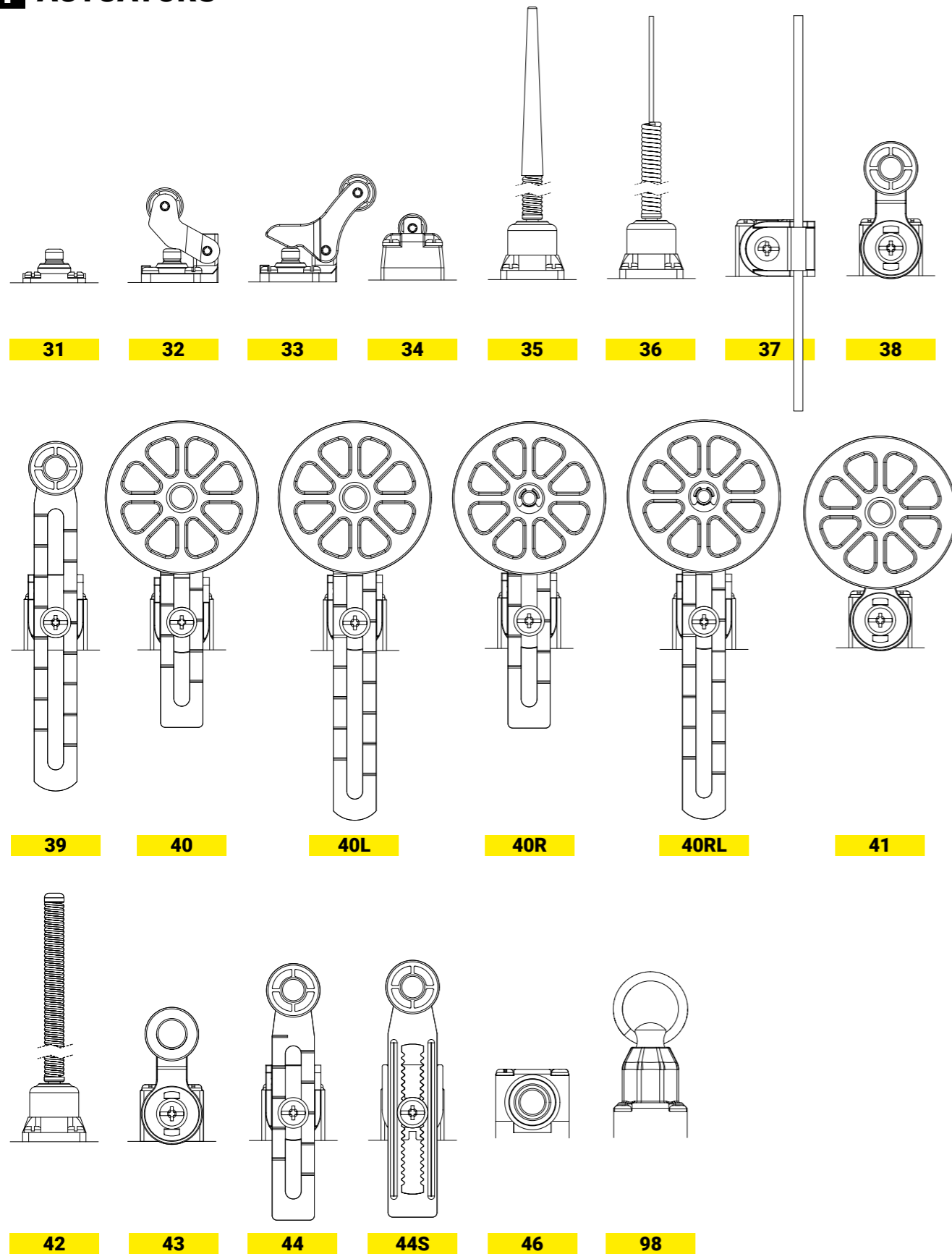
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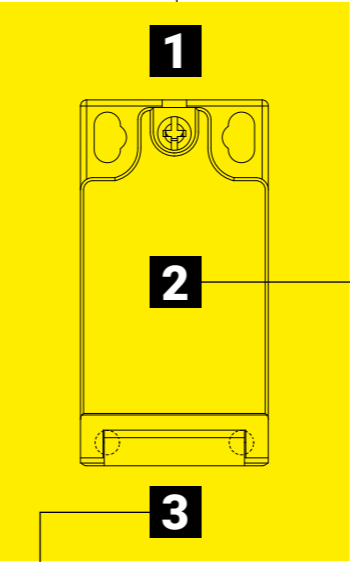
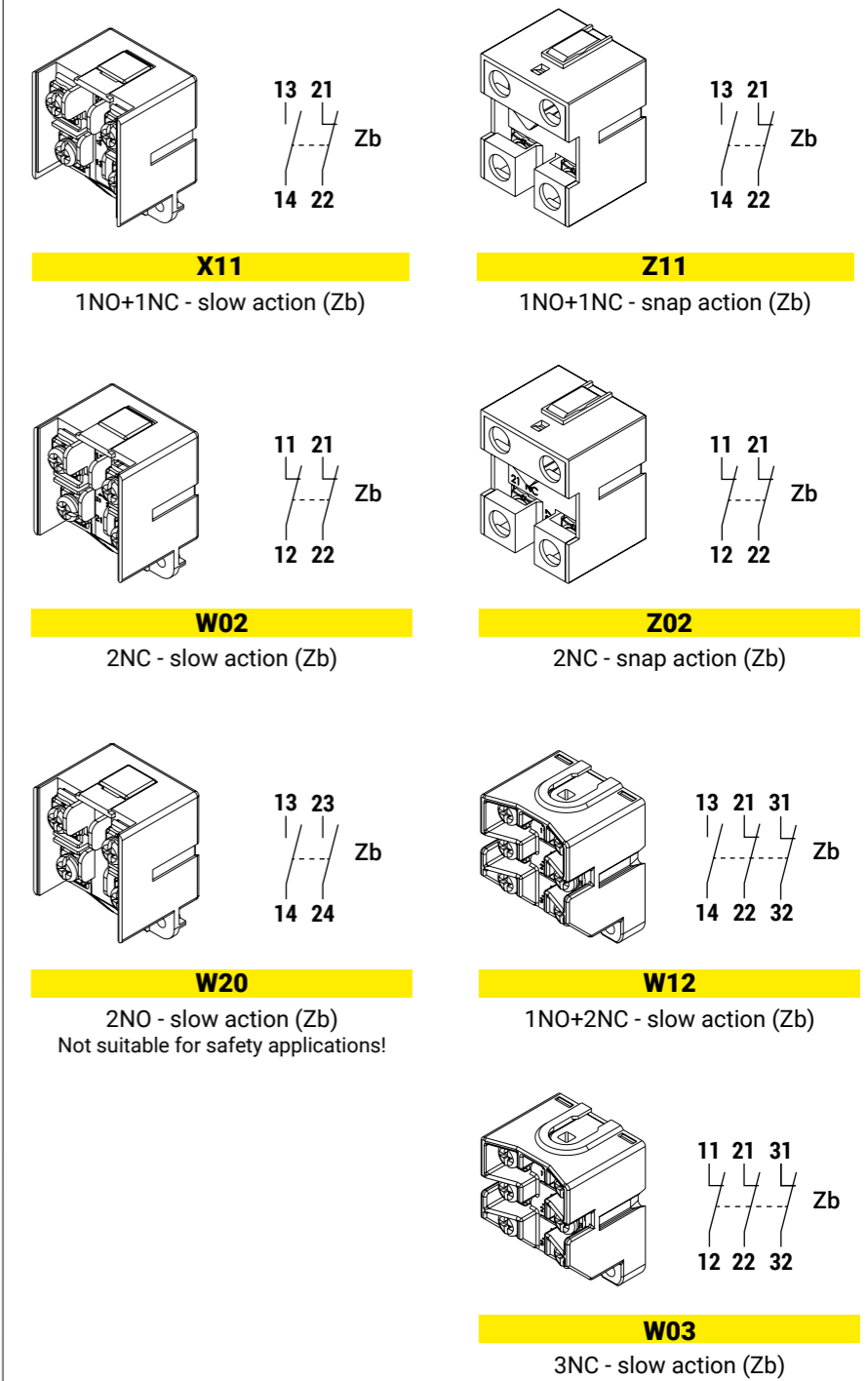


FTN - PRODUCT SELECTION OVERVIEW

1 ACTUATORS



2 CONTACT BLOCKS



3 CONDUIT ENTRY

Threaded conduit entry

Standard:
M16 × 1.5

On request:
M20 × 1.5
1/2" NPT
PG11
PG13.5
With connector

CONTACT TYPES		CATEGORIES RATINGS		
X11	1NO+1NC	slow action (Zb)	A600	AC15: 400 V - 4 A
W02	2NC		Q600	
Z11	1NO+1NC	snap action (Zb)	B600	DC13: 24V - 6 A
Z02	2NC		Q600	
W12	1NO+2NC	slow action (Zb)	A300	
W03	3NC		Q300	

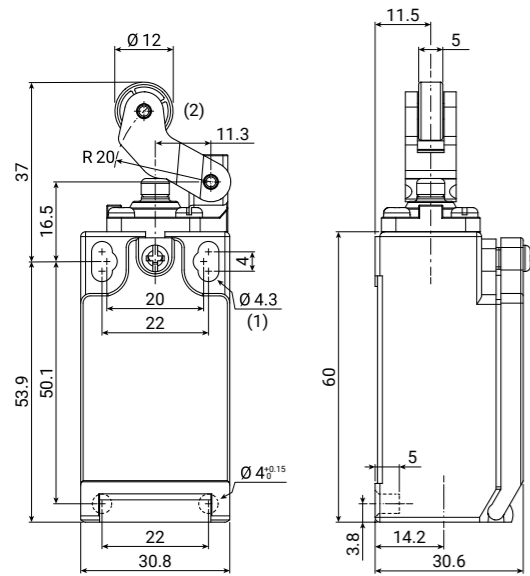
FTN132

Limit switch with PA roller lever plunger, horizontal action
IP67



FTN series		1 function		32 actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1	without reset function	32	PA roller lever plunger, horizontal action	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type

operation diagrams

X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

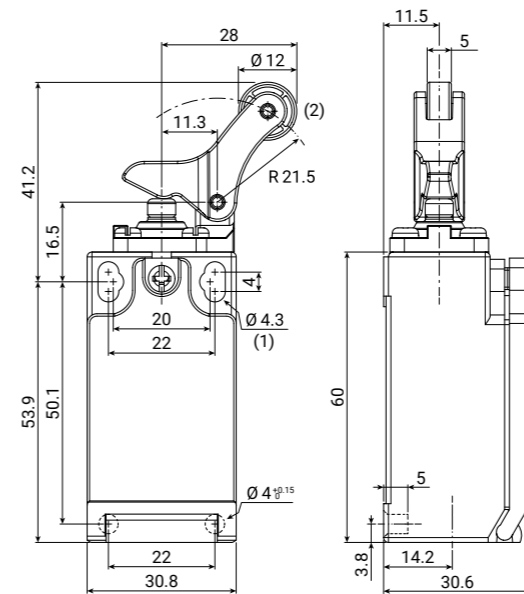
FTN133

Limit switch with PA roller lever plunger, vertical action
IP67



FTN series		1 function		33 actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1	without reset function	33	PA roller lever plunger, vertical action	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type

operation diagrams

X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	3.6 mm 3.6 mm 3.3 mm	5.4 mm - -	5.3 N 5.3 N 5.7 N	7.5 mm 7.5 mm -	13.5 N 13.5 N -	9.3 mm
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	3.1 mm 3.1 mm	1.5 mm 1.3 mm	5.0 N 5.0 N	6.8 mm 6.8 mm	10.4 N 10.4 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		3.6 mm 3.6 mm	4.5 mm -	5.3 N 5.3 N	8.8 mm 8.8 mm	15 N 15 N	

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	4.5 mm 4.5 mm 3.8 mm	6.4 mm - -	7.0 N 7.0 N 7.0 N	5.5 mm 5.5 mm -	15 N 15 N -	8.9 mm
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	3.7 mm 3.7 mm	1.8 mm 1.6 mm	4.2 N 4.2 N	8.0 mm 8.0 mm	8.3 N 8.3 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		4.2 mm 4.2 mm	5.0 mm -	7.0 N 7.0 N	5.5 mm 5.5 mm	17 N 17 N	

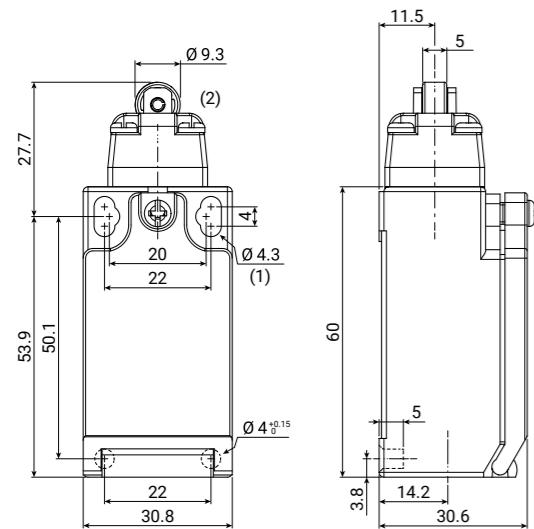
FTN134

Limit switch with PA roller plunger
IP67



FTN series		1 function	34 actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	34 PA roller plunger	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	2.8 mm	3.8 mm	7.3 N	3.5 mm	22 N	6.0 mm
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	2.4 mm	-	8.2 N	-	-	
W12: 1NO+2NC W03: 3NC	A300-Q300		2.1 mm	1.1 mm	7.2 N	4.5 mm	16.3 N	
		2.1 mm	0.9 mm	7.2 N	4.5 mm	16.3 N		
		2.6 mm	3.2 mm	7.3 N	3.8 mm	23 N		
		2.6 mm	-	7.3 N	3.8 mm	23 N		

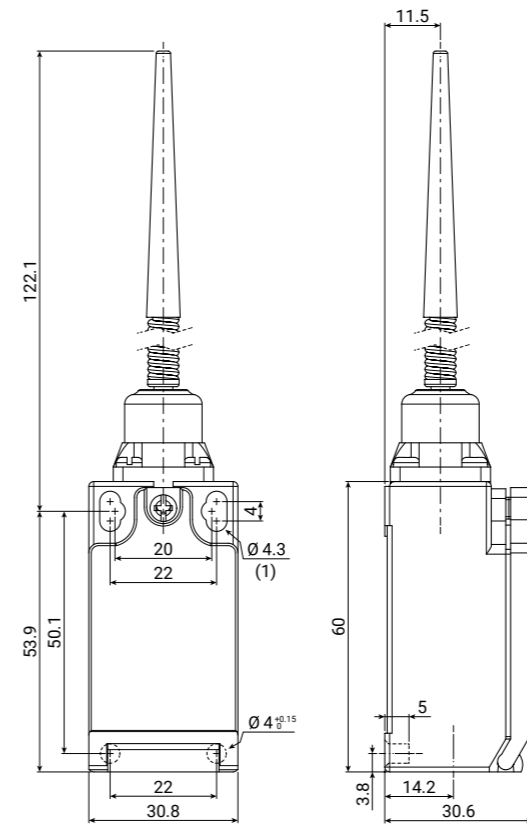
FTN135

Limit switch with spring lever with tip in PA
IP67



FTN series		1 function	35 actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	35 spring lever with tip in PA	W02: 2NC Z11: 1NO+1NC Z02: 2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
W02: 2NC	A600-Q600	AC15: 400V - 4A	15°	-	6.5 N	-	-	-
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	18°	3°	5.8 N	-	-	
W03: 3NC	A300-Q300		12°	-	6.5 N	-	-	

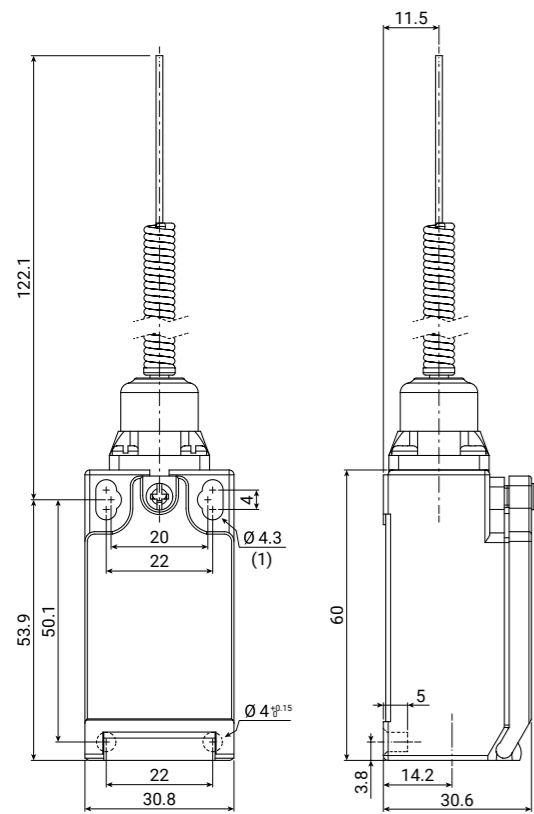
FTN136

Limit switch with CAT'S whisker
IP67



FTN series		1 function	36 actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	36 CAT'S whisker	W02: 2NC slow action (Zb) Z11: 1NO+1NC snap action (Zb) Z02: 2NC W03: 3NC slow action (Zb)	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

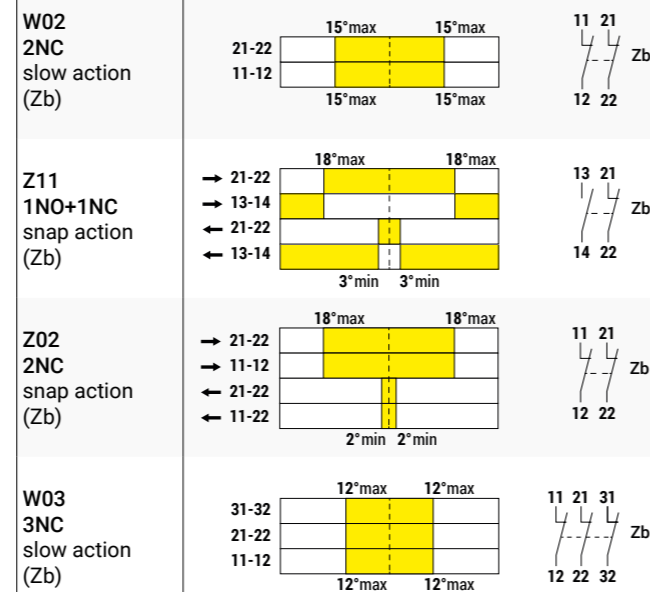
technical drawing - sizes in mm



(1) mounting holes

contact type

operation diagrams



contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		OF	POT (travel) POF (force)	
W02: 2NC	slow action (Zb)	A600-Q600	15°	-	6.5 N	-	-	-
Z11: 1NO+1NC	snap action (Zb)	B600-Q600	18°	3°	5.8 N	-	-	-
Z02: 2NC			18°	2°	5.8 N	-	-	-
W03: 3NC	slow action (Zb)	A300-Q300	12°	-	6.5 N	-	-	-

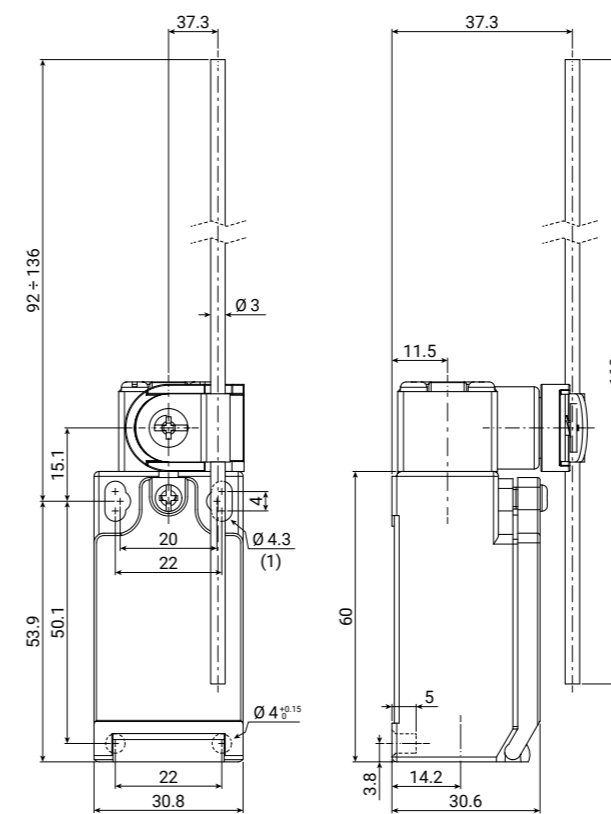
FTN137

Limit switch with adjustable metal rod lever
IP67



FTN series		1 function	37 actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	37 adjustable metal rod lever	X11: 1NO+1NC slow action (Zb) W02: 2NC Z11: 1NO+1NC snap action (Zb) Z02: 2NC W12: 1NO+2NC slow action (Zb) W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

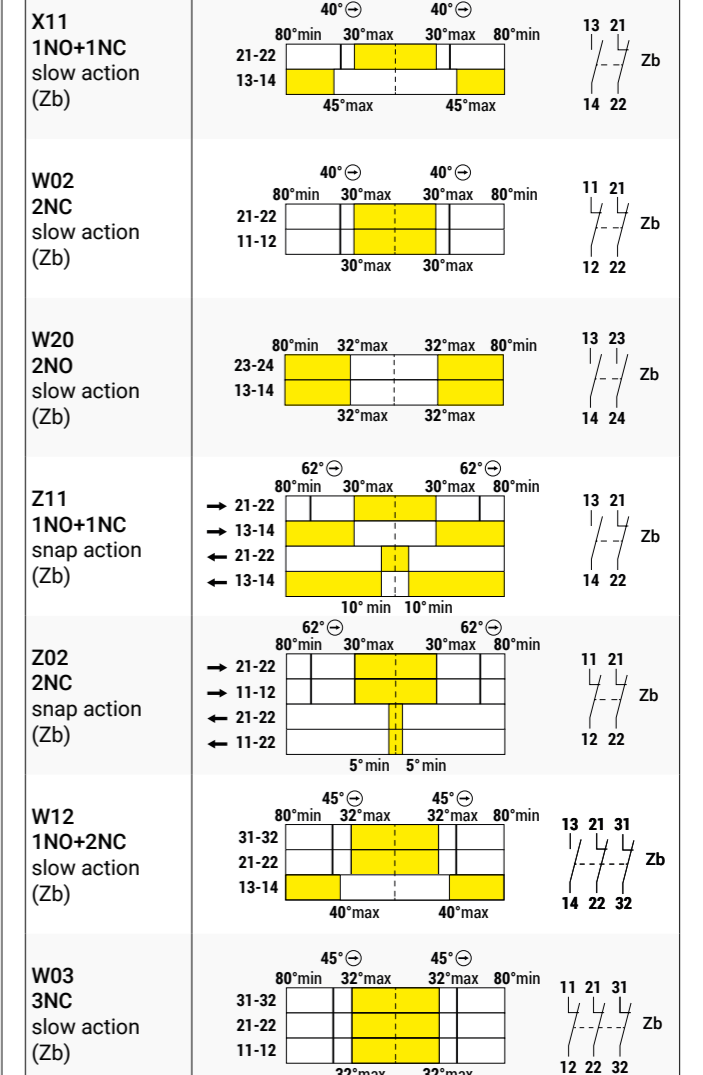
technical drawing - sizes in mm



(1) mounting holes

contact type

operation diagrams



contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		OF	POT (travel) POF (force)	
X11: 1NO+1NC	slow action (Zb)	A600-Q600	30°	45°	1.8 N	40°	6 N	-
W02: 2NC			30°	-	1.8 N	40°	6 N	-
W20: 2NO	snap action (Zb)	B600-Q600	32°	-	1.8 N	-	-	-
Z11: 1NO+1NC			30°	10°	2.1 N	62°	5.5 N	80°
Z02: 2NC	slow action (Zb)	A300-Q300	30°	5°	2.1 N	62°	5.5 N	-
W12: 1NO+2NC			32°	40°	1.8 N	45°	5.4 N	-
W03: 3NC	slow action (Zb)	-	32°	-	1.8 N	45°	5.4 N	-

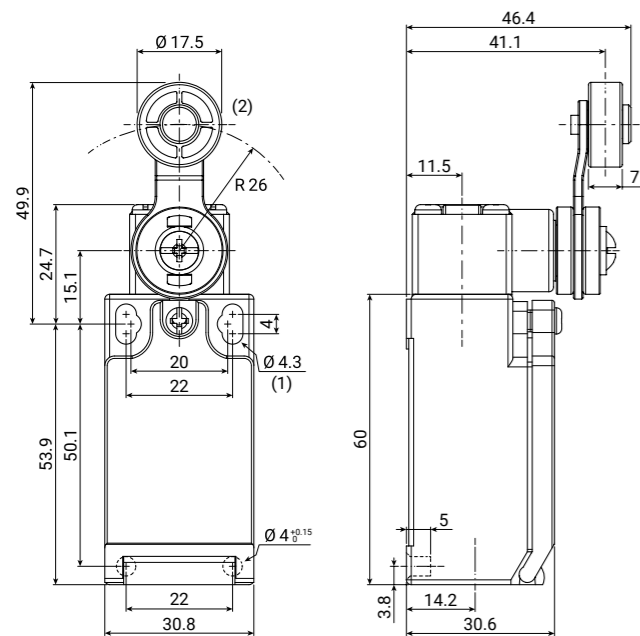
FTN138

Limit switch with Ø18 PA roller lever
IP67



FTN series		1 function	38 actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	38 Ø18 PA roller lever	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	slow action (Zb) A600-Q600	AC15: 400V - 4A	30°	45°	6.5 N	40°	6 N	80°
			30°	-	6.5 N	40°	6 N	
			32°	-	6.5 N	-	-	
Z11: 1NO+1NC Z02: 2NC	snap action (Zb) B600-Q600	DC13: 24V - 6A	30°	10°	2.1 N	62°	5.5 N	
			30°	5°	2.1 N	62°	5.5 N	
W12: 1NO+2NC W03: 3NC	slow action (Zb) A300-Q300		32°	40°	6.5 N	45°	5.4 N	
			32°	-	6.5 N	45°	5.4 N	

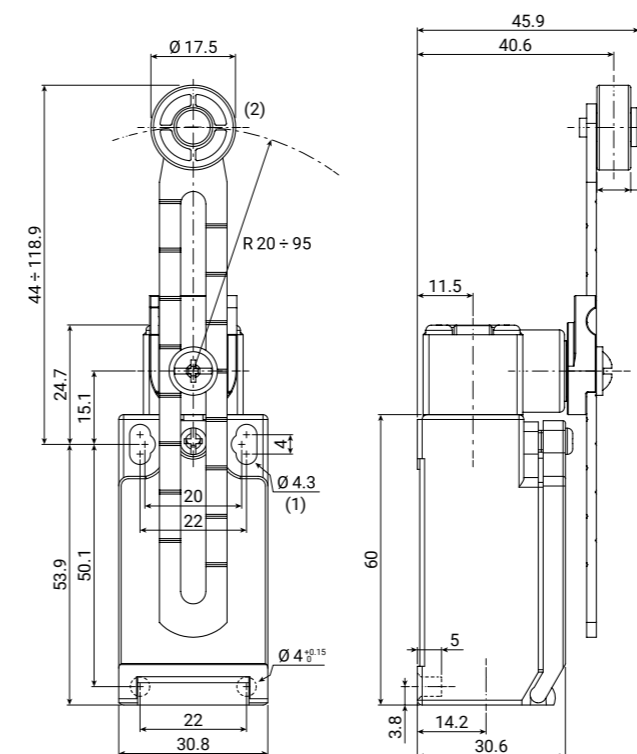
FTN139

Limit switch with Ø18 long PA roller lever with variable length
IP67



FTN series		1 function	39 actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	39 Ø18 long PA roller lever with variable length	X11: 1NO+1NC W02: 2NC Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	slow action (Zb) A600-Q600	AC15: 400V - 4A	30°	45°	6.5 N	40°	6 N	80°
			30°	-	6.5 N	40°	6 N	
			32°	-	6.5 N	-	-	
Z11: 1NO+1NC Z02: 2NC	snap action (Zb) B600-Q600	DC13: 24V - 6A	30°	10°	2.1 N	62°	5.5 N	
			30°	5°	2.1 N	62°	5.5 N	
W12: 1NO+2NC W03: 3NC	slow action (Zb) A300-Q300		32°	40°	6.5 N	45°	5.4 N	
			32°	-	6.5 N	45°	5.4 N	

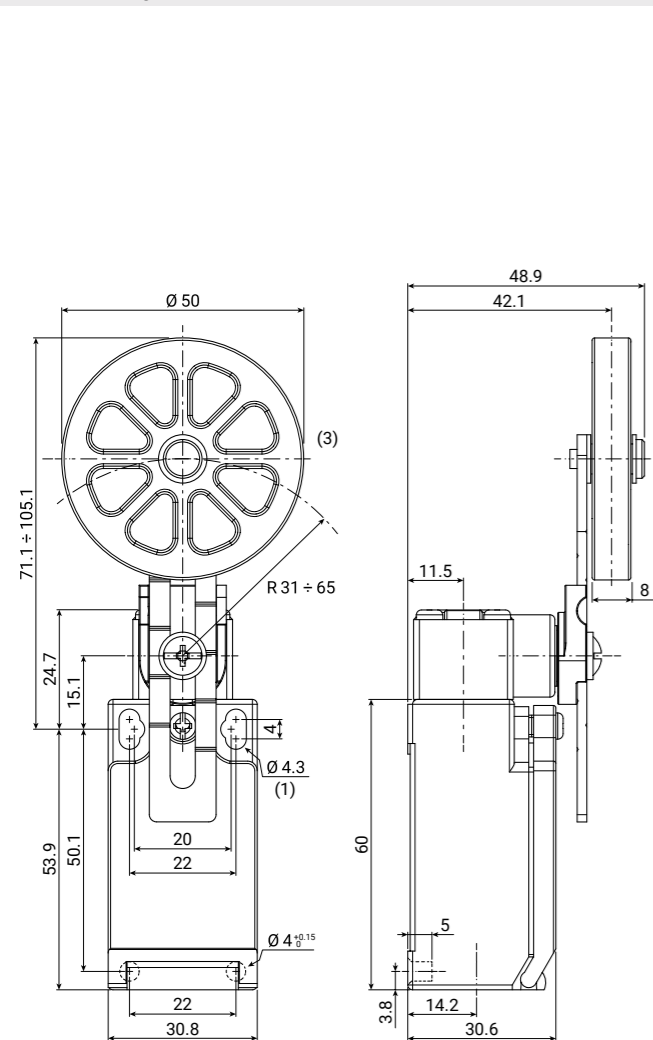
FTN140

Limit switch with Ø50 rubber roller lever with variable length
IP67



FTN series		1 function	40 actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	40 Ø50 rubber roller lever with variable length	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(3) rubber roller

contact type

operation diagrams

X11 1NO+1NC slow action (Zb)		
W02 2NC slow action (Zb)		
W20 2NO slow action (Zb)		
Z11 1NO+1NC snap action (Zb)		
Z02 2NC snap action (Zb)		
W12 1NO+2NC slow action (Zb)		
W03 3NC slow action (Zb)		

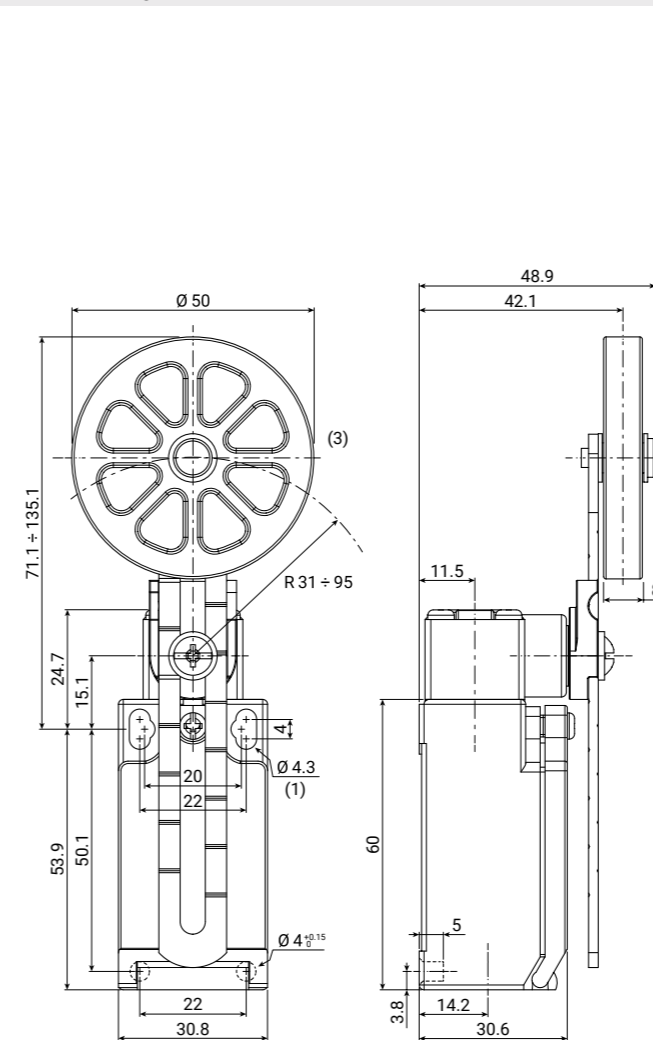
FTN140L

Limit switch with Ø50 long rubber roller lever with variable length
IP67



FTN series		1 function	40L actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	40L Ø50 long rubber roller lever with variable length	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(3) rubber roller

contact type

operation diagrams

X11 1NO+1NC slow action (Zb)		
W02 2NC slow action (Zb)		
W20 2NO slow action (Zb)		
Z11 1NO+1NC snap action (Zb)		
Z02 2NC snap action (Zb)		
W12 1NO+2NC slow action (Zb)		
W03 3NC slow action (Zb)		

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	30°	45°	6.5 N	40°	6 N	80°
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	30°	-	6.5 N	40°	6 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		30°	10°	2.1 N	62°	5.5 N	
		30°	5°	2.1 N	62°	5.5 N		
		32°	40°	6.5 N	45°	5.4 N		
		32°	-	6.5 N	45°	5.4 N		

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	30°	45°	6.5 N	40°	6 N	80°
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	30°	-	6.5 N	40°	6 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		30°	10°	2.1 N	62°	5.5 N	
		30°	5°	2.1 N	62°	5.5 N		
		32°	40°	6.5 N	45°	5.4 N		
		32°	-	6.5 N	45°	5.4 N		

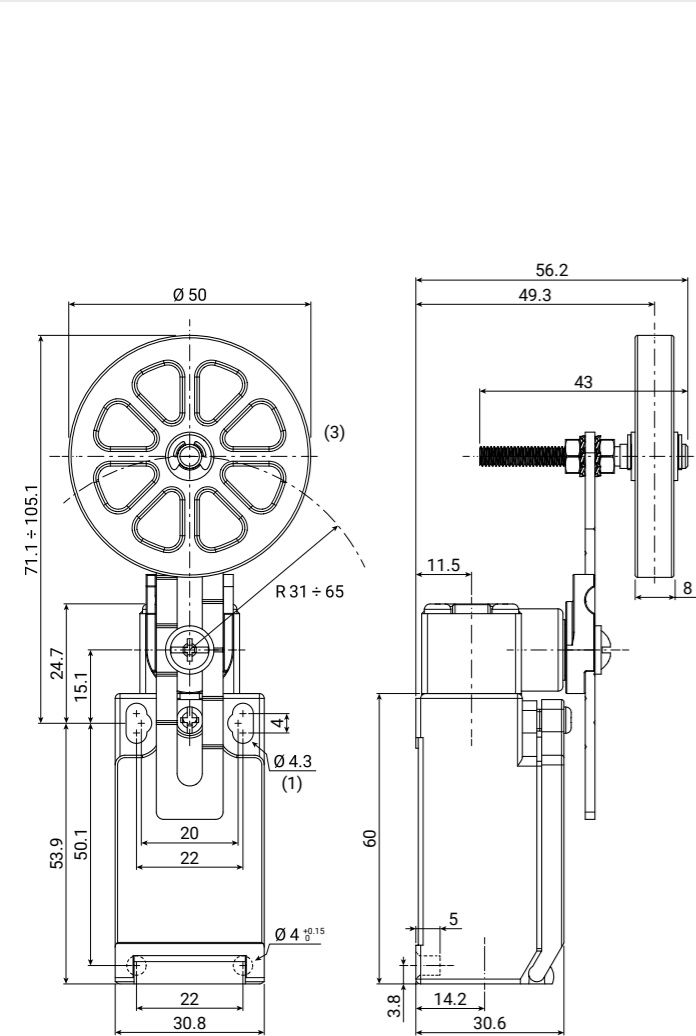
FTN140R

Limit switch with Ø50 rubber roller lever with variable length and overhanging
IP67



FTN series		1 function	40R actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	40R Ø50 rubber roller lever with variable length and overhanging	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(3) rubber roller

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	30°	45°	6.5 N	40°	6 N	80°
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	30°	10°	2.1 N	62°	5.5 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		32°	40°	6.5 N	45°	5.4 N	
			32°	-	6.5 N	45°	5.4 N	

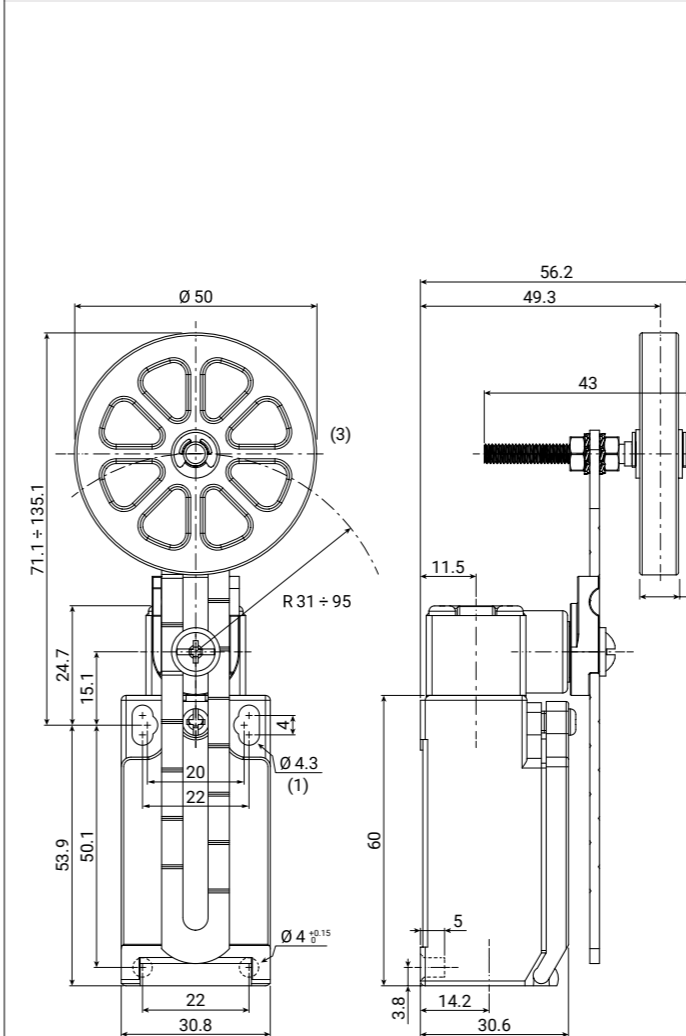
FTN140RL

Limit switch with Ø50 long rubber roller lever with variable length and overhanging
IP67



FTN series		1 function	40RL actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	40RL Ø50 long rubber roller lever with variable length and overhanging	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(3) rubber roller

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	30°	45°	6.5 N	40°	6 N	80°
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	30°	10°	2.1 N	62°	5.5 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		32°	40°	6.5 N	45°	5.4 N	
			32°	-	6.5 N	45°	5.4 N	

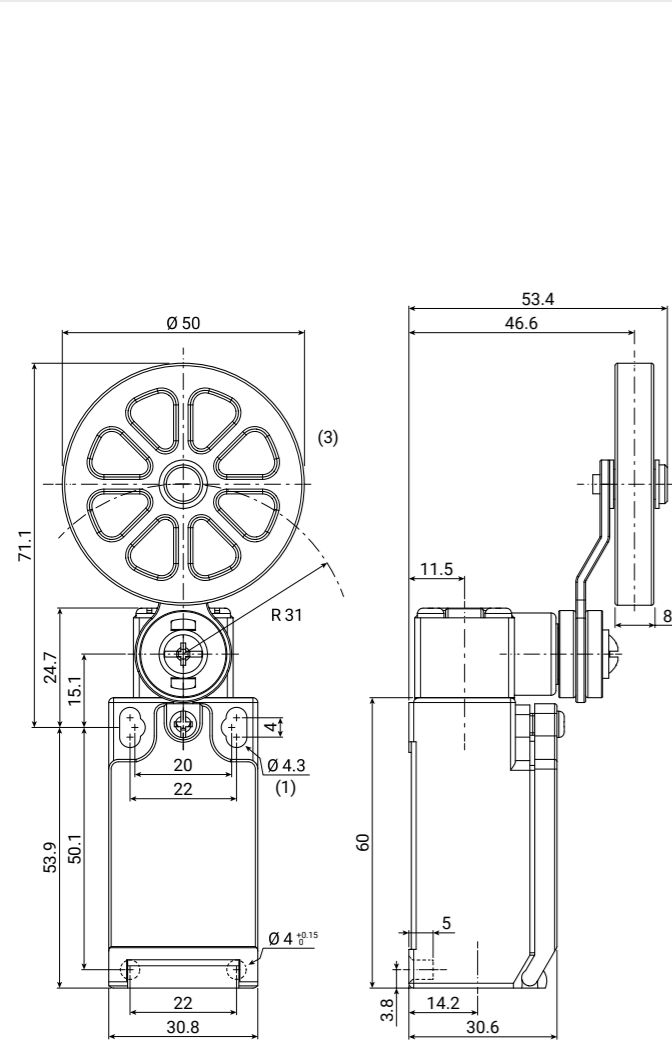
FTN141

Limit switch with Ø50 rubber roller lever
IP67



FTN series		1 function	41 actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	41 Ø50 rubber roller lever	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(3) rubber roller

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		OF	POT (travel) POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	30°	45°	6.5 N	40°	6 N	80°
			30°	-	6.5 N	40°	6 N	
			32°	-	6.5 N	-	-	
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	30°	10°	2.1 N	62°	5.5 N	
			30°	5°	2.1 N	62°	5.5 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		32°	40°	6.5 N	45°	5.4 N	
			32°	-	6.5 N	45°	5.4 N	

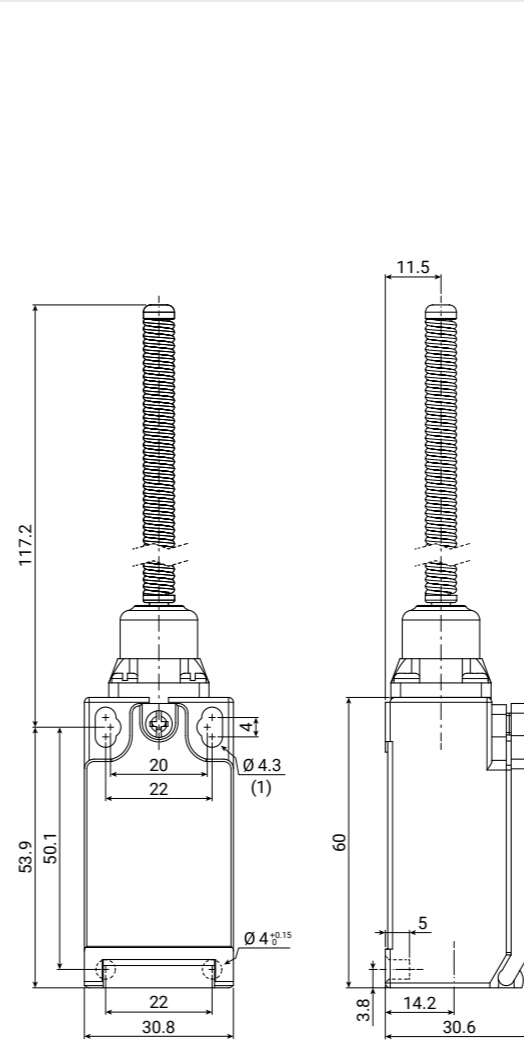
FTN142

Limit switch with wobble stick
IP67



FTN series		1 function	42 actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	42 wobble stick	W02: 2NC Z11: 1NO+1NC Z02: 2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		OF	POT (travel) POF (force)	
W02: 2NC	slow action (Zb)	A600-Q600	AC15: 400V - 4A	30°	-	6.5 N	-	-
Z11: 1NO+1NC Z02: 2NC	snap action (Zb)	B600-Q600		18°	3°	5.8 N	-	-
W03: 3NC	slow action (Zb)	A300-Q300	DC13: 24V - 6A	18°	2°	5.8 N	-	-
				32°	-	6.5 N	-	-

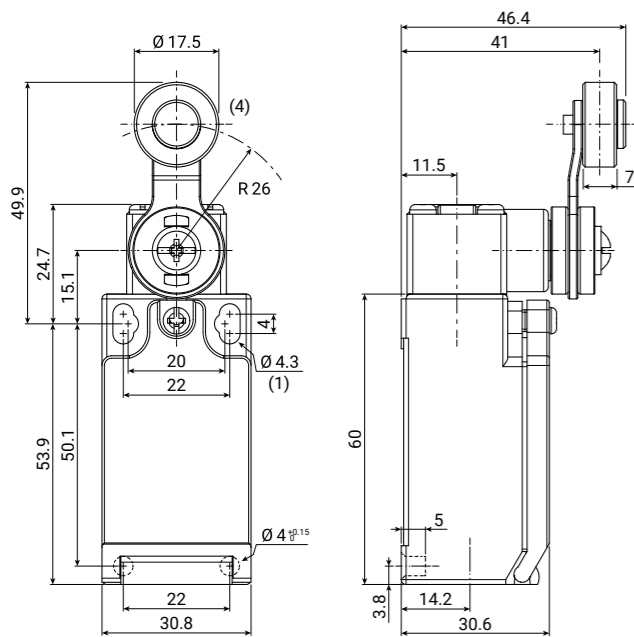
FTN143

Limit switch with Ø18 metal roller lever
IP67



FTN series		1 function	43 actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	43 Ø18 metal roller lever	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(3) rubber roller

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	30°	45°	6.5 N	40°	6 N	80°
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	30°	10°	2.1 N	62°	5.5 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		32°	40°	6.5 N	45°	5.4 N	
			32°	-	6.5 N	45°	5.4 N	
			30°	-	6.5 N	40°	6 N	
			32°	-	6.5 N	-	-	

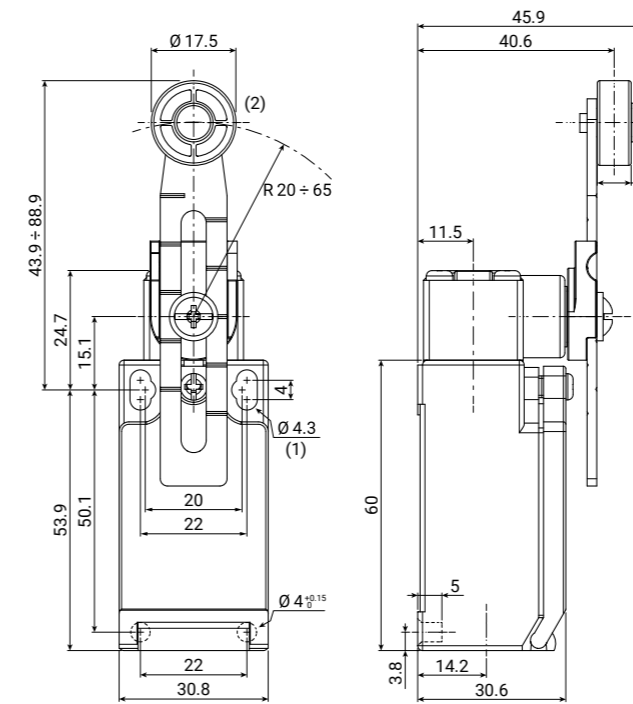
FTN144

Limit switch with Ø18 PA roller lever with variable length
IP67



FTN series		1 function	44 actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	44 Ø18 PA roller lever with variable length	X11: 1NO+1NC W02: 2NC Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	30°	45°	6.5 N	40°	6 N	80°
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	30°	10°	2.1 N	62°	5.5 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		32°	40°	6.5 N	45°	5.4 N	
			32°	-	6.5 N	45°	5.4 N	
			30°	-	6.5 N	40°	6 N	
			32°	-	6.5 N	-	-	

FTN198

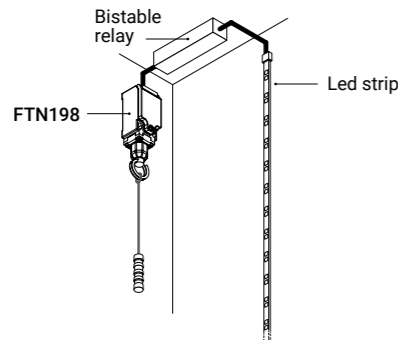
Limit switch with rope pull lever
IP67



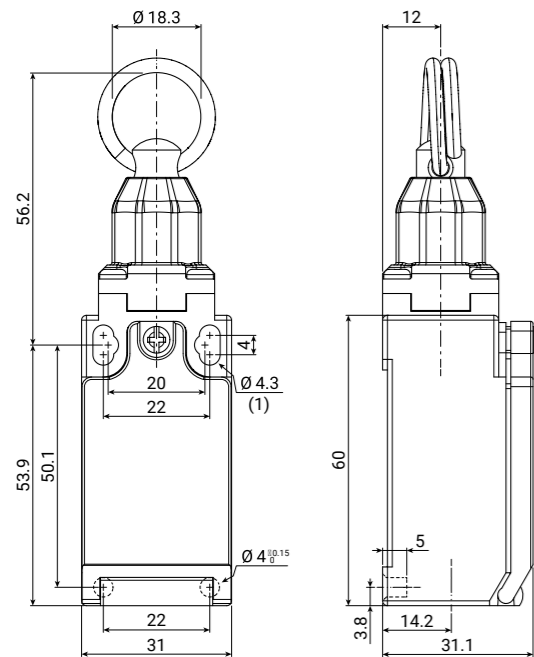
FTN series		1 function	98 actuator	XXX contact type	XX conduit entry
FTN	thermoplastic limit switch	1 without reset function	98 rope pull lever	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M N G1 G3 C
				slow action (Zb) snap action (Zb) slow action (Zb)	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

The FTN198 hasn't a maintained operating mode.

This means that a bistable relay must be inserted into the system to maintain the position.



technical drawing - sizes in mm



(1) mounting holes

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		OF	POT (travel)	
X11: 1NO+1NC	A600-Q600	AC15: 400V - 4A	3.5 mm	-	20 N	-	-	8.0 mm
W02: 2NC			3.5 mm	-	20 N	-	-	
W20: 2NO	B600-Q600	DC13: 24V - 6A	3.6 mm	3.6 mm	20 N	-	-	
Z11: 1NO+1NC			4.5 mm	3.5 mm	20 N	-	-	
Z02: 2NC	A300-Q300		4.5 mm	3.3 mm	20 N	-	-	
W12: 1NO+2NC			3.5 mm	-	20 N	-	-	
W03: 3NC			3.5 mm	-	20 N	-	-	

Description

The FTN198 switch is specifically designed to control lights in the elevator shaft. The EN 81-20 standard in paragraph 5.2.1.5 states that a light switch must be provided in the pit, near to each access point and in the engine room. The FTN198 switch allows the compartment lights to be switched through a single wiring harness, without the need to install lighting points with related wiring on each floor.

Installation

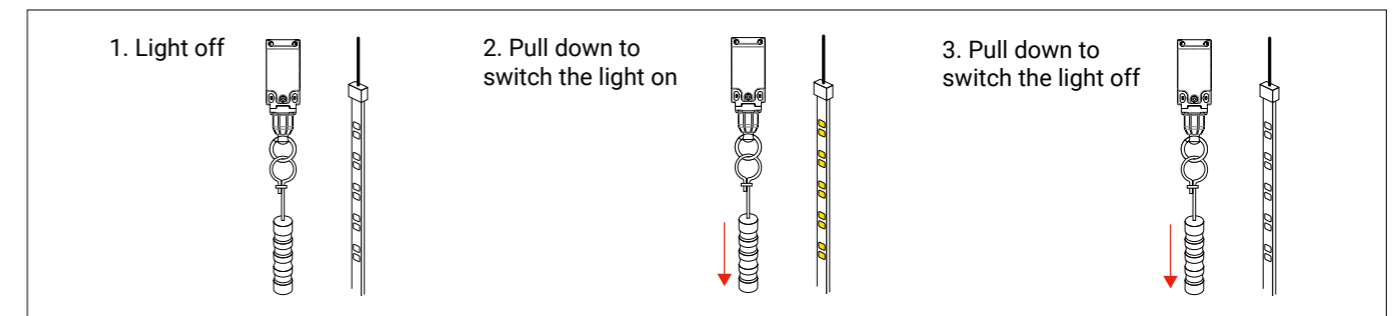
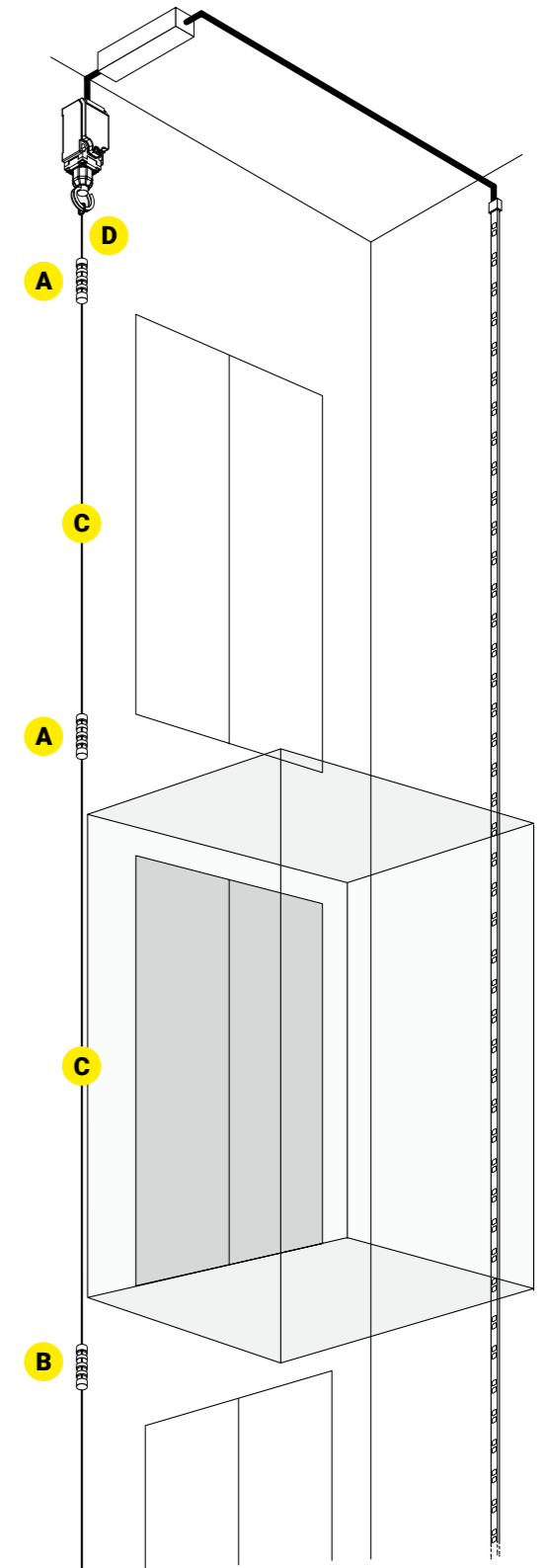
The FTN198 switch is fixed at the top of the elevator shaft and its switching is controlled by a rope running the length of the shaft near the cabin. At regular intervals, function indicators are fixed at each floor, which make the rope and the light switching operation clearly visible. The last indicator at the end of the rope has a weight inside to keep the rope extended. The operator on the roof of the cabin compartment or at any position along the elevator shaft can operate the switch by pulling the handy indicator to turn the lights in the shaft on or off.

Accessories

- Function indicator for rope**
Tightening torque of the locking screws > 0.8 ... 1.0 Nm
- A FTN198-KNOB**
Function intermediate indicator for rope
- B FTN198-KNOBT**
Function terminal indicator for rope
- Rope roll**
Galvanized steel rope ø3mm covered with transparent PVC
- C FTN198-ROPE-050**
Galvanized steel rope covered in PVC Ø3mm - L = 50m
- C FTN198-ROPE-100**
Galvanized steel rope covered in PVC Ø3mm - L = 100m
- Steel rope clamp**
- D 11001003**
End clamp for steel wire rope

Operation

The FTN198 switch has no maintained position operation mode. This means that a bistable relay must be inserted into the system to maintain the position. To switch on the light in the lift shaft, simply pull the cable, and to switch it off simply repeat the operation.





OVERVIEW



The **FTN1R series** of thermoplastic limit switches with reset device for manual reset comply with EN 50047 and are designed to provide a wide range of switch variants (slow action or snap action basic switches) and a variety of actuating heads and levers suitable also for safety applications.

Each model has a **positive opening mechanism** (NC contacts only) and is equipped with a drive retention mechanism.

The thermoplastic bodies have two fixing holes with distance of 20 or 22 mm and one hole for cable entry on the bottom of the switch.

The maximum product versatility is guaranteed by the adjustable actuators in 90° steps, allowing easy mounting and lever adjustment every 18° for 360°.

They are also suitable for use in the harshest environmental conditions with an **operating temperature range of -25°C to +80°C**.

All models in the series are **IP67 rated**.

The actuators are made of metal or thermoplastic material, while the housing is made of thermoplastic glass-filled polybutylene terephthalate.

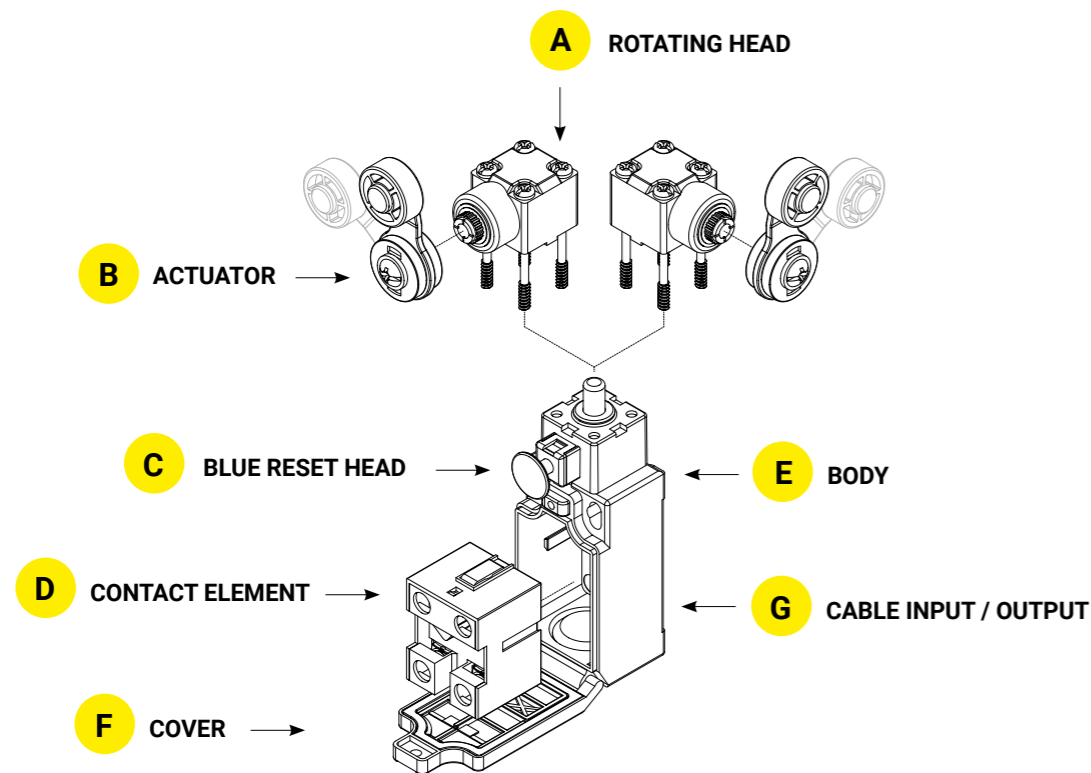
Giovanzana limit switches are suitable for every need and are suitable for the most varied sectors of use.



SPECIFICATIONS

Standards		EN 60947-5-1, UL 508, EN 50047, EN 1088, EN 60204-1
Approvals		cULus, EAC, CCC and CE marked for all applicable directives
Positive opening operation		NC contacts conforming to IEC /EN 60947-5-1 ☺
Minimum current		5 mA - 5 V DC
Thermal current	I _{th}	10 A
Rated insulation voltage	U _i	500 V
Rated impulse withstand voltage	U _{imp}	6 kV
Insulation resistance	min	100 MΩ (DC 500 V)
Contact resistance	max	25 mΩ (initial)
Switching speed	max	250 mm/s
Switching frequency	max	6000 operations per hour
Enclosure material		UL approved glass-filled polybutylene terephthalate
Enclosure protection		IP67
Operating temperature		-25 ... +80°C (-13 ... +176°F)
Pollution degree		3
Protection against electric shock		Class II (double Insulation) ☐
Electrical life expectancy	min	150.000 cycles
Mechanical life expectancy	min	1 × 10 ⁶ cycles
Vibration	IEC 68-2-6 excursion	10-55 Hz ± 1Hz 0.35 mm, 1 octave/min
Conduit entry		Various international conduit sizes (see product selection table pag. 51)
Fixing		2 × M4 screws

STRUCTURE DESCRIPTION

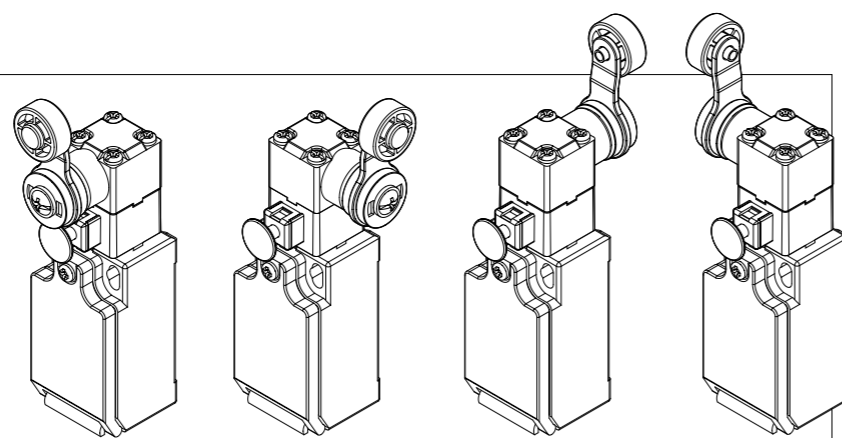


A - ROTATING HEAD

The heads are made of UL approved glass-filled polybutylene terephthalate.

All heads can be adjusted in steps of 90° over 360°, compared to the body.

The direction of the switch head can be varied in one of four directions by loosening the screws at the four corners of the head.



B - ACTUATOR

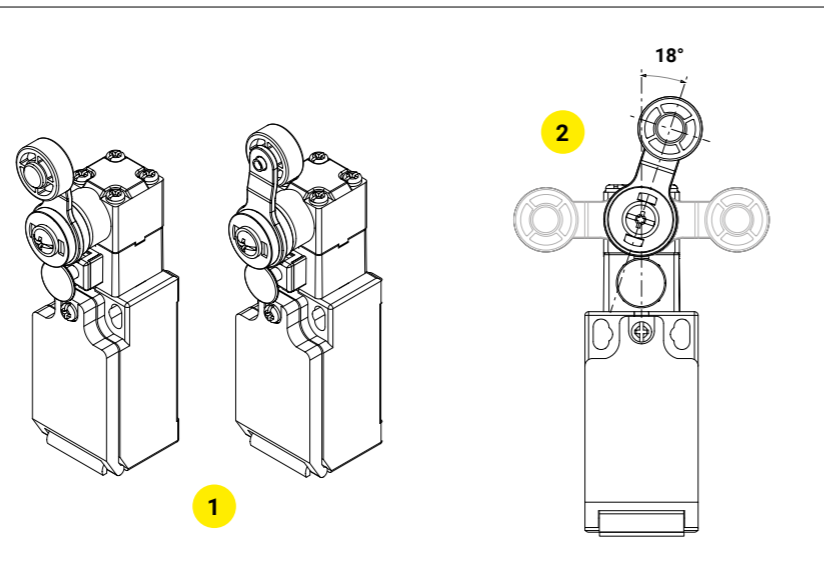
Available different types of actuators: plungers, levers, rollers and rods.

1. Tilting levers

Possibility to fix the lever on the observe or on the reverse, keeping the positive opening of the NC contact. In this way is possible to obtain two different lever work plans.

2. Adjustable levers

All levers are adjustable in steps of 18° over 360°, compared to the horizontal axis of the head. The positive movement transmission is always guaranteed thanks to the particular geometric coupling between the lever and the rotation shaft.

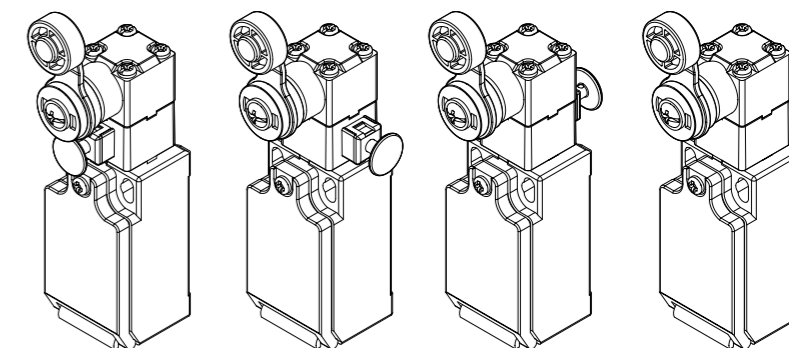


C - RESET HEAD

The heads are made of UL approved glass-filled polybutylene terephthalate.

The manual reset mechanism is blue.

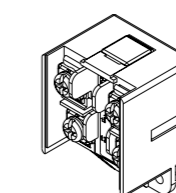
The direction of the reset head can be adjusted to any of the four directions.



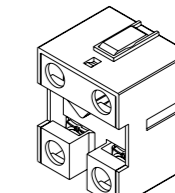
D - CONTACT ELEMENT

The built-in switch has a direct opening mechanism that forcibly separates the NC contact even when there is a contact deposit.

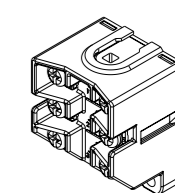
Different contact elements are available, both fast-acting and slow-acting according to different application requirements.



X11: 1NO+1NC
Slow action (Zb)



Z11: 1NO+1NC
Snap action (Zb)



W12: 1NO+2NC
Slow action (Zb)

W02: 2NC
Slow action (Zb)

Z02: 2NC
Snap action (Zb)

W03: 3NC
Slow action (Zb)

W20: 2NO
Slow action (Zb)

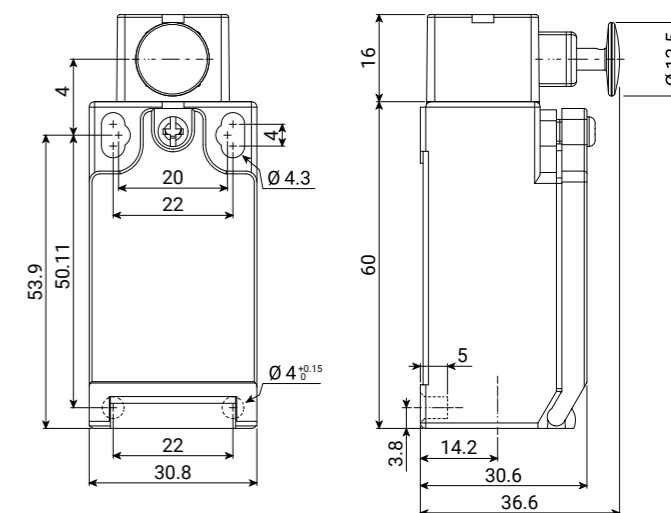
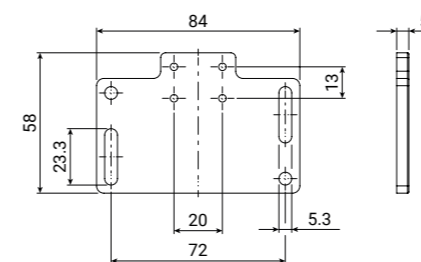
→ Not suitable for safety applications!

E - BODY

The body complies with EN 50047, with a distance of 20/22 mm between the fixing holes.

It is available a fixing plate with slots to adjust the operating point, developed for backward compatibility with old products. The plate is sold in kits (code: **KIT-FTN**) comprising:

- 1 plate;
- 2 self-tapping screws 4 × 28 mm;
- 2 washers Ø4 mm.



In order to provide more fixing stability, it is possible to use the basic holes of the device with dowel insertion.

F - COVER

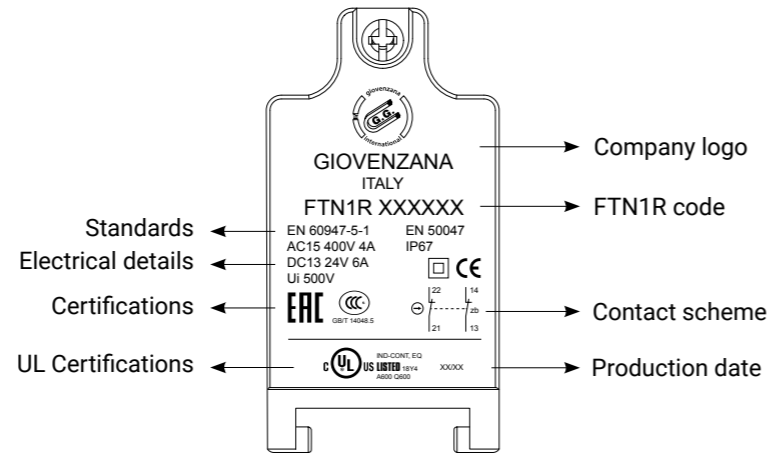
Material conforming to the RoHS Directive.

The lid is laser marked to ensure branding, coding and information on product specifications such as technical data, production date, stock or lot number, revision or control date. Lasering ensures the complete traceability of our products and components and is essential for compliance with ISO quality standards.

Some of the advantages:

- clear and precise text legibility;
- guaranteed lifetime unlike ink which deteriorates over time.

The switch cover can be opened by loosening the screw. The hinge at the bottom ensures a useful opening for easy maintenance and easy wiring, without having to completely remove the lid.



G - CABLE INPUT / OUTPUT

A threaded cable input/output is provided at the bottom of the switch. 6 standard and customised cable input/output models are available in order to cover the major international markets.

Standard: Blank: M16 × 1.5

On request: M: M20 × 1.5
N: 1/2" NPT
G1: Pg 11
G3: Pg 13.5
C: M12 connector

CONTACT ELEMENT - SPECIFICATIONS

CONTACT TYPES	CONTACT FORM	ELECTRICAL SCHEMES	CONNECTOR PIN ARRANGEMENT
X11	1NO+1NC Slow action Zb		
W02	2NC Slow action Zb		
W20	2NO Slow action Zb Not suitable for safety applications!		
Z11	1NO+1NC Snap action Zb		
Z02	2NC Snap action Zb		
W12	1NO+2NC Slow action Zb		No connector
W03	3NC Slow action Zb		No connector

CONTACT ELEMENT - OPERATING PRINCIPLE

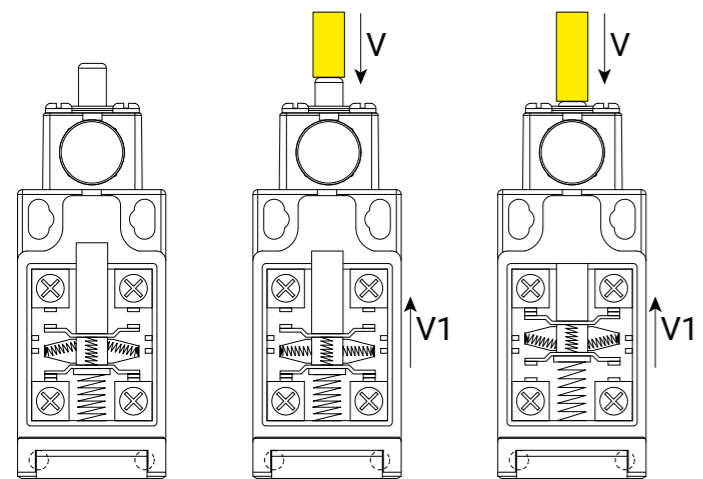
SLOW ACTION - Contact elements direct acting

Slow-acting contact blocks are characterized by identical intervention and restoration points (no differential travel).

The speed of contact motion (V1) is equal to, or proportional to, the actuator speed (V).

This type of contact is suitable for fast movements.

The opening distance depends on the distance travelled by the operator.



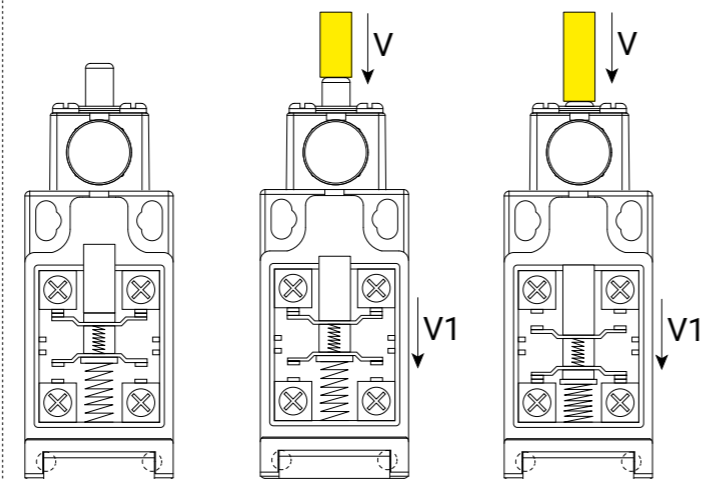
SNAP ACTION - Contact elements acting independently

Snap-action contact blocks are characterised by non-coincidental switching and resetting points (differential travel).

The speed of the contact motion (V1) is not related to the speed of the actuator (V).

This type of contact is also suitable for slow movements.

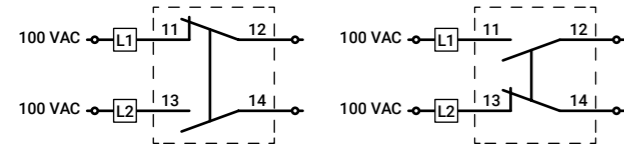
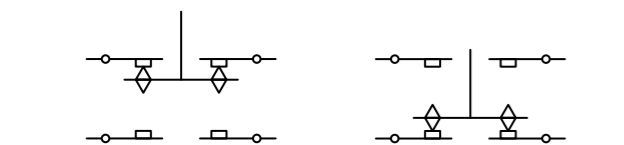
This feature ensures satisfactory electrical performance in applications involving low speed actuators.



CONTACT ELEMENT - CLASSIFICATION (ACCORDING EN 60947-5-1)

Za contact type

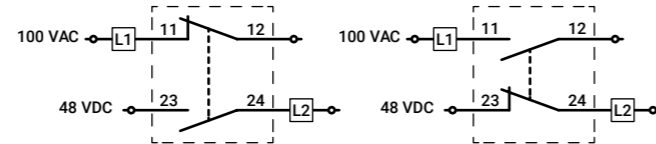
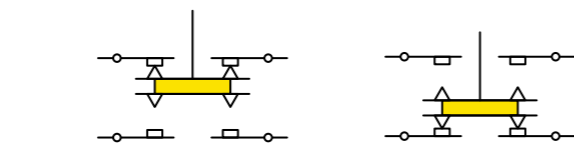
A single blade opens and closes the contacts. With this type of contact it is NOT possible to power the circuit with different voltages and polarity.



L1: load 1
L2: load 2

Zb contact type

In this case there are two blades that open and close the contact. The two blades are electrically isolated from each other. Therefore, with this type of contact it is possible to power the circuit with different voltages and polarity.

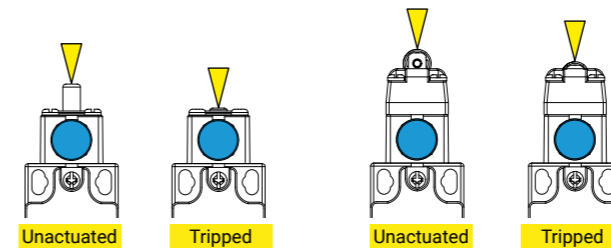


L1: load 1
L2: load 2

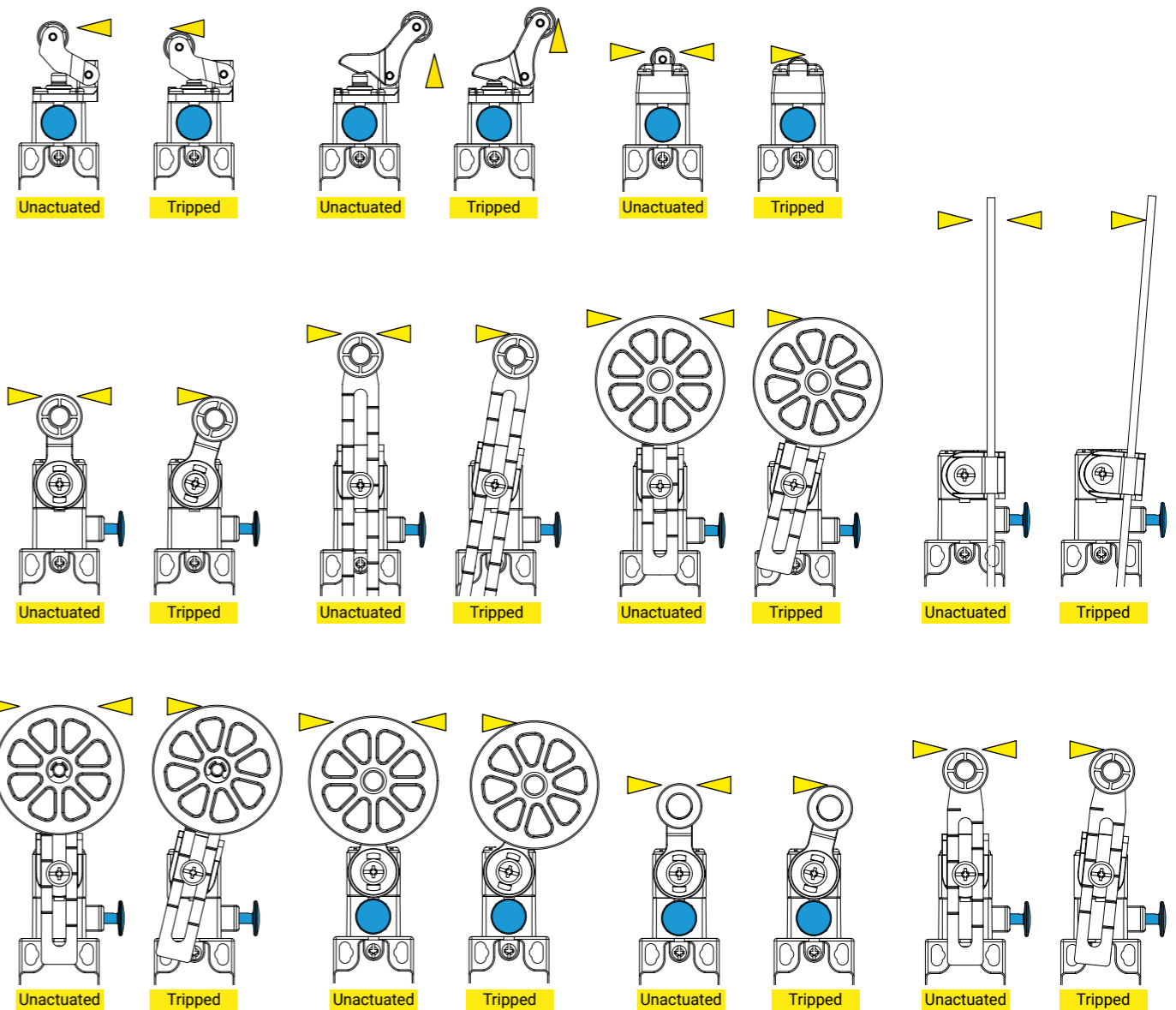
DETECTION MOVEMENTS

Limit switches are used in all automated installations and also in a wide variety of other applications. They transmit data to the logic processing system regarding: presence/absence, passage, positioning and end of travel. They have different detection movements: linear and rotary.

1. Linear detection movement - Plunger



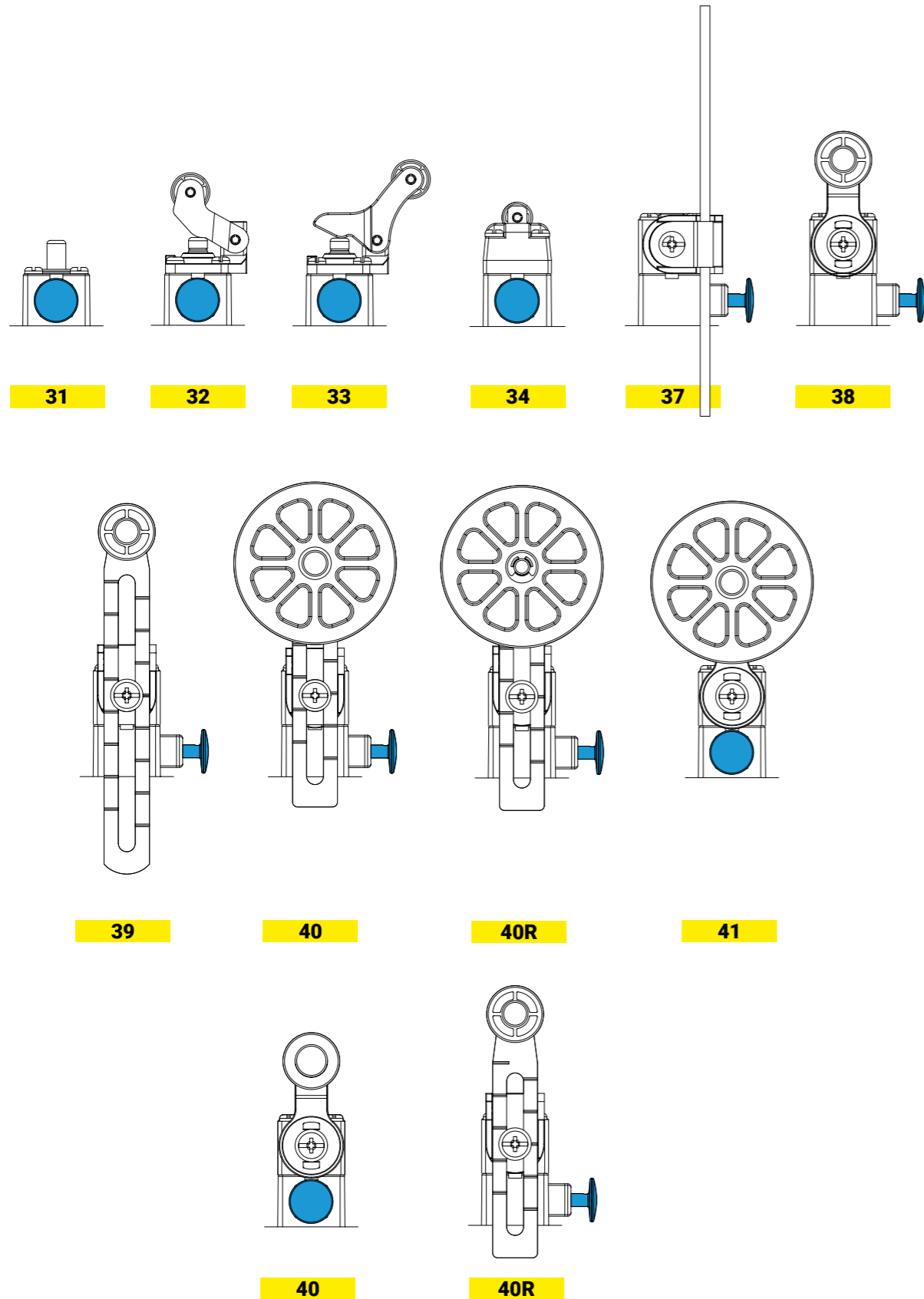
2. Rotary detection movement - Lever



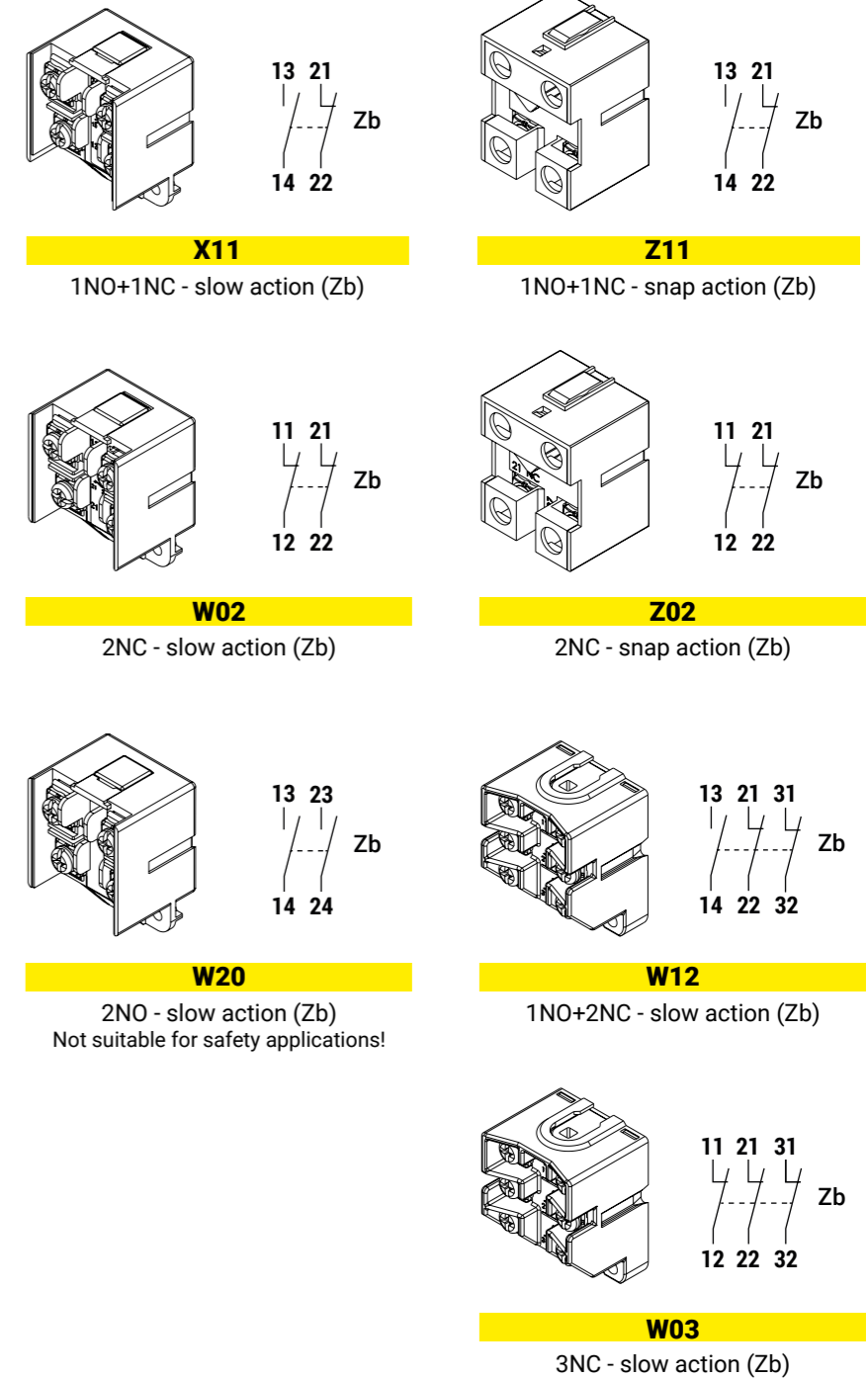
FTN1R series of thermoplastic limit switches with manual reset is equipped with Zb contacts.

FTN1R - PRODUCT SELECTION OVERVIEW

1 HEADS + ACTUATORS



2 CONTACT BLOCKS



3 CONDUIT ENTRY

Threaded conduit entry

Standard:
M16 × 1.5

On request:
M20 × 1.5
1/2" NPT
PG11
PG13.5
With connector

CONTACT TYPES		CATEGORIES RATINGS		
X11	1NO+1NC	slow action (Zb)	A600	AC15: 400 V - 4 A
W02	2NC		Q600	
Z11	1NO+1NC	snap action (Zb)	B600	DC13: 24V - 6 A
Z02	2NC		Q600	
W12	1NO+2NC	slow action (Zb)	A300	
W03	3NC		Q300	

FTN1R - CODE SELECTION OVERVIEW

F T N	1 R	3 1	X 1 1	
SERIES	FUNCTION	ACTUATOR	CONTACT TYPE	CONDUIT ENTRY
FTN thermoplastic limit switches	1R with manual reset	31 short plastic end plunger 32 PA roller lever plunger, horizontal action 33 PA roller lever plunger, vertical action 34 PA roller plunger 37 adjustable metal rod lever 38 Ø18 PA roller lever 39 Ø18 PA roller lever with variable length 40 Ø50 rubber roller lever with variable length 40R Ø50 rubber roller lever with variable length and overhanging 41 Ø50 rubber roller lever 43 Ø18 metal roller lever 44 Ø18 PA roller lever with variable length	X11 1NO+1NC slow action Zb W02 2NC slow action Zb W20 2NO slow action Zb Z11 1NO+1NC snap action Zb Z02 2NC snap action Zb W12 1NO+2NC slow action Zb W03 3NC slow action Zb	<i>standard</i> blank M16 × 1.5 <i>on request</i> M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

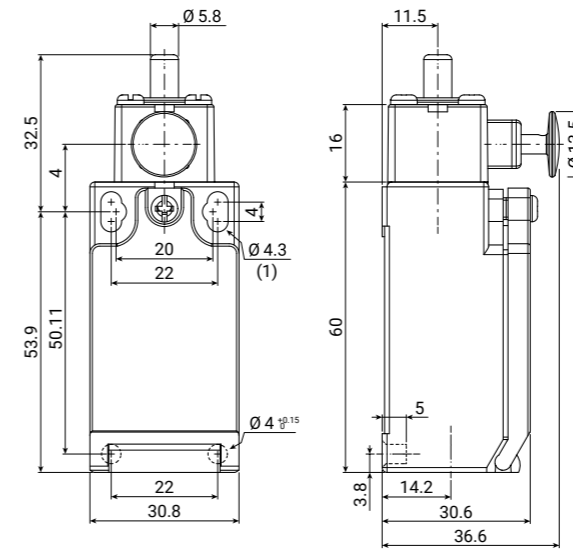
FTN1R31

Limit switch with short plastic end plunger with manual reset
IP67



FTN series	1R function	31 actuator	XXX contact type	XX conduit entry
FTN thermoplastic limit switch	1R with manual reset function	31 short plastic end plunger	X11: 1NO+1NC slow action (Zb) W02: 2NC snap action (Zb) Z11: 1NO+1NC snap action (Zb) Z02: 2NC slow action (Zb) W12: 1NO+2NC W03: 3NC	blank M16 × 1.5 (standard) M M20 × 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force	positive opening		lock travel	total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)		
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	2.4 mm	3.4 mm	7.5 N	3.1 mm	22 N	4.0 mm	6.0 mm
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	2.0 mm	1.0 mm	8.5 N	4.4 mm	16.5 N		
W12: 1NO+2NC W03: 3NC	A300-Q300		2.0 mm	0.8 mm	8.5 N	4.4 mm	16.5 N		
			2.3 mm	3.0 mm	7.5 N	3.0 mm	23 N		
			2.3 mm	-	7.5 N	3.0 mm	23 N		

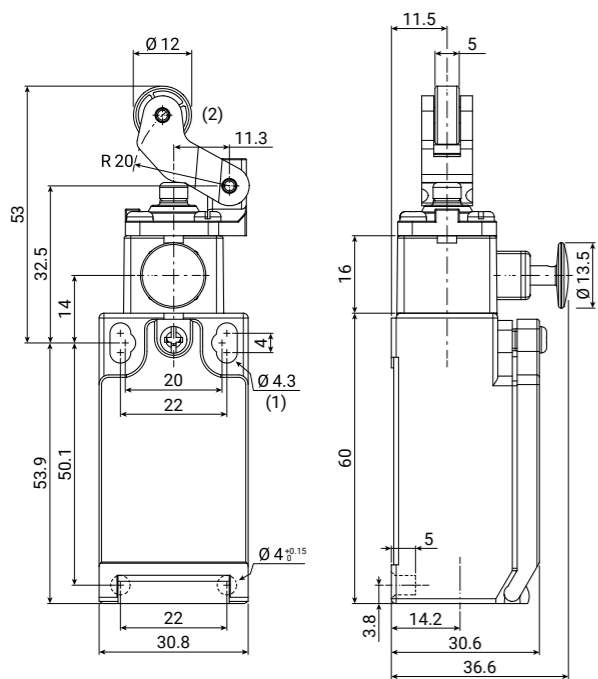
FTN1R32

Limit switch with PA roller lever plunger, horizontal action with manual reset
IP67



FTN series		1R function		32 actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1R	with manual reset function	32	PA roller lever plunger, horizontal action	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type

operation diagrams

X11 1NO+1NC slow action (Zb)		
W02 2NC slow action (Zb)		
W20 2NO slow action (Zb)		
Z11 1NO+1NC snap action (Zb)		
Z02 2NC snap action (Zb)		
W12 1NO+2NC slow action (Zb)		
W03 3NC slow action (Zb)		

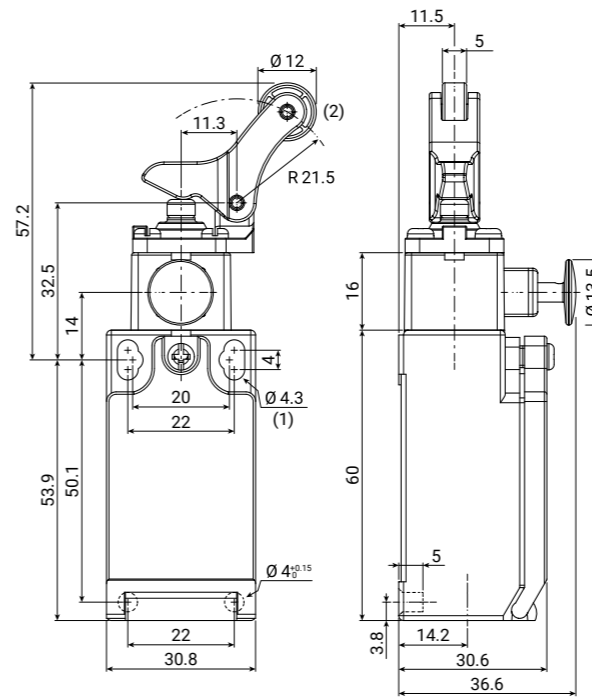
FTN1R33

Limit switch with PA roller lever plunger, vertical action with manual reset
IP67



FTN series		1R function		33 actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1R	with manual reset function	33	PA roller lever plunger, vertical action	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type

operation diagrams

X11 1NO+1NC slow action (Zb)		
W02 2NC slow action (Zb)		
W20 2NO slow action (Zb)		
Z11 1NO+1NC snap action (Zb)		
Z02 2NC snap action (Zb)		
W12 1NO+2NC slow action (Zb)		
W03 3NC slow action (Zb)		

contact type	categories	ratings	operational travel		operating force	positive opening		lock travel	total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)		
X11: 1NO+1NC W02: 2NC W20: 2NO	slow action (Zb) A600-Q600	AC15: 400V - 4A	3.5 mm	5.0 mm	5.3 N	7.5 mm	13.5 N	5.7 mm	9.0 mm
Z11: 1NO+1NC Z02: 2NC	snap action (Zb) B600-Q600	DC13: 24V - 6A	2.7 mm	1.3 mm	5.9 N	6.6 mm	10.8 N		
W12: 1NO+2NC W03: 3NC	slow action (Zb) A300-Q300	24V - 6A	3.5 mm	4.5 mm	5.3 N	8.8 mm	15 N		
			3.5 mm	-	5.3 N	8.8 mm	15 N		

contact type	categories	ratings	operational travel		operating force	positive opening		lock travel	total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)		
X11: 1NO+1NC W02: 2NC W20: 2NO	slow action (Zb) A600-Q600	AC15: 400V - 4A	4.0 mm	6.0 mm	6.4 N	5.0 mm	15 N	6.8 mm	9.5 mm
Z11: 1NO+1NC Z02: 2NC	snap action (Zb) B600-Q600	DC13: 24V - 6A	3.3 mm	1.6 mm	5.0 N	7.7 mm	10 N		
W12: 1NO+2NC W03: 3NC	slow action (Zb) A300-Q300	24V - 6A	4.0 mm	6.0 mm	6.4 N	5.3 mm	17 N		
			4.0 mm	-	6.5 N	5.3 mm	17 N		

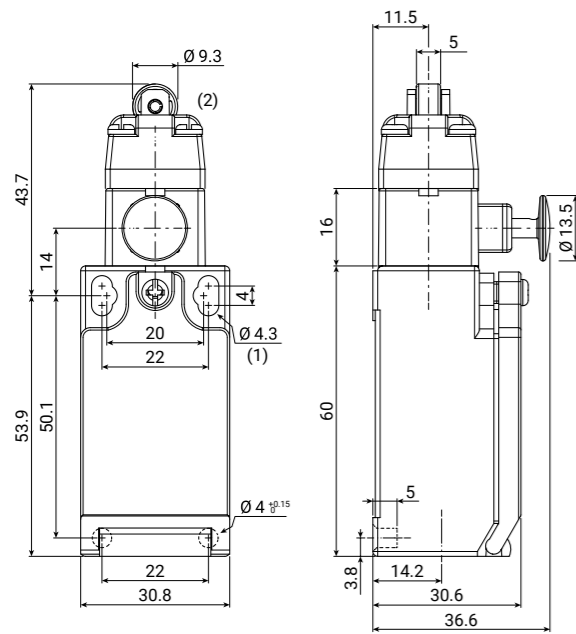
FTN1R34

Limit switch with PA roller plunger with manual reset
IP67



FTN series		1R function		34 actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1R	with manual reset function	34	PA roller plunger	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type	categories	ratings	operational travel		operating force	positive opening		lock travel	total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)		
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	2.4 mm	3.4 mm	7.5 N	3.1 mm	22 N	4.0 mm	6.0 mm
			2.4 mm	-	7.5 N	3.1 mm	22 N		
			2.4 mm	-	9.5 N	-	-		
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	2.0 mm	1.0 mm	8.5 N	4.4 mm	16.5 N	4.0 mm	6.0 mm
			2.0 mm	0.8 mm	8.5 N	4.4 mm	16.5 N		
W12: 1NO+2NC W03: 3NC	A300-Q300	24V - 6A	2.3 mm	3.0 mm	7.5 N	3.0 mm	23 N	4.0 mm	6.0 mm
			2.3 mm	-	7.5 N	3.0 mm	23 N		

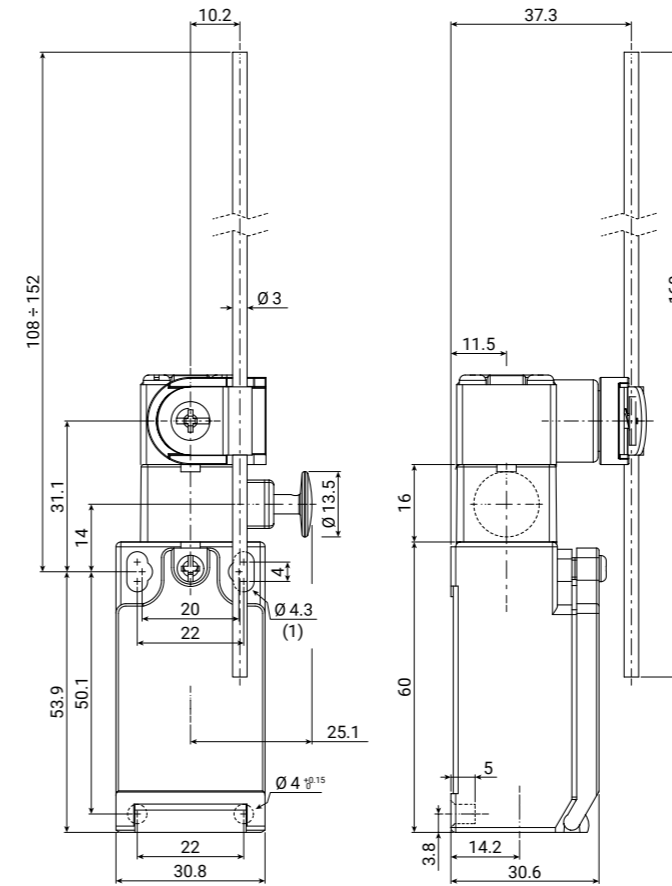
FTN1R37

Limit switch with adjustable metal rod lever with manual reset
IP67



FTN series		1R function		37 actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1R	with manual reset function	37	adjustable metal rod lever	X11: 1NO+1NC W02: 2NC Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes

contact type	categories	ratings	operational travel		operating force	positive opening		lock travel	total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)		
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	35°	50°	1.8 N	45°	6 N	55°	80°
			35°	-	1.8 N	45°	6 N		
			35°	-	1.8 N	-	-		
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	35°	9°	5.9 N	60°	5.5 N	55°	80°
			35°	4°	5.9 N	64°	5.5 N		
W12: 1NO+2NC W03: 3NC	A300-Q300	24V - 6A	32°	40°	1.8 N	45°	5.4 N	55°	80°
			32°	-	1.8 N	45°	5.4 N		

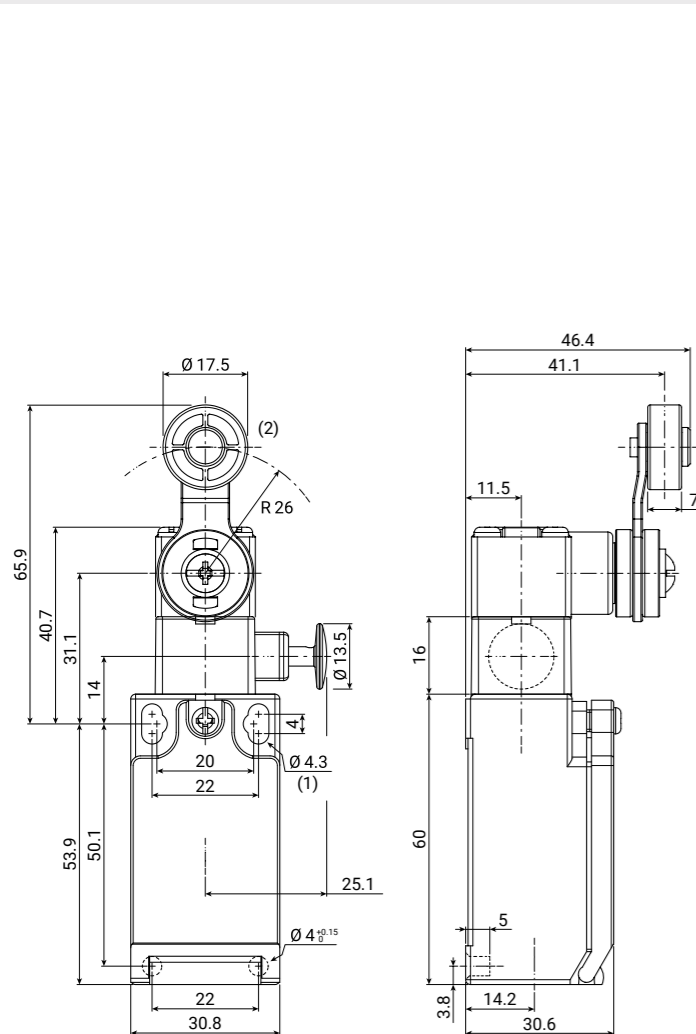
FTN1R38

Limit switch with Ø18 PA roller lever with manual reset
IP67



FTN series		1R function		38 actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1R	with manual reset function	38	Ø18 PA roller lever	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type	categories	ratings	operational travel		operating force	positive opening		lock travel	total travel	
			PT1	PT2 (slow action) RP (snap action)		OF	POT (travel)			POF (force)
X11: 1NO+1NC W02: 2NC W20: 2NO	slow action (Zb)	A600-Q600	AC15: 400V - 4A	35°	50°	6.5 N	45°	6 N	55°	80°
				35°	-	6.5 N	45°	6 N		
				35°	-	6.5 N	-	-		
Z11: 1NO+1NC Z02: 2NC	snap action (Zb)	B600-Q600	DC13: 24V - 6A	35°	9°	5.9 N	60°	5.5 N		
				35°	4°	5.9 N	64°	5.5 N		
W12: 1NO+2NC W03: 3NC	slow action (Zb)	A300-Q300	24V - 6A	32°	40°	6.5 N	45°	5.4 N		
				32°	-	6.5 N	45°	5.4 N		

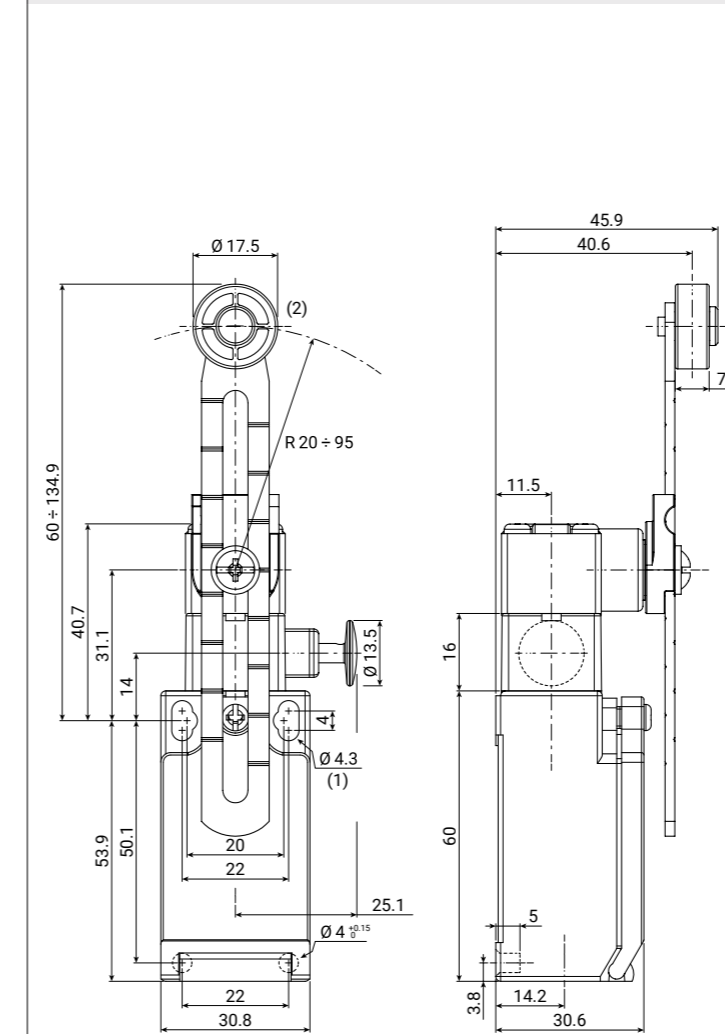
FTN1R39

Limit switch with Ø18 PA roller lever with variable length and manual reset
IP67



FTN series		1R function		39 actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1R	with manual reset function	39	Ø18 PA roller lever with variable length	X11: 1NO+1NC W02: 2NC Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type	categories	ratings	operational travel		operating force	positive opening		lock travel	total travel	
			PT1	PT2 (slow action) RP (snap action)		OF	POT (travel)			POF (force)
X11: 1NO+1NC W02: 2NC W20: 2NO	slow action (Zb)	A600-Q600	AC15: 400V - 4A	35°	50°	6.5 N	45°	6 N	55°	80°
				35°	-	6.5 N	45°	6 N		
				35°	-	6.5 N	-	-		
Z11: 1NO+1NC Z02: 2NC	snap action (Zb)	B600-Q600	DC13: 24V - 6A	35°	9°	5.9 N	60°	5.5 N		
				35°	4°	5.9 N	64°	5.5 N		
W12: 1NO+2NC W03: 3NC	slow action (Zb)	A300-Q300	24V - 6A	32°	40°	6.5 N	45°	5.4 N		
				32°	-	6.5 N	45°	5.4 N		

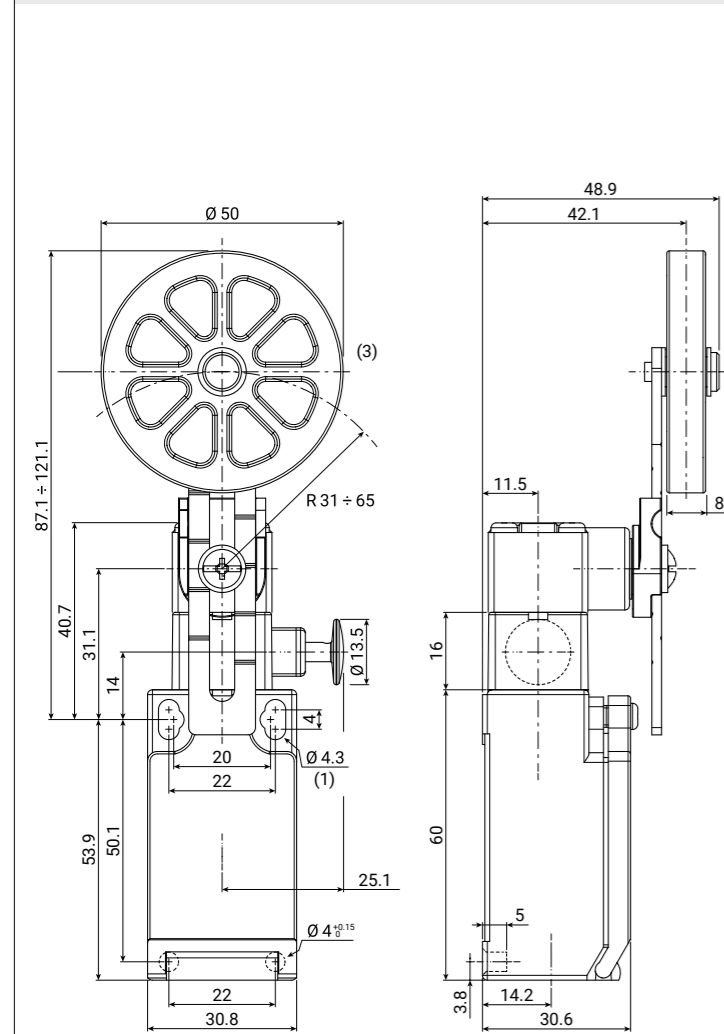
FTN1R40

Limit switch with Ø50 rubber roller lever with variable length and manual reset
IP67



FTN series		1R function		40 actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1R	with manual reset function	40	Ø50 rubber roller lever with variable length	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) rubber roller

contact type

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

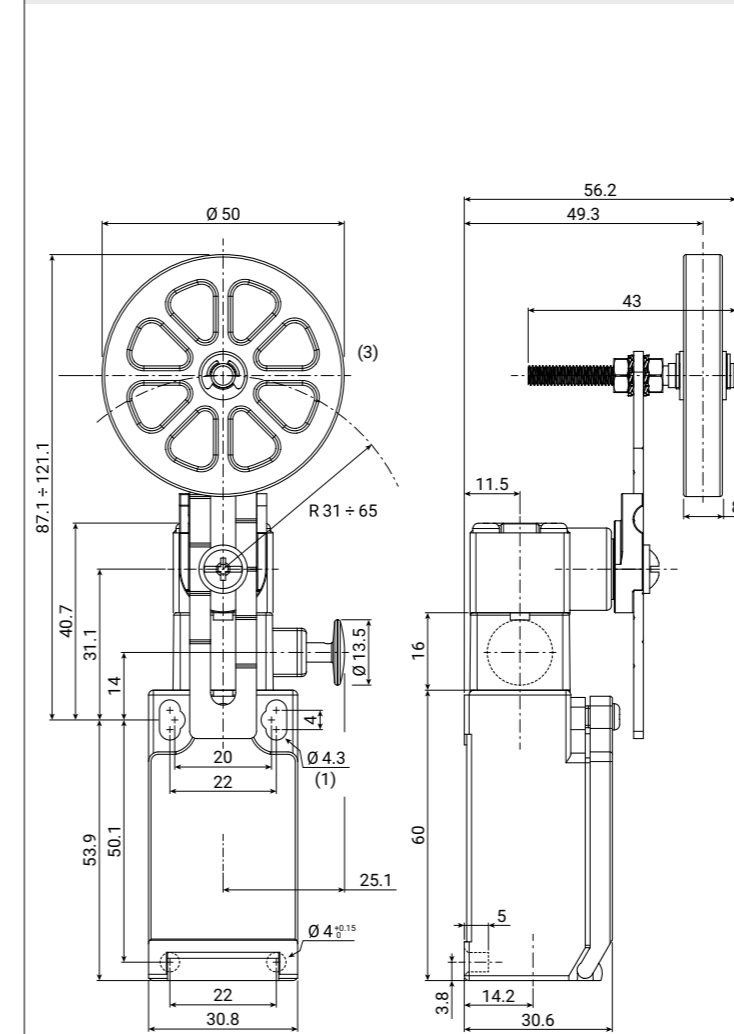
FTN1R40R

Limit switch with Ø50 rubber roller lever with variable length and manual reset
IP67



FTN series		1R function		40R actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1R	with manual reset function	40R	Ø50 rubber roller lever with variable length	X11: 1NO+1NC W02: 2NC Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) rubber roller

contact type

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force	positive opening		lock travel	total travel	
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)			
X11: 1NO+1NC W02: 2NC W20: 2NO	slow action (Zb)	A600-Q600	AC15: 400V - 4A	35°	50°	6.5 N	45°	6 N	55°	80°
				35°	-	6.5 N	45°	6 N		
				35°	-	6.5 N	-	-		
Z11: 1NO+1NC Z02: 2NC	snap action (Zb)	B600-Q600	DC13: 24V - 6A	35°	9°	5.9 N	60°	5.5 N		
				35°	4°	5.9 N	64°	5.5 N		
W12: 1NO+2NC W03: 3NC	slow action (Zb)	A300-Q300	24V - 6A	32°	40°	6.5 N	45°	5.4 N		
				32°	-	6.5 N	45°	5.4 N		

contact type	categories	ratings	operational travel		operating force	positive opening		lock travel	total travel	
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)			
X11: 1NO+1NC W02: 2NC W20: 2NO	slow action (Zb)	A600-Q600	AC15: 400V - 4A	35°	50°	6.5 N	45°	6 N	55°	80°
				35°	-	6.5 N	45°	6 N		
				35°	-	6.5 N	-	-		
Z11: 1NO+1NC Z02: 2NC	snap action (Zb)	B600-Q600	DC13: 24V - 6A	35°	9°	5.9 N	60°	5.5 N		
				35°	4°	5.9 N	64°	5.5 N		
W12: 1NO+2NC W03: 3NC	slow action (Zb)	A300-Q300	24V - 6A	32°	40°	6.5 N	45°	5.4 N		
				32°	-	6.5 N	45°	5.4 N		

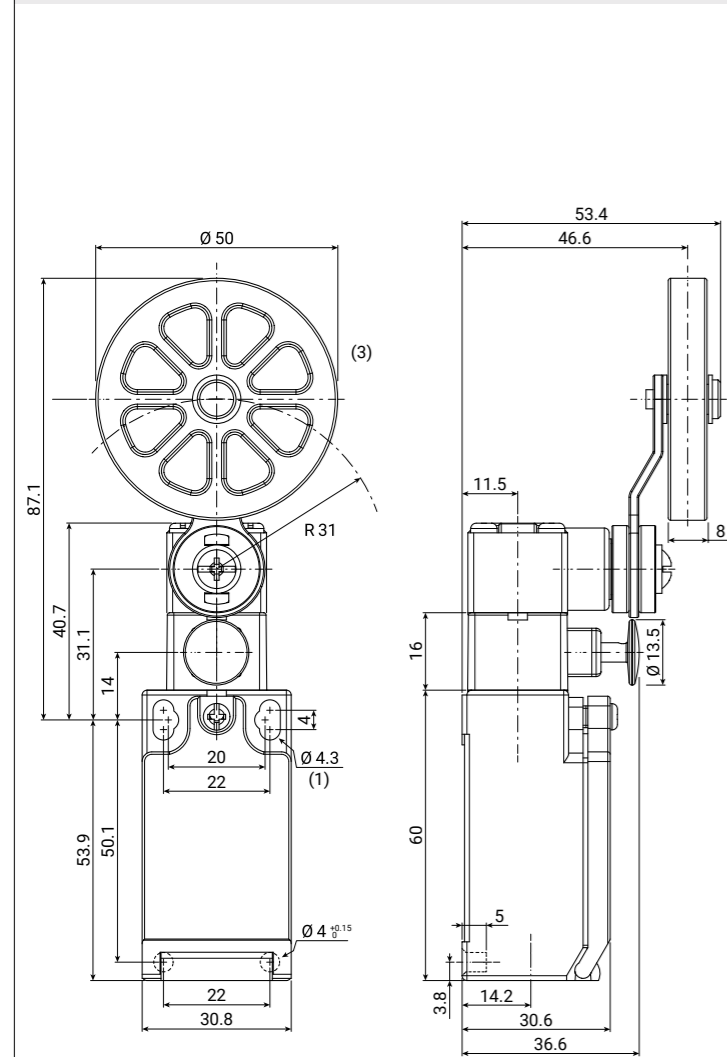
FTN1R41

Limit switch with Ø50 rubber roller lever with manual reset
IP67



FTN series		1R function		41 actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1R	with manual reset function	41	Ø50 rubber roller lever	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) rubber roller

contact type	categories	ratings	operational travel		operating force	positive opening		lock travel	total travel	
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)			
X11: 1NO+1NC W02: 2NC W20: 2NO	slow action (Zb)	A600-Q600	AC15: 400V - 4A	35°	50°	6.5 N	45°	6 N	55°	80°
				35°	-	6.5 N	45°	6 N		
				35°	-	6.5 N	-	-		
Z11: 1NO+1NC Z02: 2NC	snap action (Zb)	B600-Q600	DC13: 24V - 6A	35°	9°	5.9 N	60°	5.5 N		
				35°	4°	5.9 N	64°	5.5 N		
W12: 1NO+2NC W03: 3NC	slow action (Zb)	A300-Q300	24V - 6A	32°	40°	6.5 N	45°	5.4 N		
				32°	-	6.5 N	45°	5.4 N		

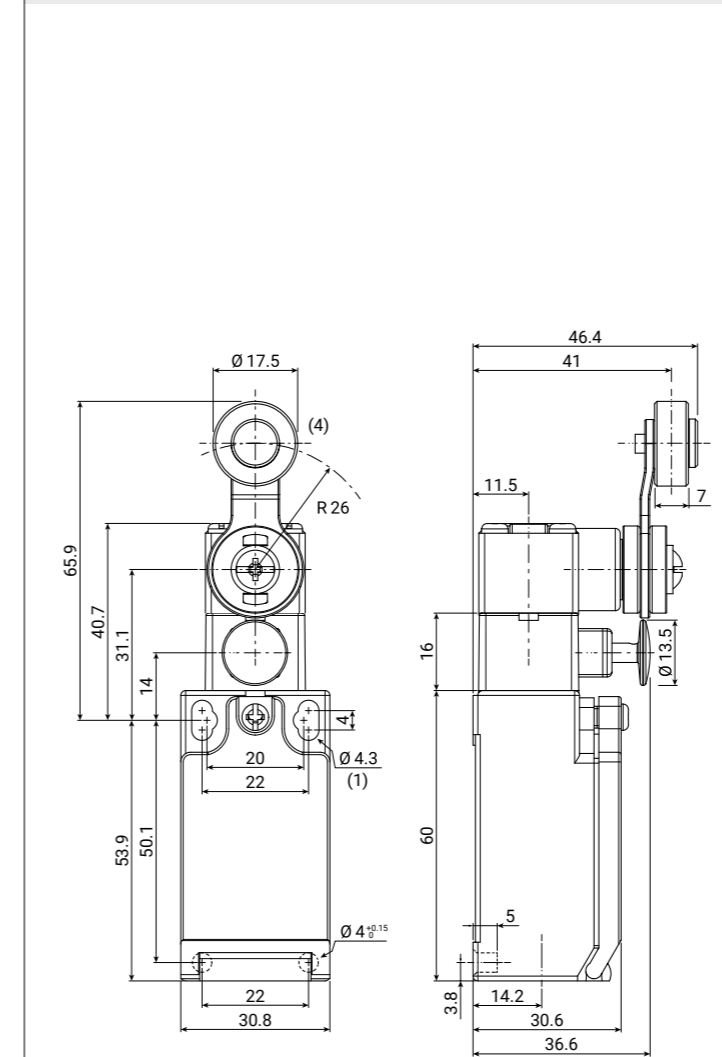
FTN1R43

Limit switch with Ø18 metal roller lever with manual reset
IP67



FTN series		1R function		43 actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1R	with manual reset function	43	Ø18 metal roller lever	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) metal roller

contact type	categories	ratings	operational travel		operating force	positive opening		lock travel	total travel	
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)			
X11: 1NO+1NC W02: 2NC W20: 2NO	slow action (Zb)	A600-Q600	AC15: 400V - 4A	35°	50°	6.5 N	45°	6 N	55°	80°
				35°	-	6.5 N	45°	6 N		
				35°	-	6.5 N	-	-		
Z11: 1NO+1NC Z02: 2NC	snap action (Zb)	B600-Q600	DC13: 24V - 6A	35°	9°	5.9 N	60°	5.5 N		
				35°	4°	5.9 N	64°	5.5 N		
W12: 1NO+2NC W03: 3NC	slow action (Zb)	A300-Q300	24V - 6A	32°	40°	6.5 N	45°	5.4 N		
				32°	-	6.5 N	45°	5.4 N		

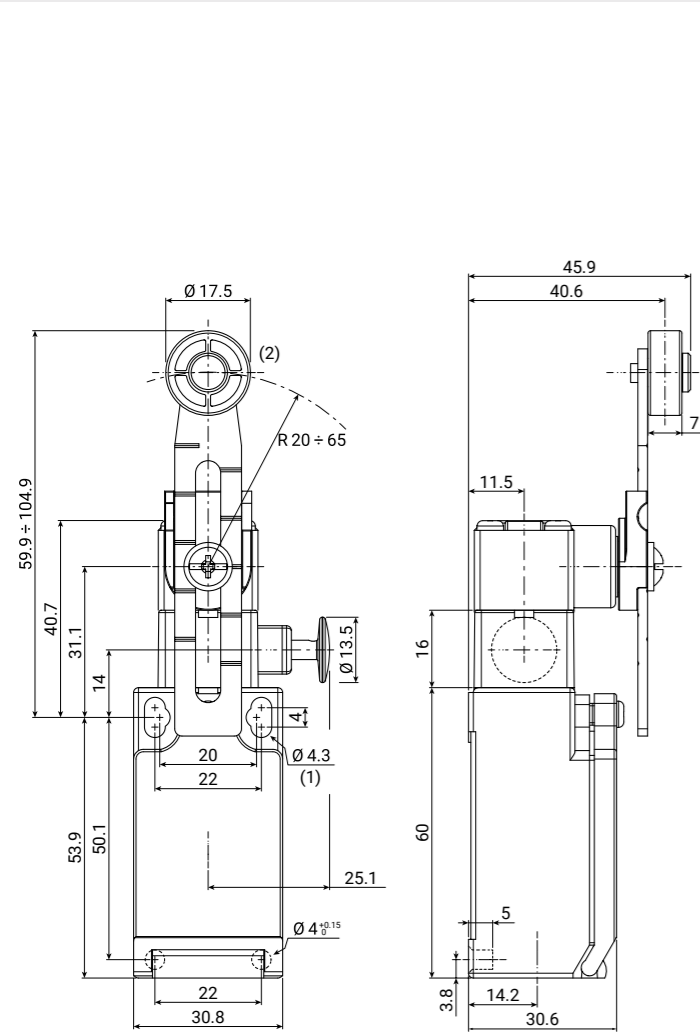
FTN1R44

Limit switch with Ø18 PA roller lever with variable length and manual reset
IP67



FTN series		1R function		44 actuator		XXX contact type		XX conduit entry	
FTN	thermoplastic limit switch	1R	with manual reset function	44	Ø18 PA roller lever with variable length	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)	blank M N G1 G3 C	M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force	positive opening		lock travel	total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)		
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	35°	50°	6.5 N	45°	6 N	55°	80°
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	35°	9°	5.9 N	60°	5.5 N		
W12: 1NO+2NC W03: 3NC	A300-Q300		32°	40°	6.5 N	45°	5.4 N		
			32°	-	6.5 N	45°	5.4 N		



OVERVIEW



The 40 mm **FTNG series** of thermoplastic limit switches complies with EN 50041 and is designed to provide a wide range of switch variants (slow action or snap action basic switches) and a variety of actuating heads and levers suitable also for safety applications.

The thermoplastic bodies have four fixing holes at a distance of 30 × 60 mm and a hole for the cable input/output at the bottom of the switch.

The maximum product versatility is guaranteed by the adjustable actuators in 90° steps, allowing easy mounting and lever adjustment every 18° for 360°.

They are particularly suitable for **heavy applications**, thanks to their solidity of steel parts, head and lid fixed by threaded inserts and metric screws. The fixing is prepared for 4 M5 screws.

They are also suitable for use in the harshest environmental conditions with an **operating temperature range of -25°C to +80°C**.

All models in the series are **IP67 rated**.

The actuators are made of metal or thermoplastic material, while the case is made of thermoplastic glass-filled polybutylene terephthalate.

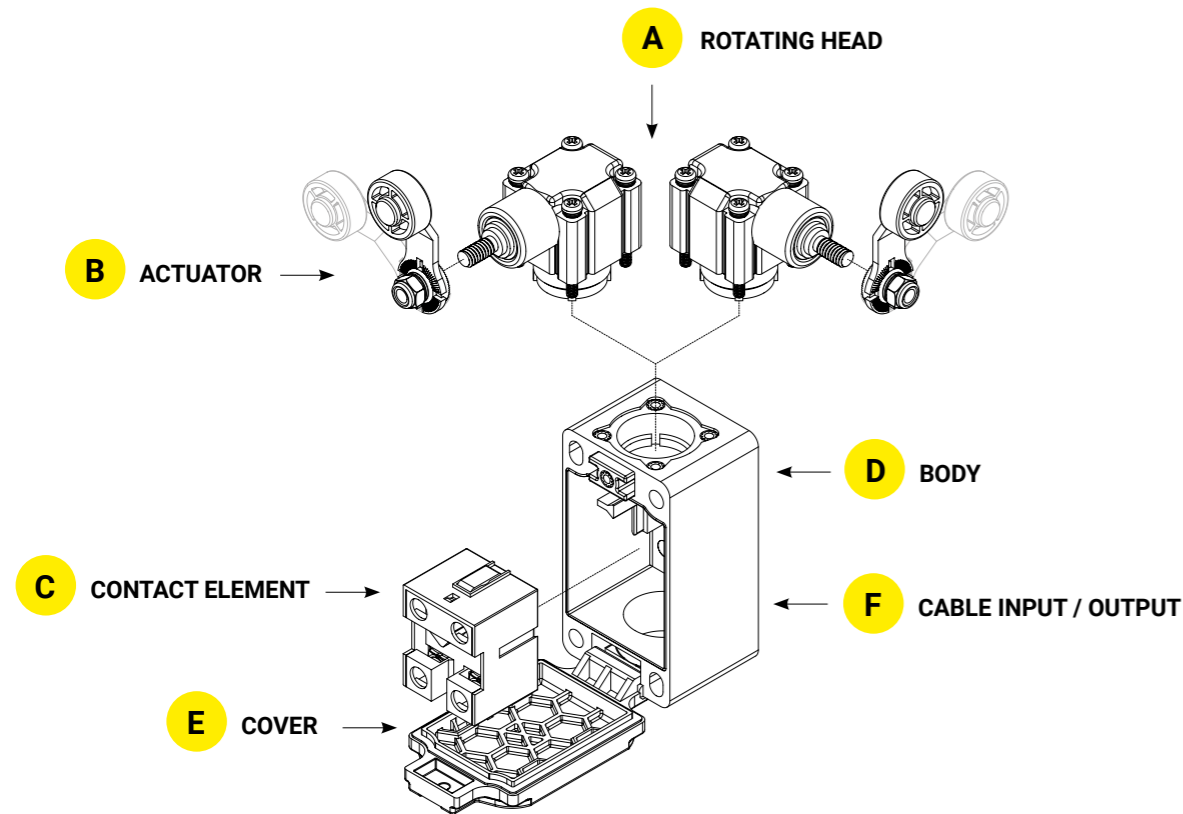
Giovanzana limit switches offer solutions for every need and are suitable for the most varied sectors of use.



SPECIFICATIONS

Standards		EN 60947-5-1, UL 508, EN 50041, EN 1088, EN 60204-1
Approvals		cULus, EAC, CCC and CE marked for all applicable directives
Positive opening operation		NC contacts conforming to IEC /EN 60947-5-1 ☺
Minimum current		5 mA - 5 V DC
Thermal current	I _{th}	10 A
Rated insulation voltage	U _i	500 V
Rated impulse withstand voltage	U _{imp}	6 kV
Insulation resistance	min	100 MΩ (DC 500 V)
Contact resistance	max	25 mΩ (initial)
Switching speed	max	250 mm/s
Switching frequency	max	6000 operations per hour
Enclosure material		UL approved glass-filled polybutylene terephthalate
Enclosure protection		IP67
Operating temperature		-25 ... +80°C (-13 ... +176°F)
Pollution degree		3
Protection against electric shock		Class II (double Insulation) ☐ Double insulation makes ground terminal unnecessary
Electrical life expectancy	min	150.000 cycles
Mechanical life expectancy	min	1 × 10 ⁷ cycles
Vibration	IEC 68-2-6 excursion	10-55 Hz ± 1Hz 0.35 mm, 1 octave/min
Conduit entry		Various international conduit sizes (see product selection table pag. 75)
Fixing		4 × M5 screws

STRUCTURE DESCRIPTION

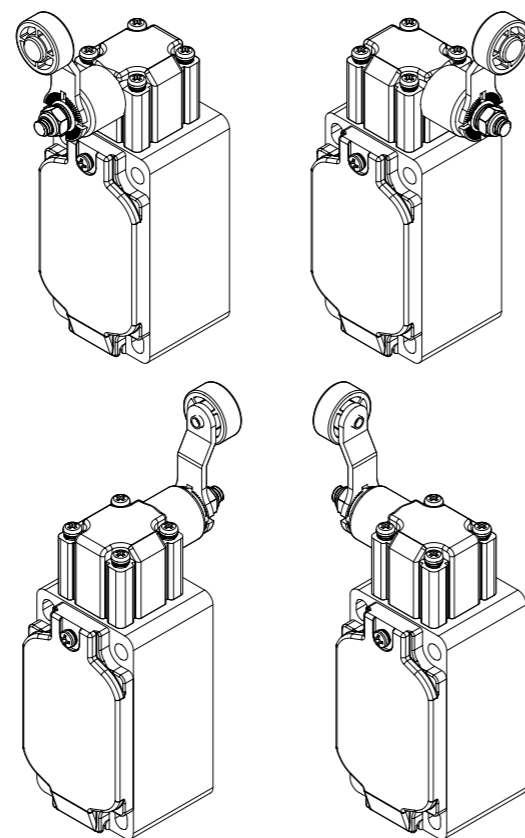


A - ROTATING HEAD

The heads are made of UL approved glass-filled polybutylene terephthalate.

All heads can be adjusted in steps of 90° over 360°, compared to the body.

The direction of the switch head can be varied in one of four directions by loosening the screws at the four corners of the head.



B - ACTUATOR

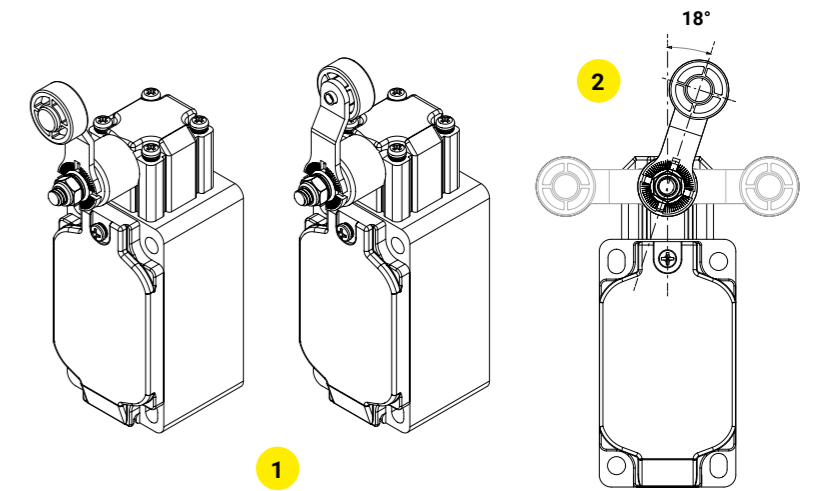
Available different types of actuators: plungers, levers, rollers and rods.

1. Tilting levers

Possibility to fix the lever on the observe or on the reverse, keeping the positive opening of the NC contact. In this way is possible to obtain two different lever work plans.

2. Adjustable levers

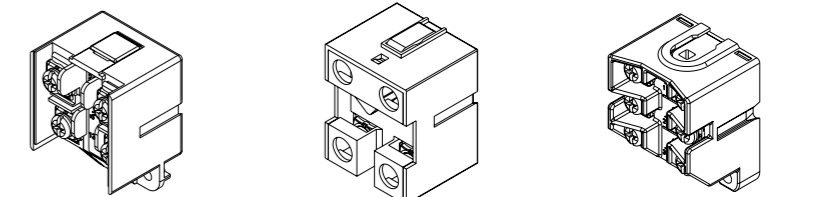
All levers are adjustable in steps of 18° over 360°, compared to the horizontal axis of the head. The positive movement transmission is always guaranteed thanks to the particular geometric coupling between the lever and the rotation shaft.



C - CONTACT ELEMENT

The built-in switch has a direct opening mechanism that forcibly separates the NC contact even when there is a contact deposit.

Different contact elements are available, both fast-acting and slow-acting according to different application requirements.



X11: 1NO+1NC
Slow action (Zb)

Z11: 1NO+1NC
Snap action (Zb)

W12: 1NO+2NC
Slow action (Zb)

W02: 2NC
Slow action (Zb)

Z02: 2NC
Snap action (Zb)

W03: 3NC
Slow action (Zb)

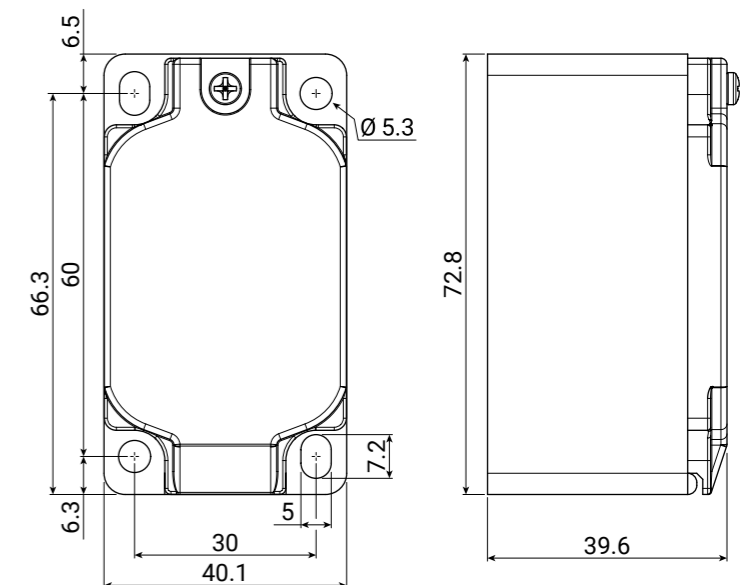
W20: 2NO
Slow action (Zb)

→ Not suitable for safety applications!

D - BODY

The body complies with EN 50041, with a distance of 30 × 60 mm between the fixing holes.

The FTNG series has the special feature of having 4 fixing holes to ensure better and more solid installation stability using M5 screws.



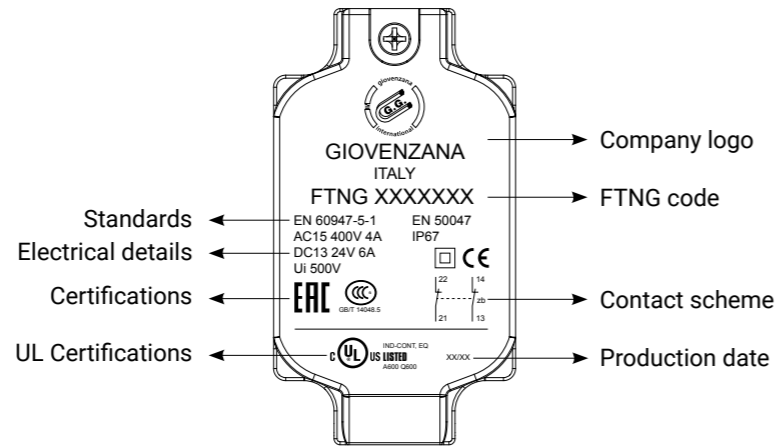
E - COVER

Material conforming to the RoHS Directive.

The lid is laser marked to ensure branding, coding and information on product specifications such as technical data, production date, stock or lot number, revision or control date. Lasering ensures the complete traceability of our products and components and is essential for compliance with ISO quality standards.

Some of the advantages:
- clear and precise text legibility;
- guaranteed lifetime unlike ink which deteriorates over time.

The switch cover can be opened by loosening the screw. The hinge at the bottom ensures a useful opening for easy maintenance and easy wiring, without having to completely remove the lid.



F - CABLE INPUT / OUTPUT

A threaded cable input/output is provided at the bottom of the switch.

Four standard and customised cable input/output models are available in order to cover the major international markets.

Standard: Blank: M20 × 1.5

**On request: N: 1/2" NPT
G3: Pg 13.5
C: M12 connector**

CONTACT ELEMENT - SPECIFICATIONS

CONTACT TYPES	CONTACT FORM	ELECTRICAL SCHEMES	CONNECTOR PIN ARRANGEMENT
X11	1NO+1NC Slow action Zb		
W02	2NC Slow action Zb		
W20	2NO Slow action Zb Not suitable for safety applications!		
Z11	1NO+1NC Snap action Zb		
Z02	2NC Snap action Zb		
W12	1NO+2NC Slow action Zb		No connector
W03	3NC Slow action Zb		No connector

CONTACT ELEMENT - OPERATING PRINCIPLE

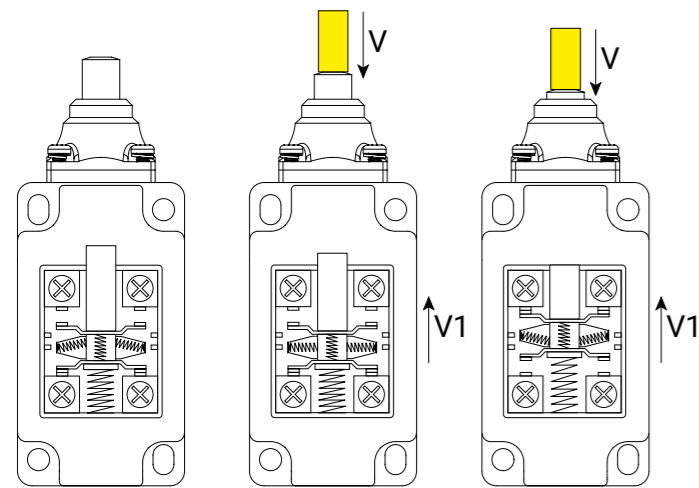
SLOW ACTION - Contact elements direct acting

Slow-acting contact blocks are characterized by identical intervention and restoration points (no differential travel).

The speed of contact motion (V1) is equal to, or proportional to, the actuator speed (V).

This type of contact is suitable for fast movements.

The opening distance depends on the distance travelled by the operator.



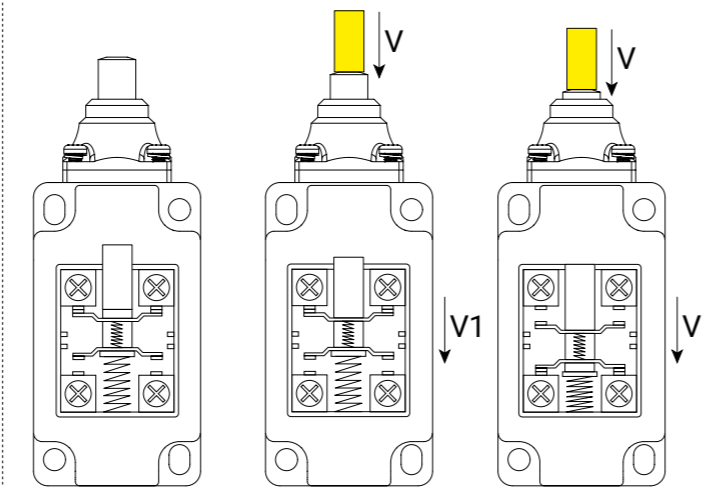
SNAP ACTION - Contact elements acting independently

Snap-action contact blocks are characterised by non-coincidental switching and resetting points (differential travel).

The speed of the contact motion (V1) is not related to the speed of the actuator (V).

This type of contact is also suitable for slow movements.

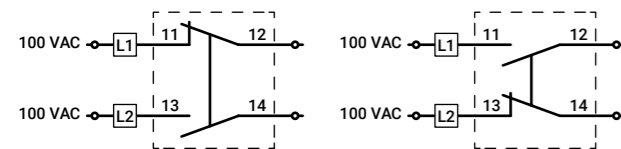
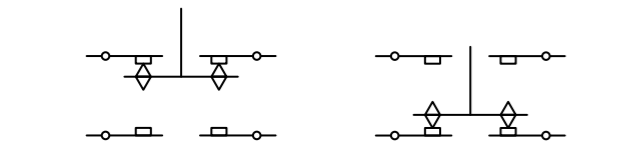
This feature ensures satisfactory electrical performance in applications involving low speed actuators.



CONTACT ELEMENT - CLASSIFICATION (ACCORDING EN 60947-5-1)

Za contact type

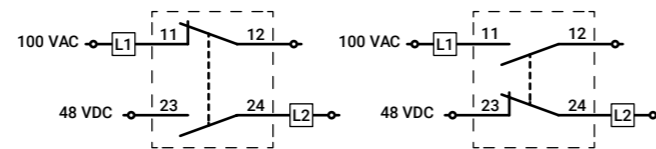
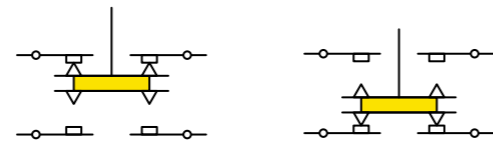
A single blade opens and closes the contacts. With this type of contact it is NOT possible to power the circuit with different voltages and polarity.



L1: load 1
L2: load 2

Zb contact type

In this case there are two blades that open and close the contact. The two blades are electrically isolated from each other. Therefore, with this type of contact it is possible to power the circuit with different voltages and polarity.



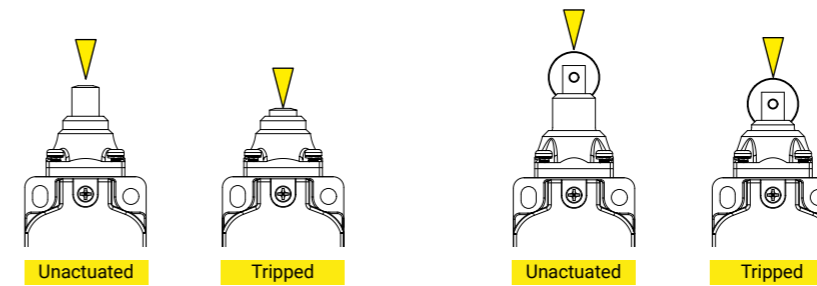
L1: load 1
L2: load 2

40 mm FTNG series of thermoplastic limit switches is equipped with Zb contacts.

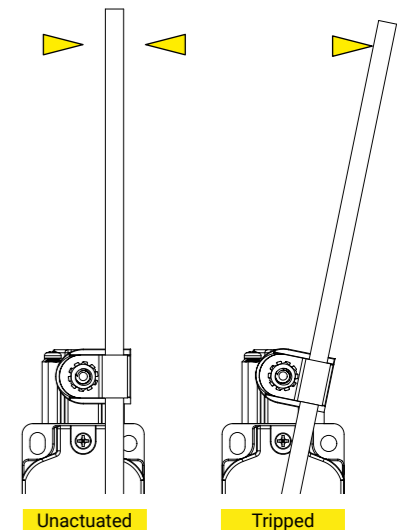
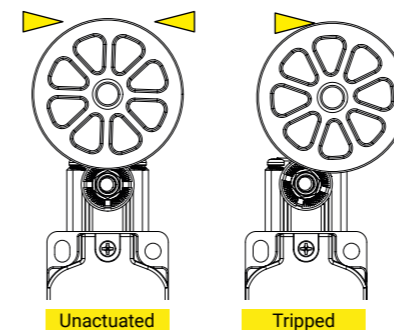
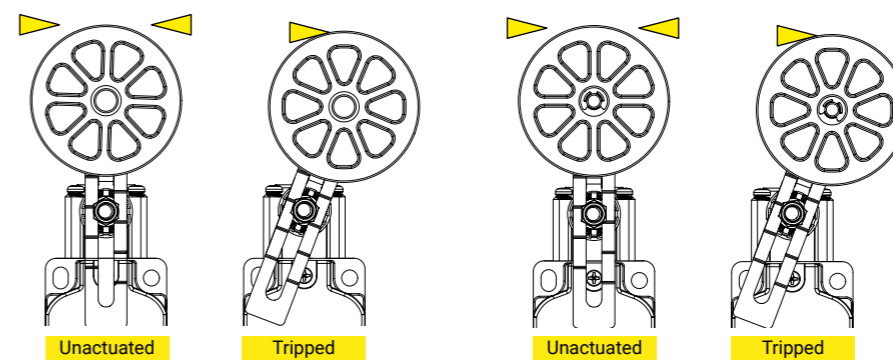
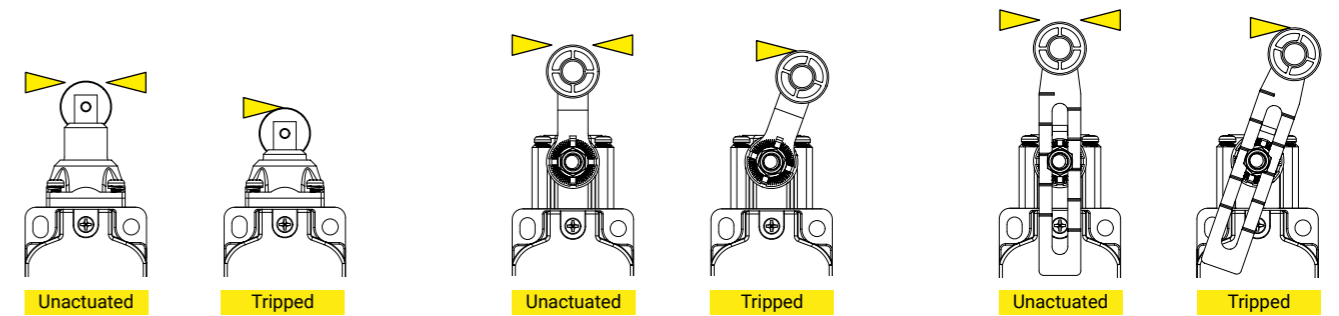
DETECTION MOVEMENTS

Limit switches are used in all automated installations and also in a wide variety of other applications. They transmit data to the logic processing system regarding: presence/absence, passage, positioning and end of travel. They have different detection movements: linear and rotary.

1. Linear detection movement - Plunger

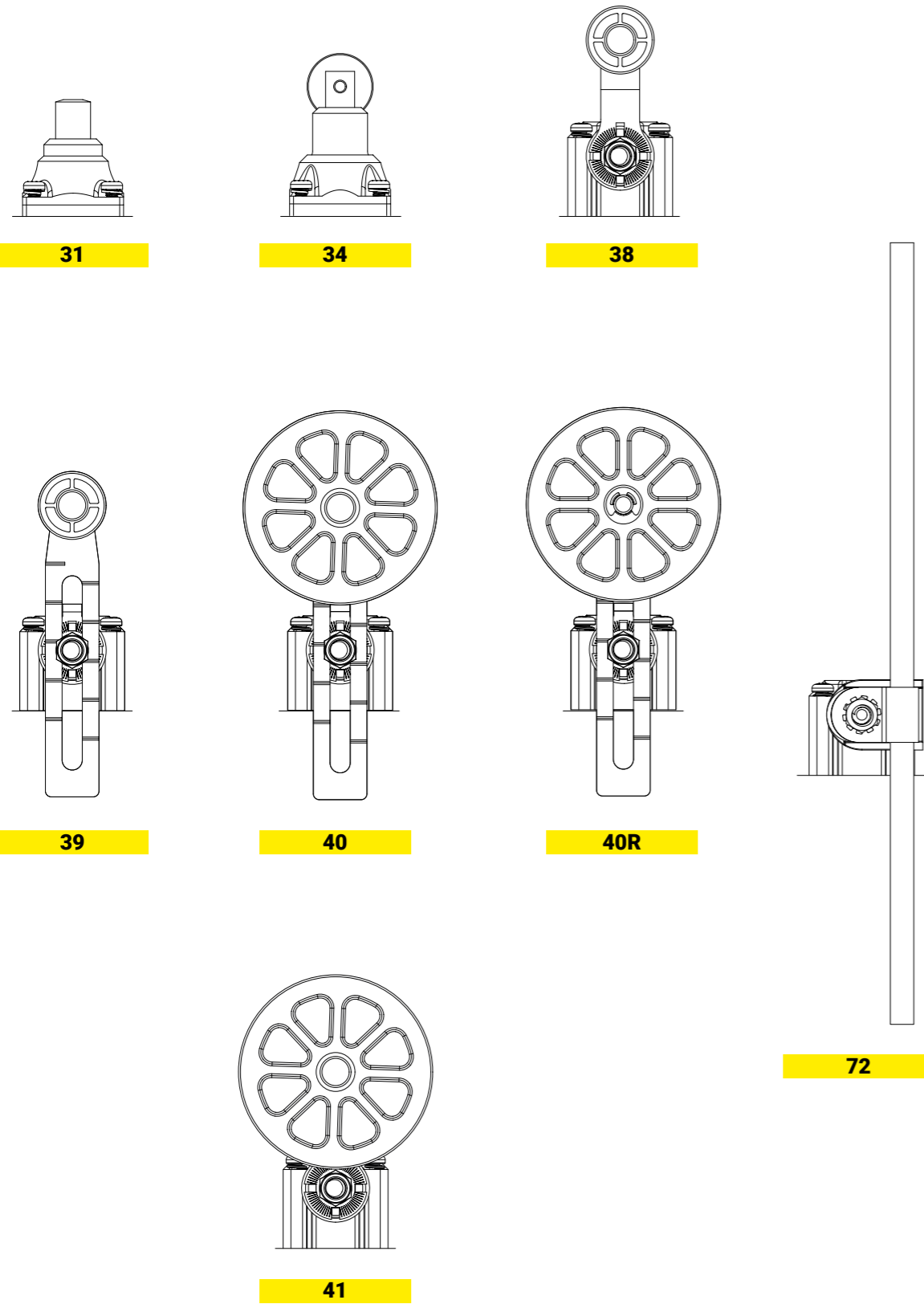


2. Rotary detection movement - Lever

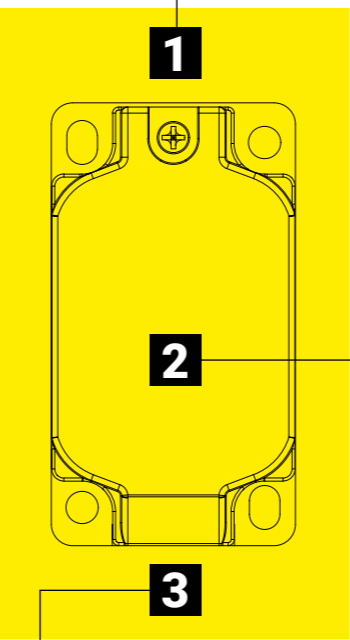
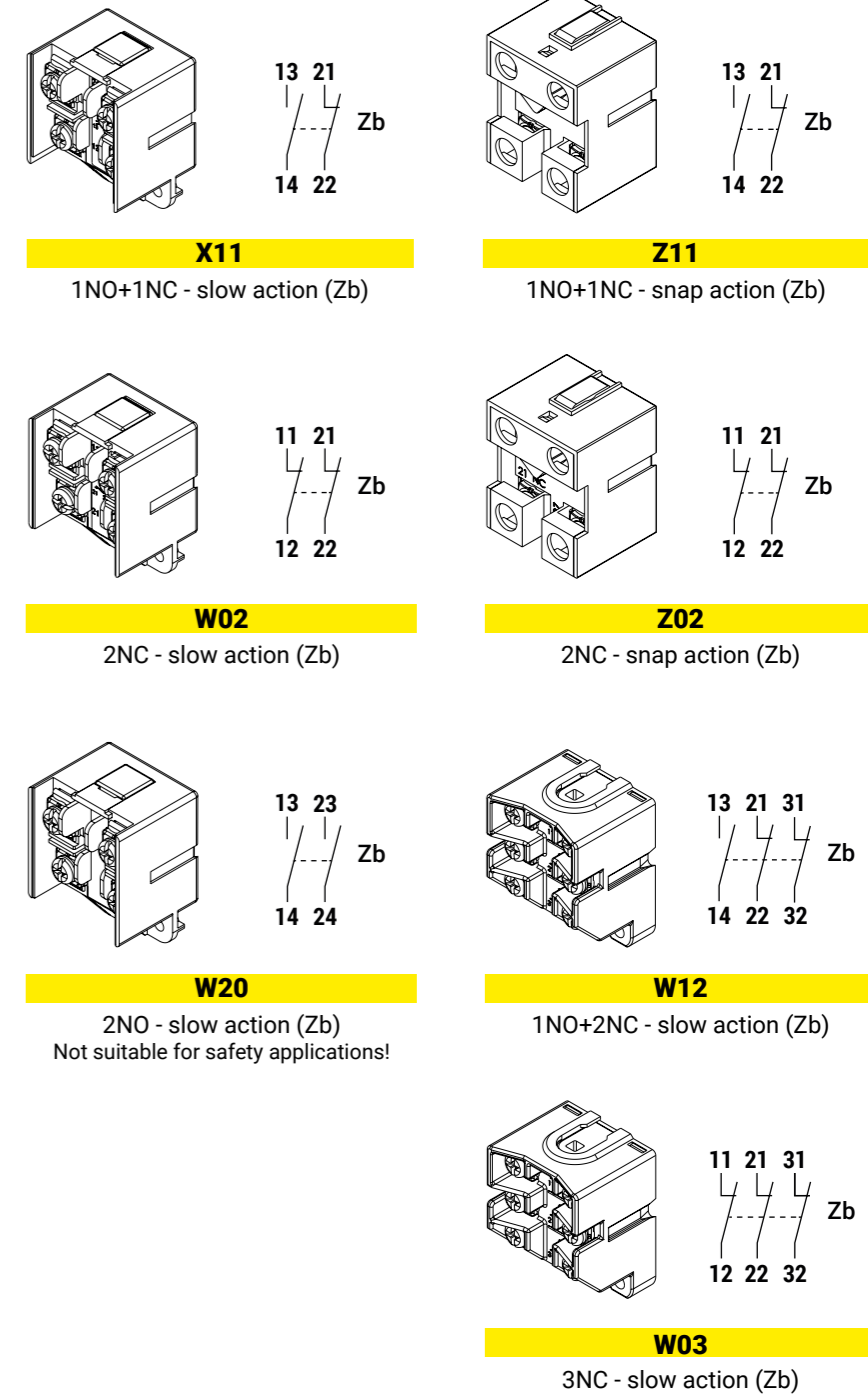


FTNG - PRODUCT SELECTION OVERVIEW

1 HEADS + ACTUATORS



2 CONTACT BLOCKS



3 CONDUIT ENTRY

Threaded conduit entry

Standard:
M20 × 1.5

On request:
1/2" NPT
PG13.5
With connector

CONTACT TYPES		CATEGORIES RATINGS		
X11	1NO+1NC	slow action (Zb)	A600	AC15: 400 V - 4 A
W02	2NC		Q600	
Z11	1NO+1NC	snap action (Zb)	B600	DC13: 24V - 6 A
Z02	2NC		Q600	
W12	1NO+2NC	slow action (Zb)	A300	
W03	3NC		Q300	

FTNG - CODE SELECTION OVERVIEW

FTNG	1	3 1	X 1 1	
SERIES	FUNCTION	ACTUATOR	CONTACT TYPE	CONDUIT ENTRY
FTNG 40 mm thermoplastic limit switches for heavy applications	1 without reset	31 short metal end plunger 34 metal roller plunger 38 Ø18 PA roller lever 39 Ø18 PA roller lever with variable length 40 Ø50 rubber roller lever with variable length 41 Ø50 rubber roller lever 72 adjustable PA rod lever	X11 1NO+1NC slow action Zb W02 2NC slow action Zb W20 2NO slow action Zb Z11 1NO+1NC snap action Zb Z02 2NC snap action Zb W12 1NO+2NC slow action Zb W03 3NC slow action Zb	<i>standard</i> blank M20 × 1.5 <i>on request</i> N 1/2" NPT G3 PG13.5 C male code "A" M12 × 1 connector

SAFETY INTEGRITY LEVEL ACCORDING TO IEC 61508

IEC 61508: Functional safety of electrical / electronic / programmable electronic safety systems

**FTNG SERIES:
40 mm thermoplastic limit switches IP67**

Configuration 1oo2 (redundant) 2NC or 2NO or NC + NO positive opening / closing with diagnostics on the two contacts (consistency and crossing check).

λ_{SD}	$1.79 \cdot 10^{-8}$	h^{-1}	λ_S	$2.18 \cdot 10^{-7}$	h^{-1}
λ_{SU}	$2.00 \cdot 10^{-7}$	h^{-1}	λ_D	$1.20 \cdot 10^{-7}$	h^{-1}
λ_{DD}	0.00	h^{-1}			
λ_{DU}	$1.20 \cdot 10^{-7}$	h^{-1}	λ_{TOT}	$3.39 \cdot 10^{-7}$	h^{-1}

SFF	64.48%	MTTR	4	h
		TID	0.0016667	h

TI	1	2	5	years
PFDv	$5.27 \cdot 10^{-4}$	$1.05 \cdot 10^{-3}$	$2.64 \cdot 10^{-3}$	

SIL	3	2	2
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SIL³



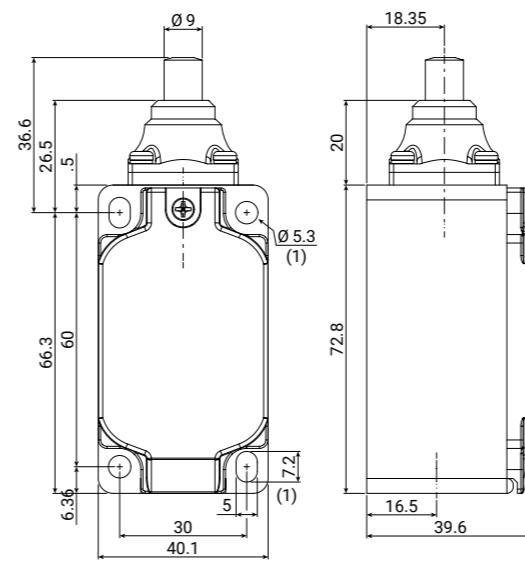
FTNG131

Limit switch with short metal end plunger
IP67



FTNG series	1 function	31 actuator	XXX contact type	XX conduit entry	
FTNG	40 mm thermoplastic limit switches for heavy applications	1 without reset function	31 short metal end plunger	X11: 1NO+1NC W02: 2NC Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)
				blank N G3 C	M20 × 1.5 (standard) 1/2" NPT PG13.5 male code "A" M12 × 1 connector

technical drawing - sizes in mm



(1) mounting holes

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC	A600-Q600	AC15: 400V - 4A	2.6 mm	3.8 mm	11.6 N	6.0 mm	28 N	7.0 mm
W02: 2NC			2.6 mm	-	11.6 N	6.0 mm	28 N	
W20: 2NO			2.6 mm	-	11.4 N	-	-	
Z11: 1NO+1NC	B600-Q600	DC13: 24V - 6A	2.5 mm	1.2 mm	10.4 N	4.9 mm	22 N	7.0 mm
Z02: 2NC			2.5 mm	1.2 mm	8.6 N	4.9 mm	22 N	
W12: 1NO+2NC			2.8 mm	3.5 mm	9.4 N	5.0 mm	10 N	
W03: 3NC	A300-Q300		2.8 mm	-	9.4 N	5.0 mm	10 N	

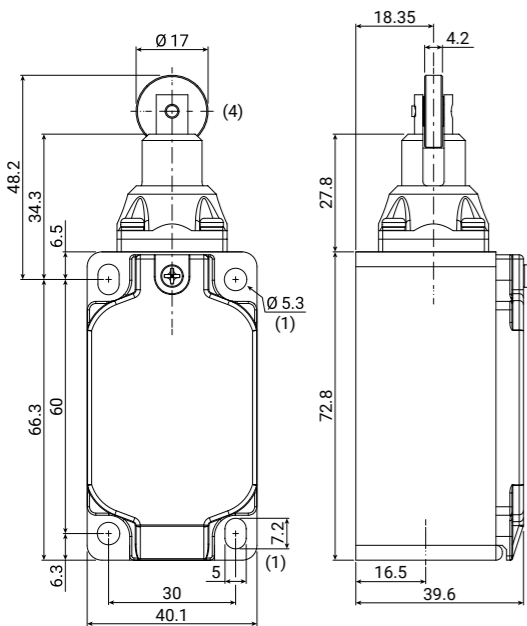
FTNG134

Limit switch with metal roller plunger
IP67



FTNG series	1 function	34 actuator	XXX contact type	XX conduit entry
FTNG 40 mm thermoplastic limit switches for heavy applications	1 without reset function	34 metal roller plunger	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M20 x 1.5 (standard) N 1/2" NPT G3 PG13.5 C male code "A" M12 x 1 connector

technical drawing - sizes in mm



(1) mounting holes
(4) metal roller

contact type

operation diagrams

X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	2.6 mm	3.8 mm	11.6 N	6.0 mm	28 N	7.0 mm
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	2.6 mm	-	11.6 N	6.0 mm	28 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		2.6 mm	-	11.4 N	-	-	
			2.5 mm	1.2 mm	10.4 N	4.9 mm	22 N	
			2.5 mm	1.2 mm	8.6 N	4.9 mm	22 N	
			2.8 mm	3.5 mm	9.4 N	5.0 mm	10 N	
			2.8 mm	-	9.4 N	5.0 mm	10 N	

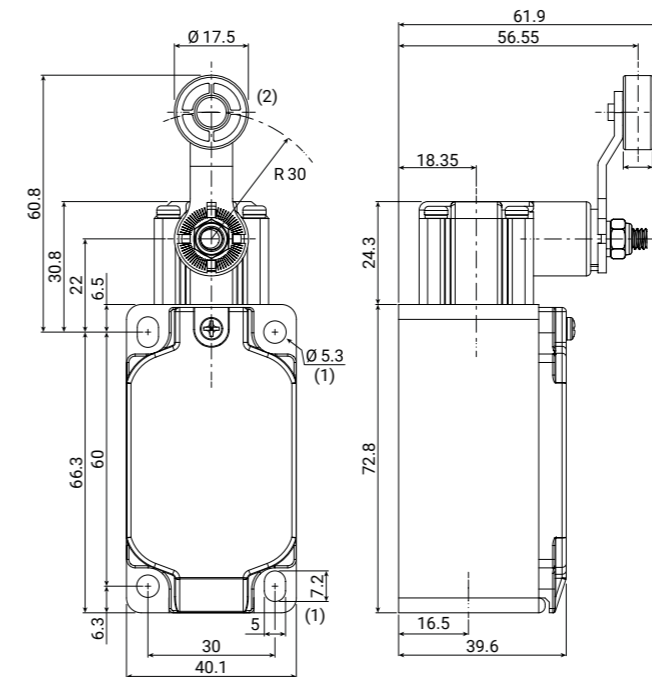
FTNG138

Limit switch with Ø18 PA roller lever
IP67



FTNG series	1 function	38 actuator	XXX contact type	XX conduit entry
FTNG 40 mm thermoplastic limit switches for heavy applications	1 without reset function	38 Ø18 PA roller lever	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M20 x 1.5 (standard) N 1/2" NPT G3 PG13.5 C male code "A" M12 x 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type

operation diagrams

X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	33°	45°	6.5 N	45°	8.5 N	80°
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	33°	-	6.5 N	45°	8.5 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		33°	-	6.5 N	-	-	
			35°	15°	5.5 N	65°	13.2 N	
			35°	15°	5.5 N	65°	13.2 N	
			35°	42°	6.5 N	50°	8 N	
			35°	-	6.5 N	50°	8 N	

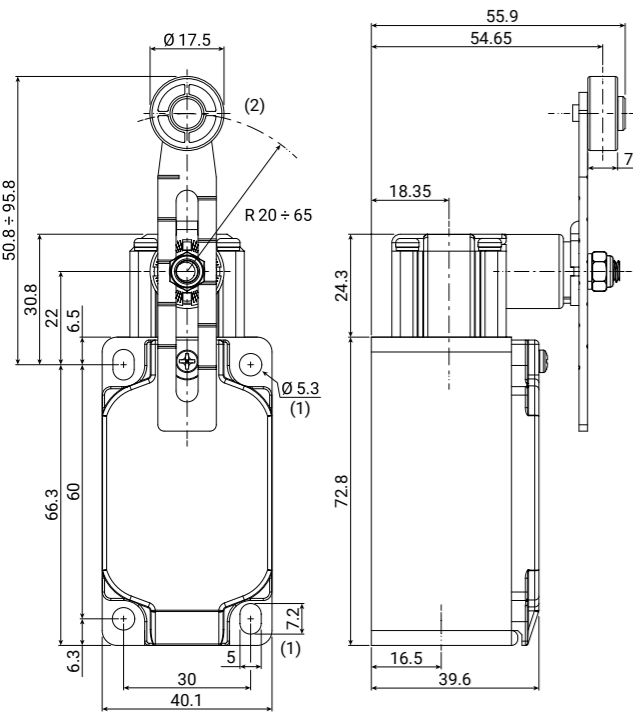
FTNG139

Limit switch with Ø18 PA roller lever with variable length
IP67



FTNG series	1 function	39 actuator	XXX contact type	XX conduit entry
FTNG 40 mm thermoplastic limit switches for heavy applications	1 without reset function	39 Ø18 PA roller lever with variable length	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M20 x 1.5 (standard) N 1/2" NPT G3 PG13.5 C male code "A" M12 x 1 connector

technical drawing - sizes in mm



(1) mounting holes
(2) plastic roller

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

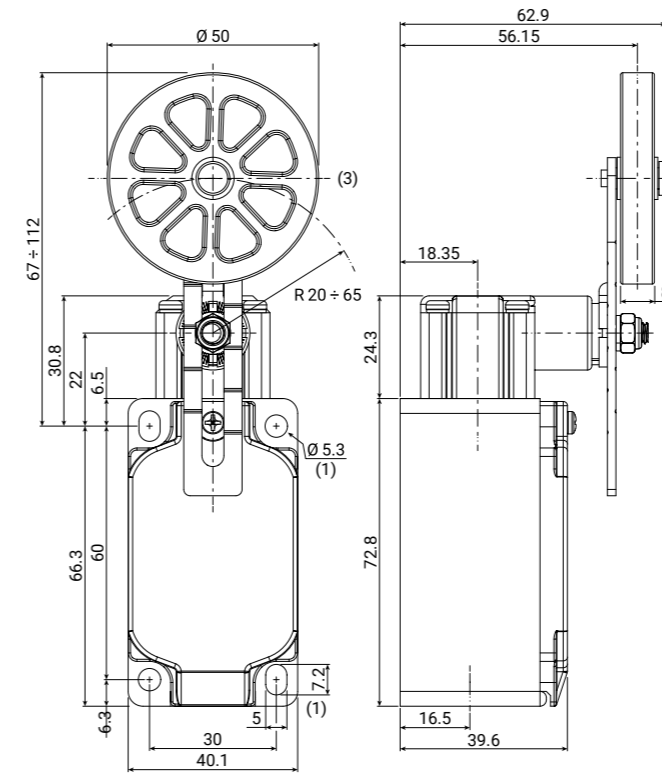
FTNG140

Limit switch with Ø50 rubber roller lever with variable length
IP67



FTNG series	1 function	40 actuator	XXX contact type	XX conduit entry
FTNG 40 mm thermoplastic limit switches for heavy applications	1 without reset function	40 Ø50 rubber roller lever with variable length	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M20 x 1.5 (standard) N 1/2" NPT G3 PG13.5 C male code "A" M12 x 1 connector

technical drawing - sizes in mm



(1) mounting holes
(3) rubber roller

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
W20 2NO slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	33°	45°	6.5 N	45°	8.5 N	80°
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	35°	15°	5.5 N	65°	13.2 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		35°	42°	6.5 N	50°	8 N	
			35°	-	6.5 N	50°	8 N	
			33°	-	6.5 N	45°	8.5 N	
			33°	-	6.5 N	-	-	

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	33°	45°	6.5 N	45°	8.5 N	80°
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	35°	15°	5.5 N	65°	13.2 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		35°	42°	6.5 N	50°	8 N	
			35°	-	6.5 N	50°	8 N	
			33°	-	6.5 N	45°	8.5 N	
			33°	-	6.5 N	-	-	

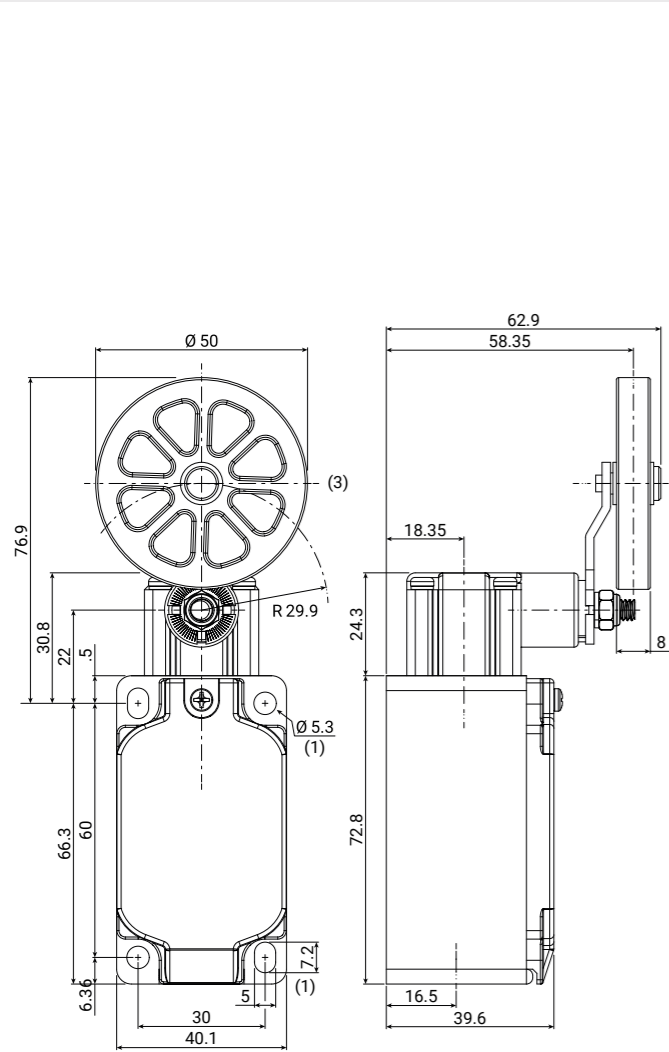
FTNG141

Limit switch with Ø50 rubber roller lever
IP67



FTNG series	1 function	41 actuator	XXX contact type	XX conduit entry
FTNG 40 mm thermoplastic limit switches for heavy applications	1 without reset function	41 Ø50 rubber roller lever	X11: 1NO+1NC W02: 2NC W20: 2NO Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M20 x 1.5 (standard) N 1/2" NPT G3 PG13.5 C male code "A" M12 x 1 connector

technical drawing - sizes in mm



(1) mounting holes
(3) rubber roller

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	33°	45°	6.5 N	45°	8.5 N	80°
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	35°	15°	5.5 N	65°	13.2 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		35°	42°	6.5 N	50°	8 N	
			35°	-	6.5 N	50°	8 N	
			33°	-	6.5 N	45°	8.5 N	
			33°	-	6.5 N	-	-	

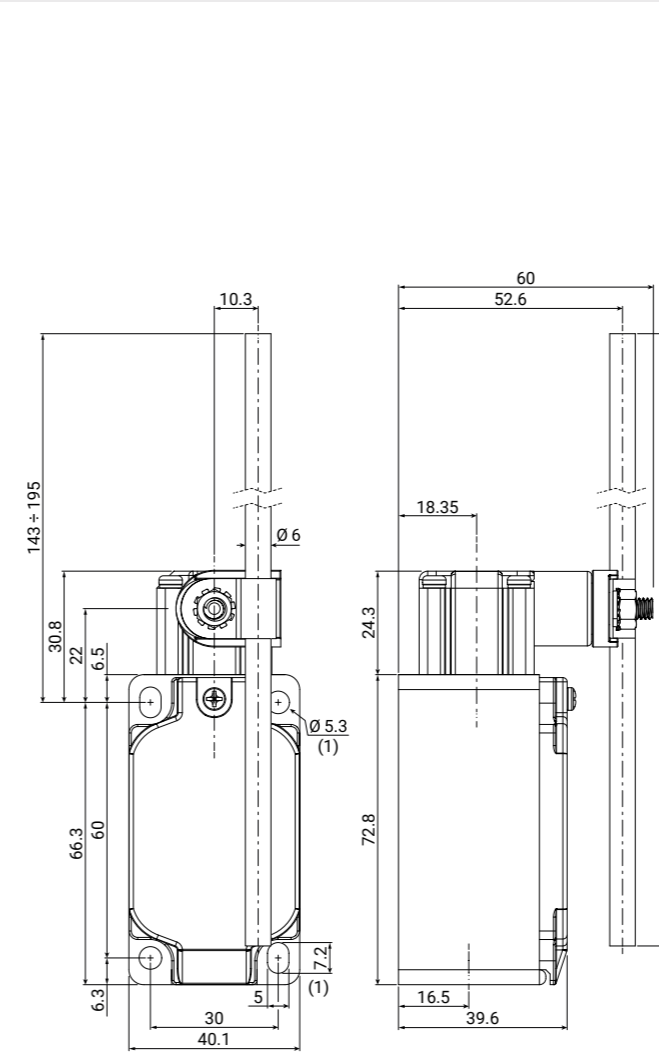
FTNG172

Limit switch with adjustable PA rod lever
IP67



FTNG series	1 function	72 actuator	XXX contact type	XX conduit entry
FTNG 40 mm thermoplastic limit switches for heavy applications	1 without reset function	72 adjustable PA rod lever	X11: 1NO+1NC W02: 2NC Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	blank M20 x 1.5 (standard) N 1/2" NPT G3 PG13.5 C male code "A" M12 x 1 connector

technical drawing - sizes in mm



(1) mounting holes

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC W20: 2NO	A600-Q600	AC15: 400V - 4A	33°	45°	6.5 N	45°	8.5 N	80°
Z11: 1NO+1NC Z02: 2NC	B600-Q600	DC13: 24V - 6A	35°	15°	5.5 N	65°	13.2 N	
W12: 1NO+2NC W03: 3NC	A300-Q300		35°	42°	6.5 N	50°	8 N	
			35°	-	6.5 N	50°	8 N	
			33°	-	6.5 N	45°	8.5 N	
			33°	-	6.5 N	-	-	



OVERVIEW



The **STNK series** thermoplastic safety switches with separate actuator comply with EN 50047 and are designed to provide different switch variants (slow action or snap action basic switches) and three different separate actuators that complete the product body.

The thermoplastic bodies have two fixing holes with distance of 20 or 22 mm and one hole for cable entry on the bottom of the switch. Various types of threaded cable entry are available to cover the main requirements of the international market.

In terms of design, the switching element and actuator are separated. **The product is sold as complete with body and key.** The stainless steel key is fixed to the moving part of the guard in such a way that it is separated from the switch whenever the guard is opened.

The positive opening NC contact is always open when the actuator is withdrawn. A special mechanism ensures that the removal of the actuator forces a positive opening of the electrical contacts.

The STNK series is designed to control gates, sliding doors and other guards that protect dangerous parts of machinery without inertia.

They are suitable for use in the harshest environmental conditions with an **operating temperature range of -25°C to +80°C.**

All models in the series are **IP65 rated.**

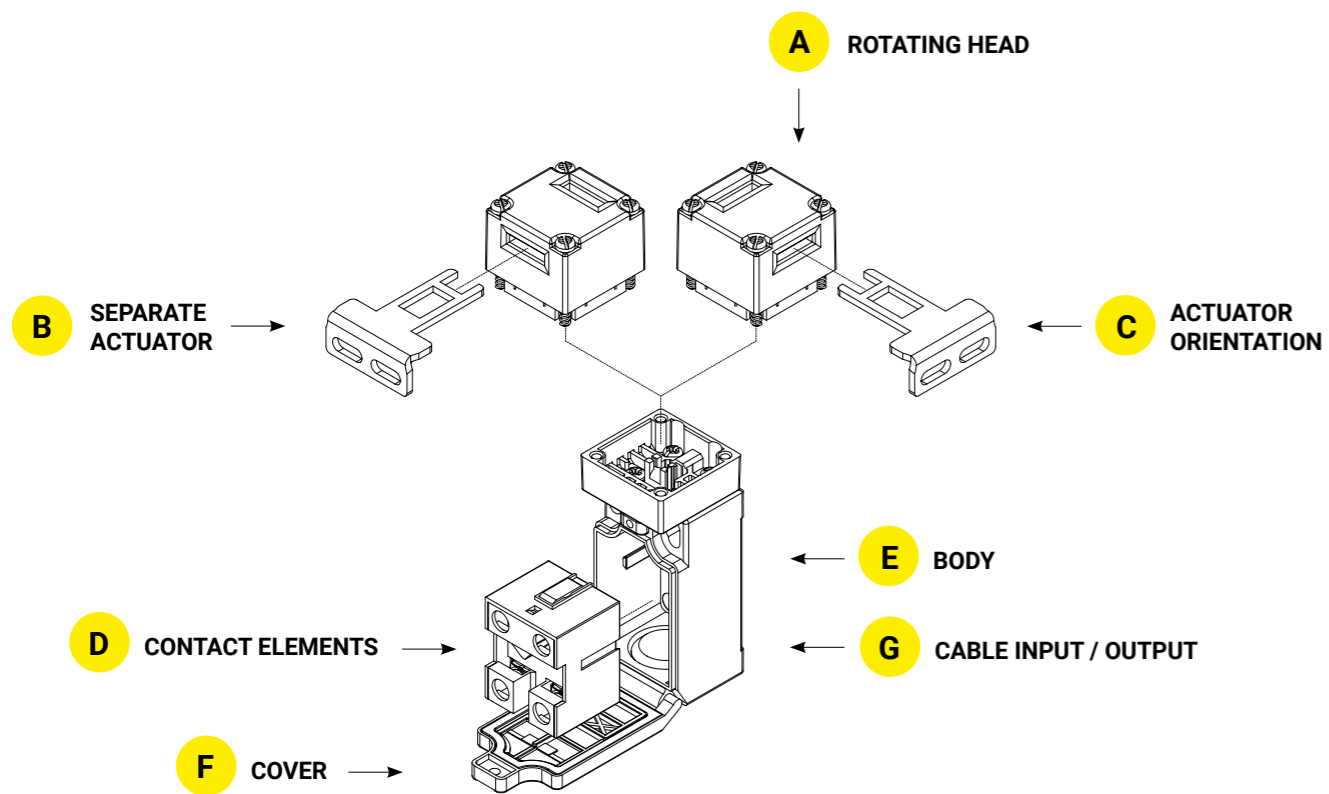


SPECIFICATIONS

Standards		EN 60947-5-1, UL 508, EN 50047, EN 1088, EN 60204-1
Approvals		cULus, EAC, CCC and CE marked for all applicable directives
Positive opening operation		NC contacts conforming to IEC /EN 60947-5-1 ⊕
Minimum current		5 mA - 5 V DC
Thermal current	I _{th}	10 A
Rated insulation voltage	U _i	500 V AC
Rated impulse withstand voltage	U _{imp}	6 kV
Insulation resistance	min	100 MΩ (DC 500 V)
Contact resistance	max	25 mΩ (initial)
Actuator frequency	max	2 cycles/min
Enclosure material		UL approved glass-filled polybutylene terephthalate
Enclosure protection		IP65
Operating temperature		-25 ... +80°C (-13 ... +176°F)
Pollution degree		3
Protection against electric shock		Class II (double Insulation) □ Double insulation makes ground terminal unnecessary
Electrical life expectancy	min	150.000 cycles
Mechanical life expectancy	min	1 x 10 ⁶ cycles
Vibration	IEC 68-2-6 excursion	10-55 Hz ± 1Hz 0.35 mm, 1 octave/min
Conduit entry		arious international conduit sizes (see product selection table pag. 91)
Fixing		2 x M4 screws

STNK SERIES
thermoplastic safety switches with separate actuator

STRUCTURE DESCRIPTION



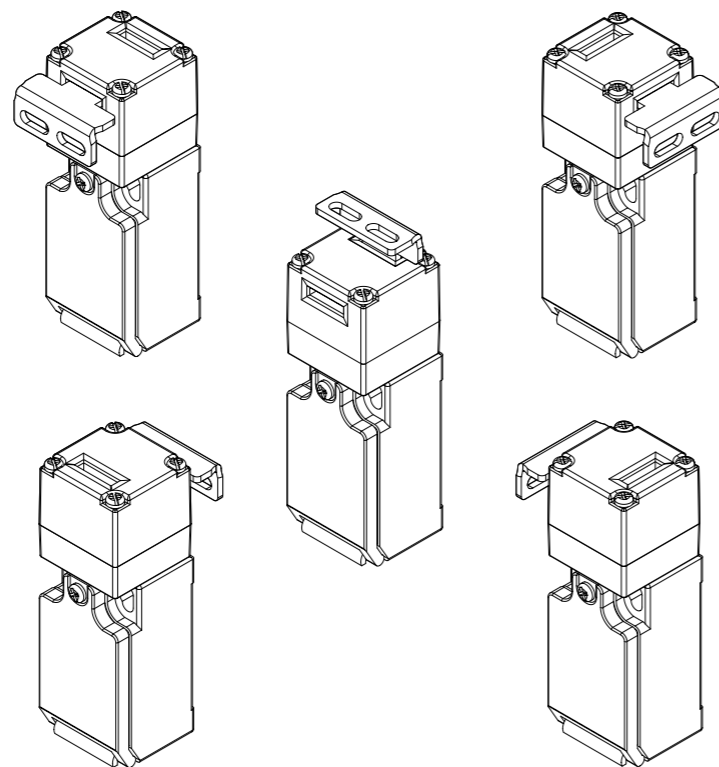
A - ROTATING HEAD

The heads are made of UL approved glass-filled polybutylene terephthalate.

All heads can be adjusted in steps of 90° over 360°, compared to the body.

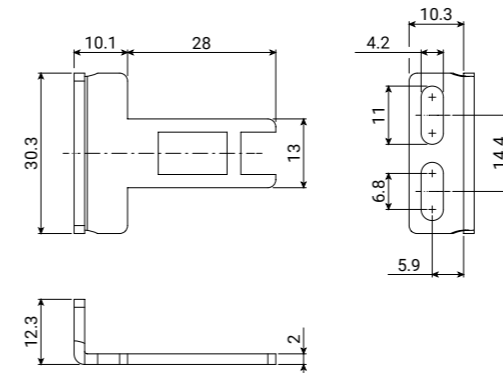
The direction of the switch head can be varied in one of four directions by loosening the screws at the four corners of the head.

The working planes of the device vary depending on the orientation of the head and actuator.

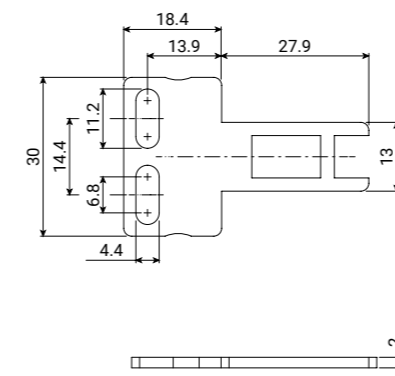


B - SEPARATE ACTUATOR

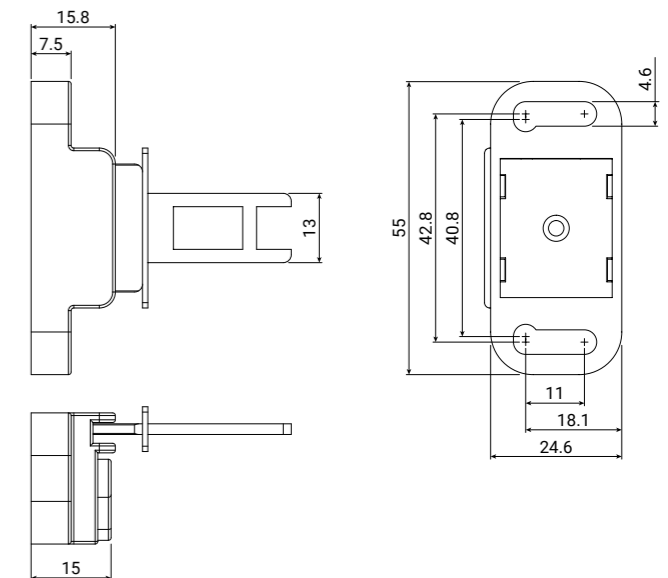
01 Angled actuator



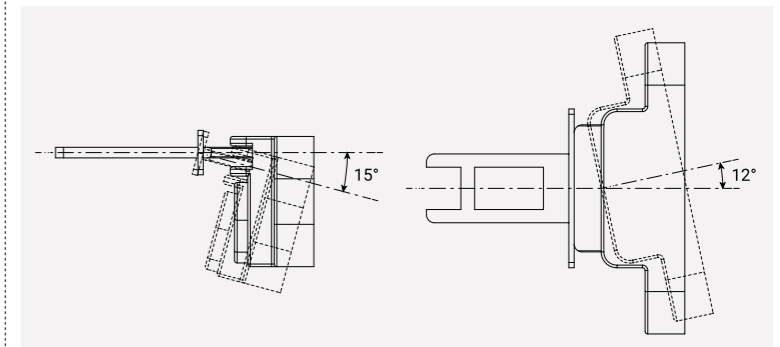
02 Straight actuator



03 Jointed actuator



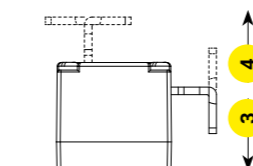
The actuator can flex in four directions for applications where the protection alignment is not precise.



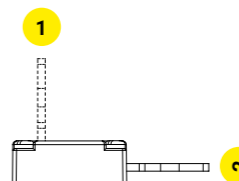
C - ACTUATOR ORIENTATION

The key actuator can be inserted into the side or upper hole.

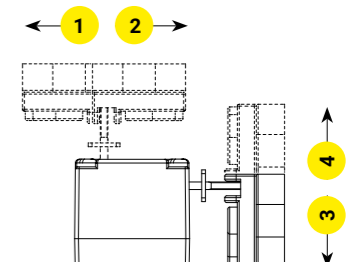
The keys can be inserted in both housings by choosing the orientation that suits the application.



Angled actuator



Straight actuator

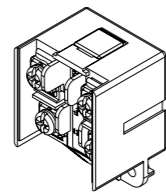


Jointed actuator

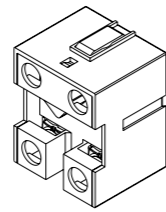
D - CONTACT ELEMENT

The built-in switch has a direct opening mechanism that forcibly separates the NC contact even when there is a contact deposit.

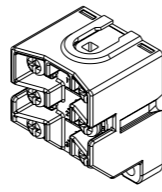
Different contact elements are available, both fast-acting and slow-acting according to different application requirements.



X11: 1NO+1NC
Slow action (Zb)



Z11: 1NO+1NC
Snap action (Zb)



W12: 1NO+2NC
Slow action (Zb)

W02: 2NC
Slow action (Zb)

Z02: 2NC
Snap action (Zb)

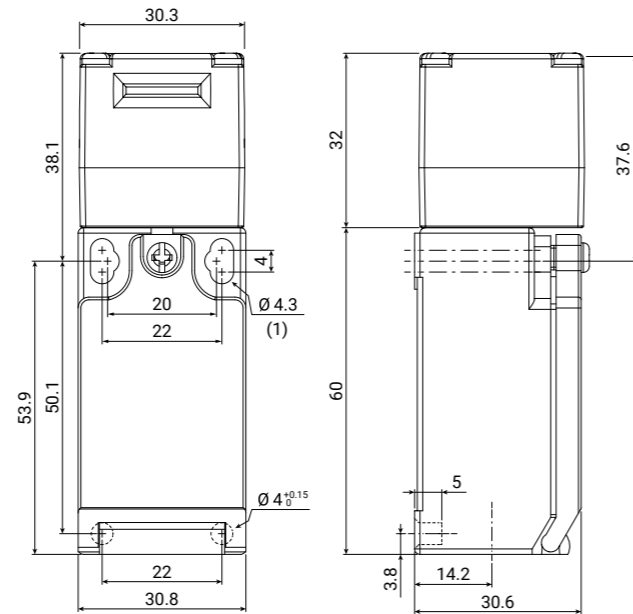
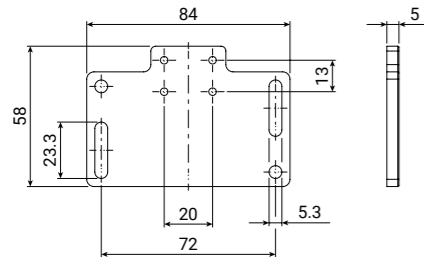
W03: 3NC
Slow action (Zb)

E - BODY

The body complies with EN 50047, with a distance of 20/22 mm between the fixing holes.

It is available a fixing plate with slots to adjust the operating point, developed for backward compatibility with old products. The plate is sold in kits (code: **KIT-FTN**) comprising:

- 1 plate;
- 2 self-tapping screws 4 × 28 mm;
- 2 washers Ø4 mm.



F - COVER

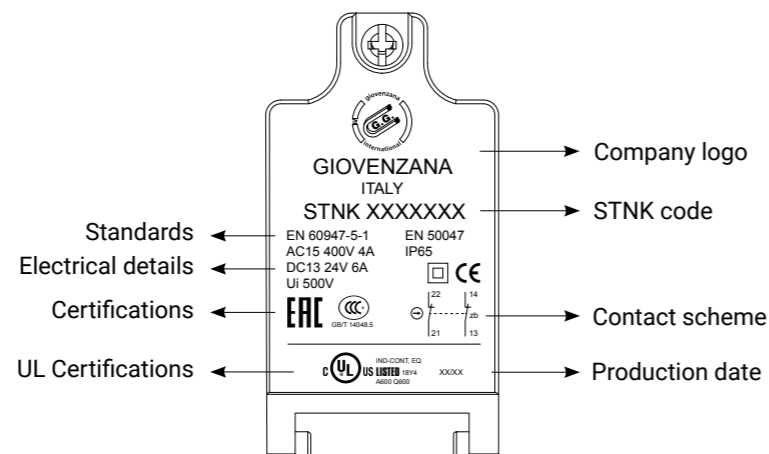
Material conforming to the RoHS Directive.

The lid is laser marked to ensure branding, coding and information on product specifications such as technical data, production date, stock or lot number, revision or control date. Lasering ensures the complete traceability of our products and components and is essential for compliance with ISO quality standards.

Some of the advantages:

- clear and precise text legibility;
- guaranteed lifetime unlike ink which deteriorates over time.

The cover, with a hinge at the bottom, can be opened by removing the screw, which ensures easy maintenance and wiring.



G - CABLE INPUT / OUTPUT

A threaded cable input/output is provided at the bottom of the switch.

6 standard and customised cable input/output models are available in order to cover the major international markets.

Standard: Blank: M16 × 1.5

On request: M: M20 × 1.5

N: 1/2" NPT

G1: Pg 11

G3: Pg 13.5

C: M12 connector

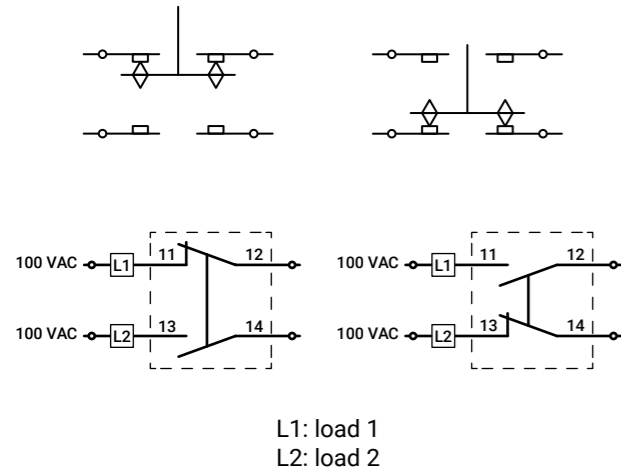
CONTACT ELEMENT - SPECIFICATIONS

CONTACT TYPES	CONTACT FORM	ELECTRICAL SCHEMES	CONNECTOR PIN ARRANGEMENT
X11	1NO+1NC Slow action Zb		
W02	2NC Slow action Zb		
Z11	1NO+1NC Snap action Zb		
Z02	2NC Snap action Zb		
W12	1NO+2NC Slow action Zb		No connector
W03	3NC Slow action Zb		No connector

CONTACT ELEMENT - CLASSIFICATION (ACCORDING EN 60947-5-1)

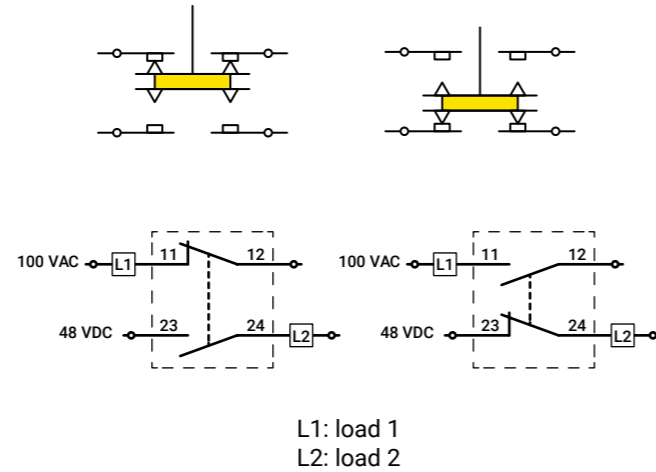
Za contact type

A single blade opens and closes the contacts. With this type of contact it is NOT possible to power the circuit with different voltages and polarity.



Zb contact type

In this case there are two blades that open and close the contact. The two blades are electrically isolated from each other. Therefore, with this type of contact it is possible to power the circuit with different voltages and polarity.



STNK series of thermoplastic safety switches with separate actuator is equipped with Zb contacts.

SAFETY INTEGRITY LEVEL ACCORDING TO IEC 61508

IEC 61508: Functional safety of electrical / electronic / programmable electronic safety systems

STNK SERIES: thermoplastic safety switches with separate actuator IP65

Configuration 1oo2 (redundant) 2NC or 2NO or NC + NO positive opening / closing with diagnostics on the two contacts (consistency and crossing check).

λ_{SD}	$1.79 \cdot 10^{-8}$	h^{-1}	λ_S	$2.18 \cdot 10^{-7}$	h^{-1}
λ_{SU}	$2.00 \cdot 10^{-7}$	h^{-1}	λ_D	$1.20 \cdot 10^{-7}$	h^{-1}
λ_{DD}	0.00	h^{-1}			
λ_{DU}	$1.20 \cdot 10^{-7}$	h^{-1}	λ_{TOT}	$3.39 \cdot 10^{-7}$	h^{-1}

SFF	64.48%	MTTR	4	h
		TID	0.0016667	h

TI	1	2	5	years
----	---	---	---	-------

PFDv	$5.27 \cdot 10^{-4}$	$1.05 \cdot 10^{-3}$	$2.64 \cdot 10^{-3}$
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SIL	3	2	2
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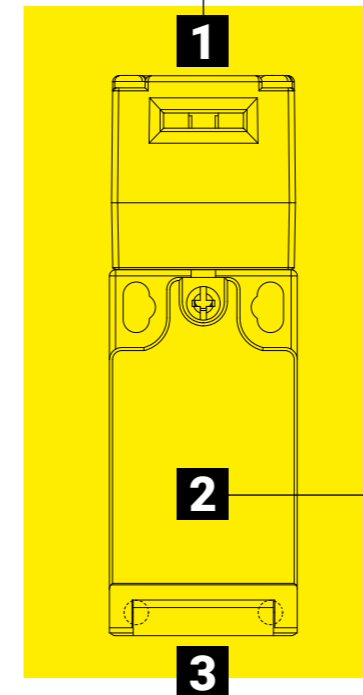
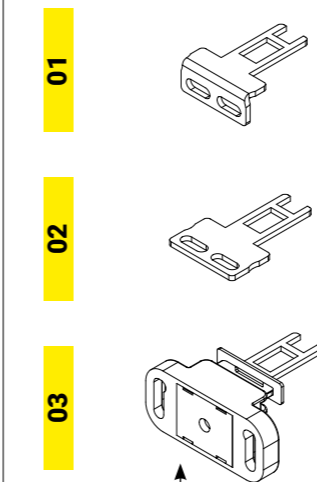
SIL³



STNK01 STNK02 STNK03

STNK - PRODUCT SELECTION OVERVIEW

1 SEPARATE ACTUATORS



3 CONDUIT ENTRY

Threaded conduit entry

Standard:
M16 x 1.5

On request:
M20 x 1.5
1/2" NPT
PG11
PG13.5
With connector

2 CONTACT BLOCKS

X11		Z11	
1NO+1NC - slow action (Zb)		1NO+1NC - snap action (Zb)	
W02		Z02	
2NC - slow action (Zb)		2NC - snap action (Zb)	
W12		W12	
1NO+2NC - slow action (Zb)		1NO+2NC - slow action (Zb)	
W03		W03	
3NC - slow action (Zb)		3NC - slow action (Zb)	

CONTACT TYPES		CATEGORIES RATINGS	
X11	1NO+1NC	slow action (Zb)	A600
W02	2NC		Q600
Z11	1NO+1NC	slow action (Zb)	B600
Z02	2NC	slow action (Zb)	Q600
W12	1NO+2NC	slow action (Zb)	A300
W03	3NC	slow action (Zb)	Q300

AC15:
400 V - 4 A

DC13:
24V - 6 A

STNK - CODE SELECTION OVERVIEW

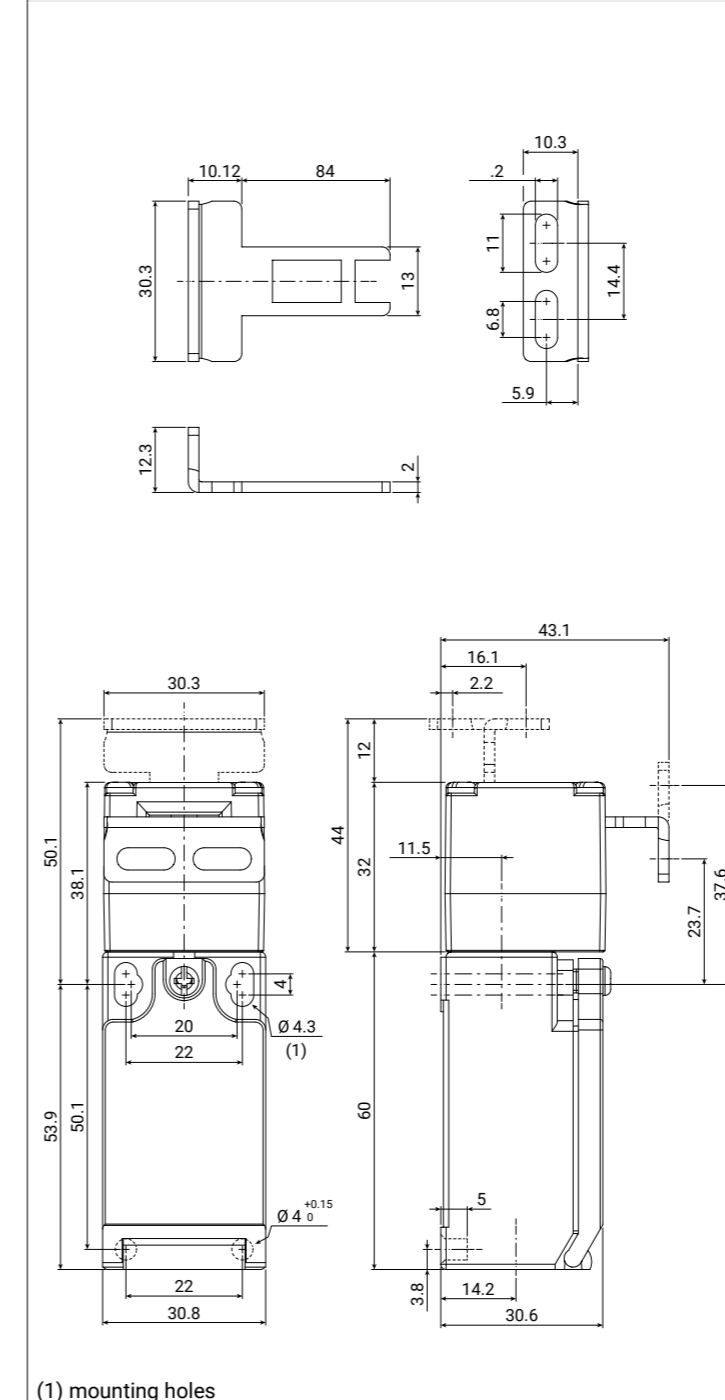
S T N K	0 1	X 1 1	
SERIES	SEPARATE ACTUATOR	CONTACT TYPE	CONDUIT ENTRY
STNK thermoplastic safety switches with separate actuator	01 angled actuator 02 straight actuator 03 jointed actuator	X11 1NO+1NC slow action Zb W02 2NC slow action Zb Z11 1NO+1NC snap action Zb Z02 2NC snap action Zb W12 1NO+2NC slow action Zb W03 3NC slow action Zb	<i>standard</i> blank M16 x 1.5 <i>on request</i> M M20 x 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 x 1 connector

STNK01

Thermoplastic safety switch with angled actuator
IP65



technical drawing - sizes in mm



(1) mounting holes

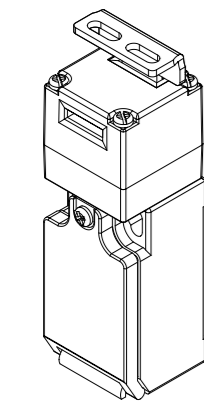
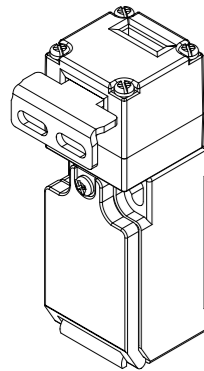
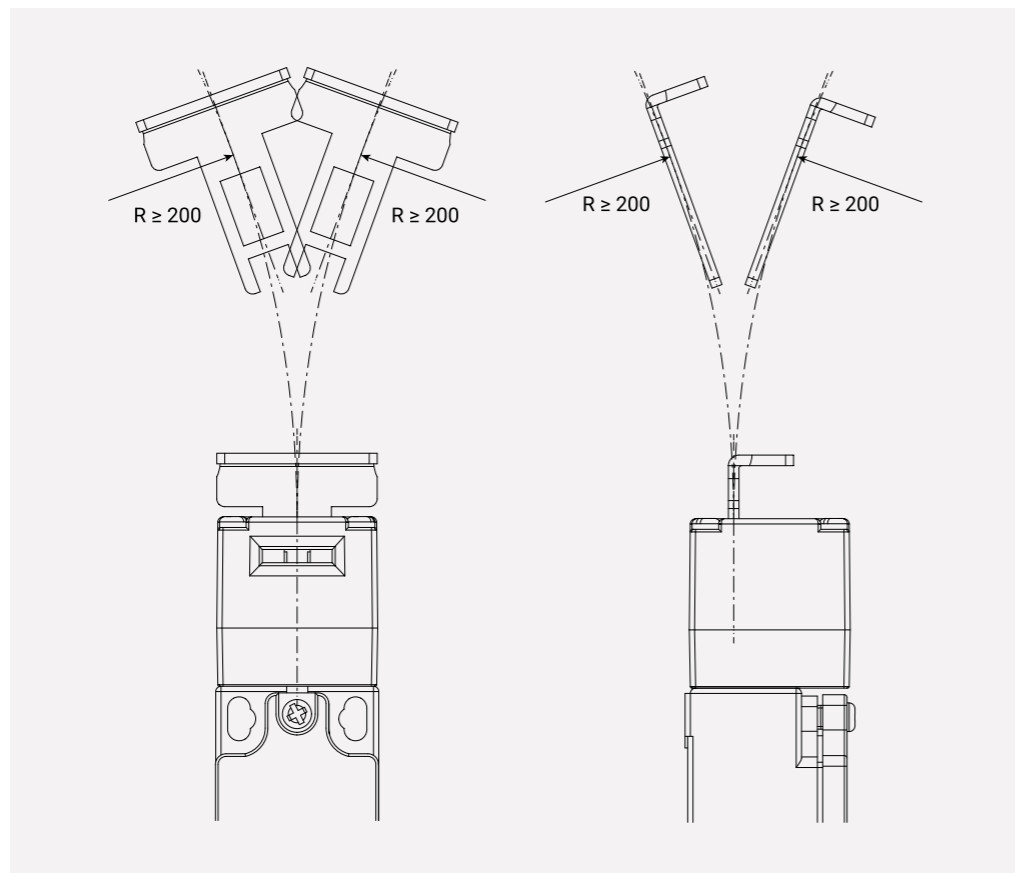
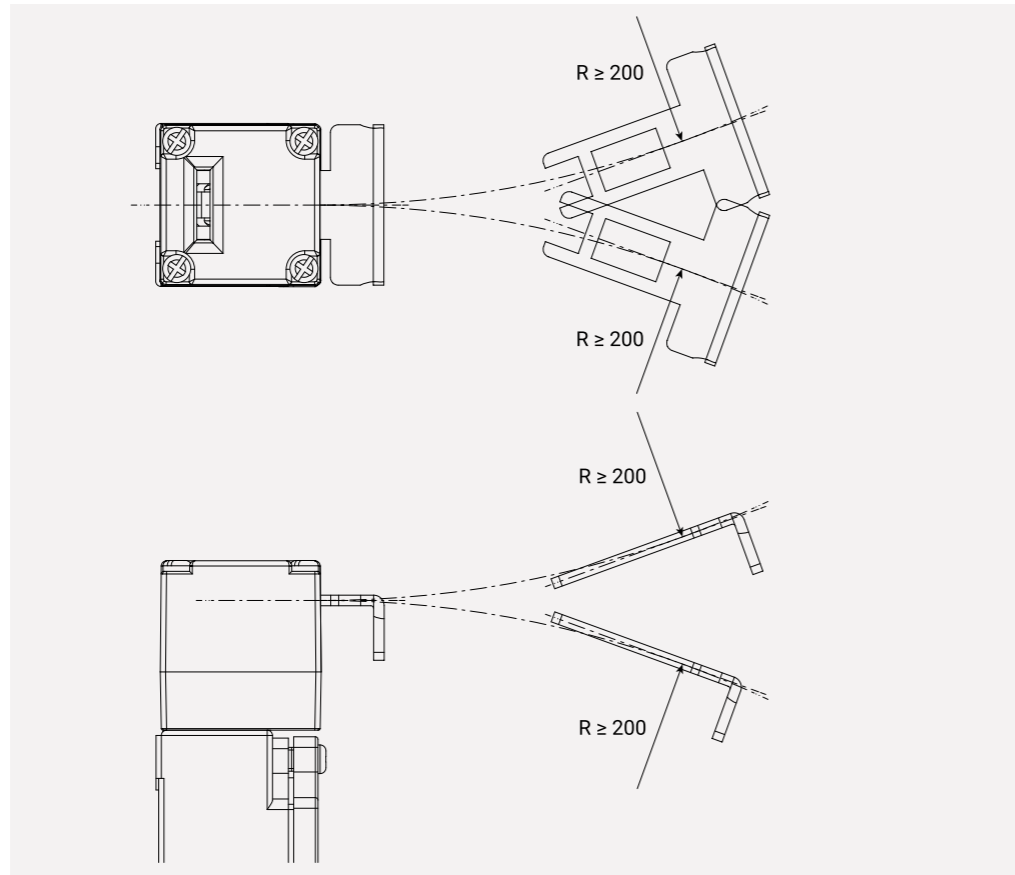
STNK series	01 actuator	XXX contact type	XX conduit entry
STNK thermoplastic safety switch	with angled actuator	X11: 1NO+1NC slow action (Zb) W02: 2NC Z11: 1NO+1NC snap action (Zb) Z02: 2NC W12: 1NO+2NC slow action (Zb) W03: 3NC	blank M16 x 1.5 (standard) M M20 x 1.5 N 1/2" NPT G1 PG11 G3 PG13.5 C male code "A" M12 x 1 connector

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC slow action (Zb)	A600-Q600	AC15: 400V - 4A	7.4 mm	8.4 mm	25 N	8.1 mm	60 N	∞
W02: 2NC	B600-Q600		7.4 mm	-	25 N	8.1 mm	60 N	
Z11: 1NO+1NC snap action (Zb)		A300-Q300	6.5 mm	4.8 mm	14 N	8.0 mm	26 N	
Z02: 2NC	6.5 mm		4.5 mm	14 N	8.0 mm	26 N		
W12: 1NO+2NC slow action (Zb)		DC13: 24V - 6A	7.2 mm	8.0 mm	25 N	8.2 mm	60 N	
W03: 3NC			7.2 mm	-	25 N	8.2 mm	60 N	

STNK01

Thermoplastic safety switch with angled actuator
IP65

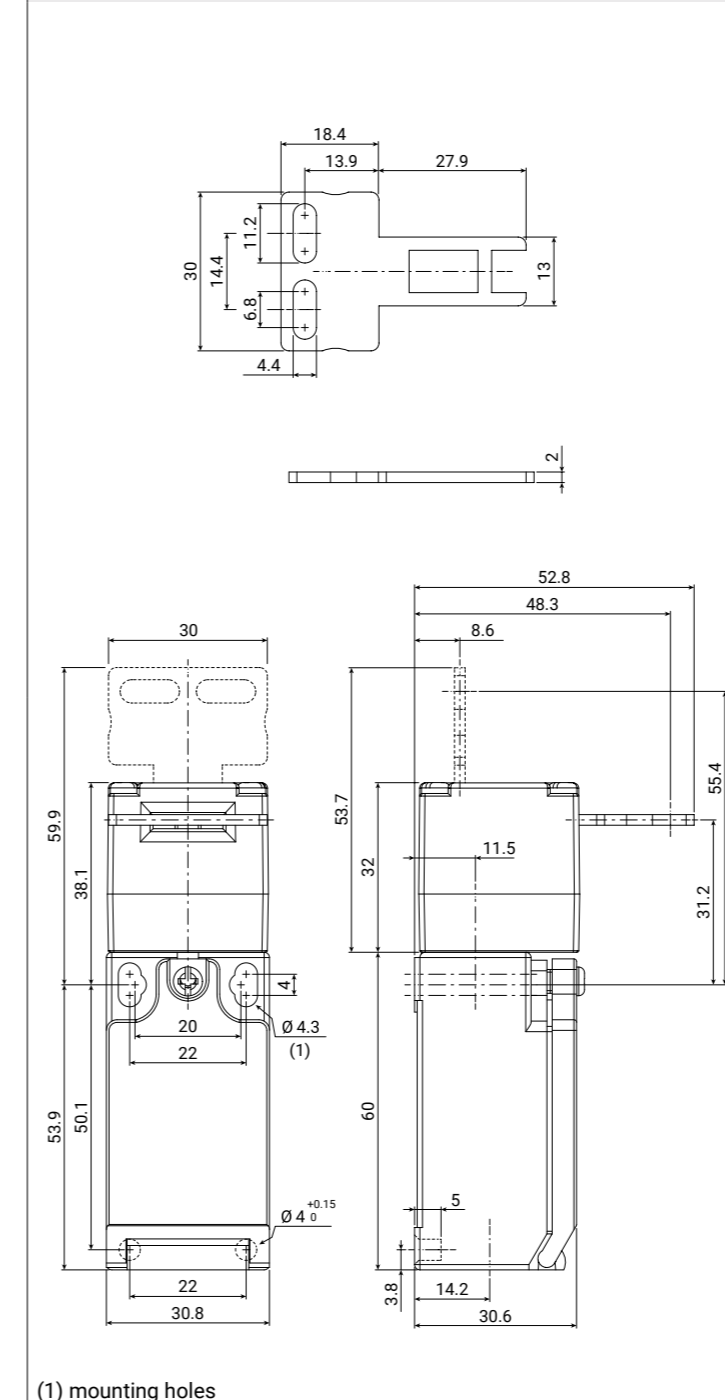


STNK02

Thermoplastic safety switch with straight actuator
IP65



technical drawing - sizes in mm



(1) mounting holes

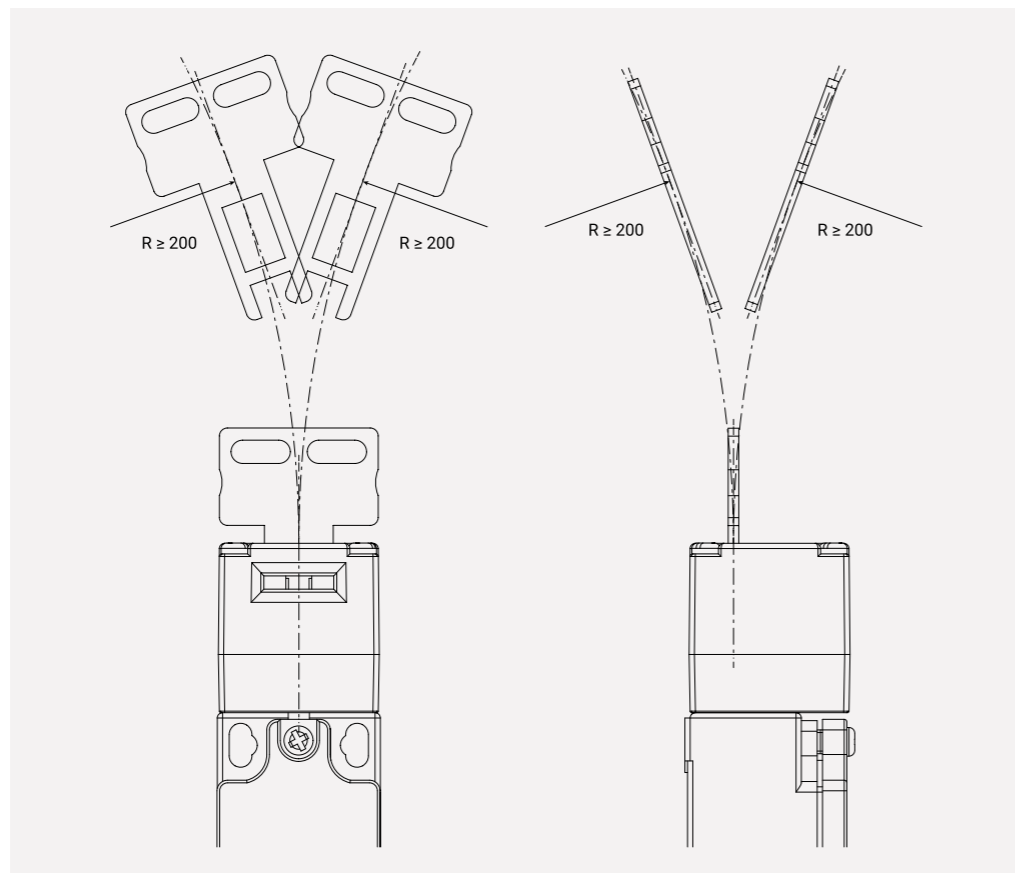
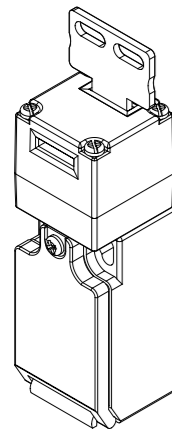
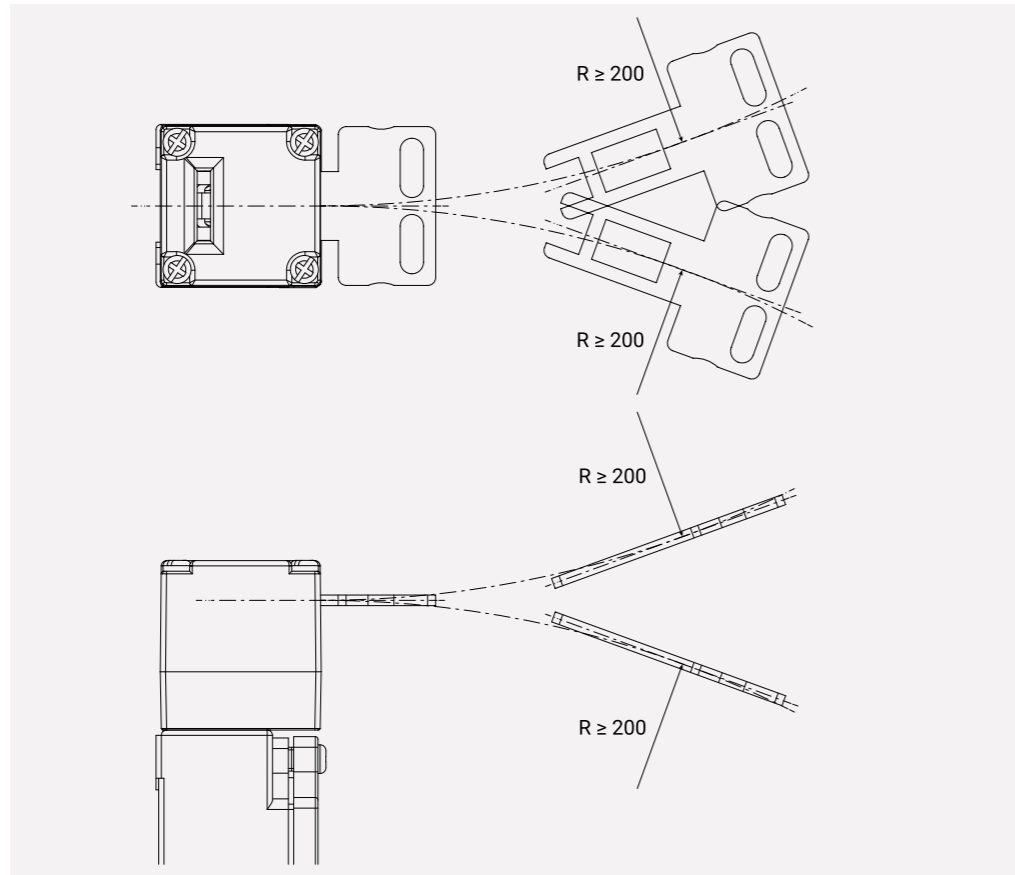
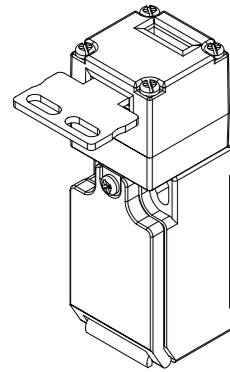
STNK series	02 actuator	XXX contact type	XX conduit entry
STNK thermoplastic safety switch	with straight actuator	X11: 1NO+1NC W02: 2NC Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)
			blank M N G1 G3 C
			M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force	positive opening		total travel
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC	A600-Q600	AC15: 400V - 4A	7.4 mm	8.4 mm	25 N	8.1 mm	60 N	∞
Z11: 1NO+1NC Z02: 2NC			7.4 mm	-	25 N	8.1 mm	60 N	
W12: 1NO+2NC W03: 3NC	B600-Q600	DC13: 24V - 6A	6.5 mm	4.8 mm	14 N	8.0 mm	26 N	∞
			6.5 mm	4.5 mm	14 N	8.0 mm	26 N	
	A300-Q300		7.2 mm	8.0 mm	25 N	8.2 mm	60 N	∞
			7.2 mm	-	25 N	8.2 mm	60 N	

STNK02

Thermoplastic safety switch with straight actuator
IP65

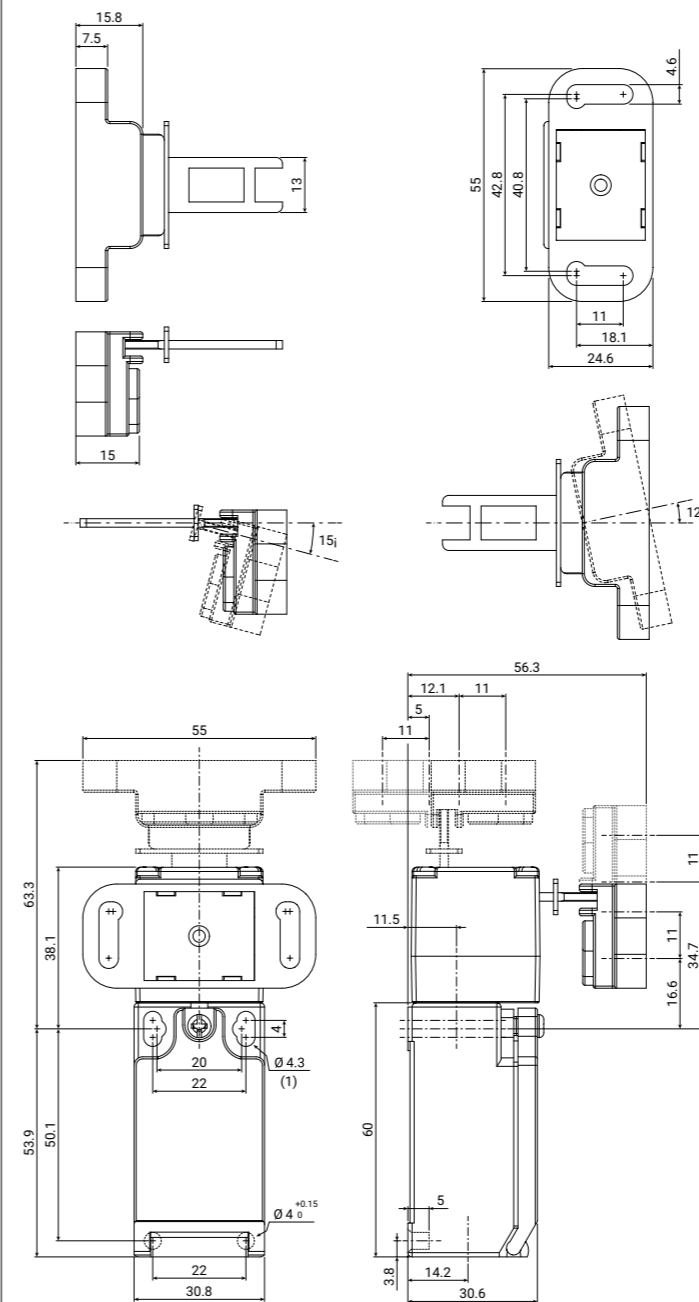


STNK03

Thermoplastic safety switch with jointed actuator
IP65



technical drawing - sizes in mm



(1) mounting holes

STNK series	03 actuator	XXX contact type	XX conduit entry
STNK thermoplastic safety switch	with jointed actuator	X11: 1NO+1NC W02: 2NC Z11: 1NO+1NC Z02: 2NC W12: 1NO+2NC W03: 3NC	slow action (Zb) snap action (Zb) slow action (Zb)
			blank M N G1 G3 C
			M16 × 1.5 (standard) M20 × 1.5 1/2" NPT PG11 PG13.5 male code "A" M12 × 1 connector

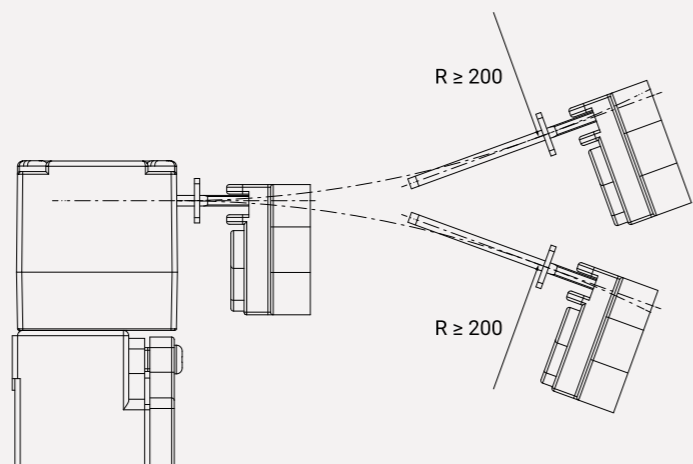
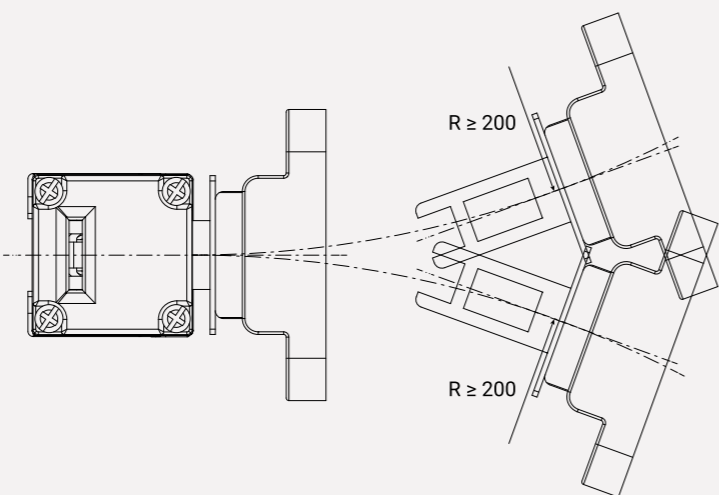
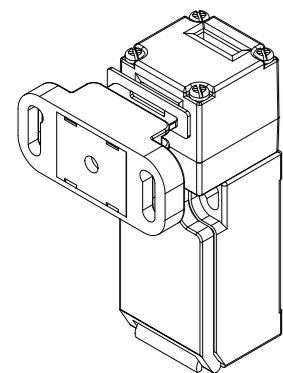
contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
W02 2NC slow action (Zb)	
Z11 1NO+1NC snap action (Zb)	
Z02 2NC snap action (Zb)	
W12 1NO+2NC slow action (Zb)	
W03 3NC slow action (Zb)	

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action) RP (snap action)		POT (travel)	POF (force)	
X11: 1NO+1NC W02: 2NC	A600-Q600	AC15: 400V - 4A	7.4 mm	8.4 mm	25 N	8.1 mm	60 N	∞
Z11: 1NO+1NC Z02: 2NC			6.5 mm	4.8 mm	14 N	8.0 mm	26 N	
W12: 1NO+2NC W03: 3NC	A300-Q300	DC13: 24V - 6A	7.2 mm	8.0 mm	25 N	8.2 mm	60 N	
			7.2 mm	-	25 N	8.2 mm	60 N	



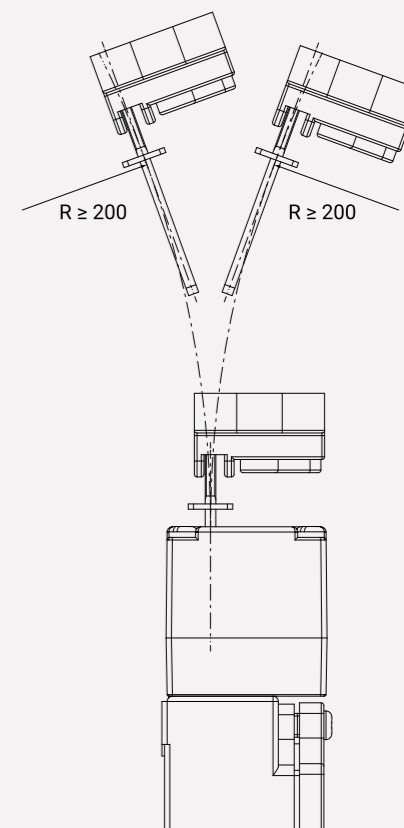
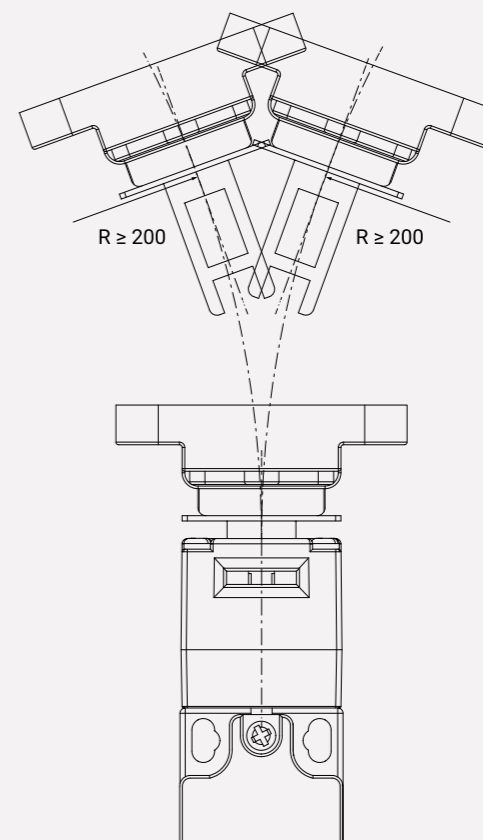
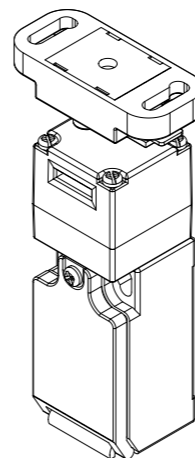
STNK03

Thermoplastic safety switch with jointed actuator
IP65



STNK03

Thermoplastic safety switch with jointed actuator
IP65





OVERVIEW

FCT series of pre-wired or M12-connected thermoplastic switches includes 4 product families characterized by the different type of connection (pre-wired or M12 connection) and the orientation of the connection output (horizontal or vertical):

- FCT2L series: with pre-wired horizontal connection on the side.
- FCT2V series: with pre-wired vertical connection on the bottom.
- FCTML series: with horizontal M12 connection on the side.
- FCTMV series: with vertical M12 connection on the bottom.

- FCT2L/FCT2V series: Available in our catalog dedicated to components for use in hazardous areas and potentially explosive atmospheres, the pre-wired thermoplastic limit switches certified ATEX and IECEx with horizontal or vertical cable exit.

The FCTM series of industrial limit switches is available with a 4-pin M12 connector integrated into the limit switch housing for modular and quick wiring installations. This industrial limit switch is available with the M12 connector for horizontal or vertical cable entry.

Limit switches with M12 connectors allow installation flexibility and replacement of wiring higher than standard industrial limit switches wired by the customer.

We also offer the pre-wired limit switches with 2 meter or custom length cables already installed.

The thermoplastic limit switches of the FTC series have an **IP67 protection class for use in harsh environments.**

They are equipped with rotating heads, adjustable levers and a double insulated housing.

SPECIFICATIONS

Standards		IEC/EN 60947-5-1, EN 60204-1
Approvals		cULus, EAC, CCC and CE marked for all applicable directives Only for M12-connected available also cRUus
Positive opening operation		NC contacts conforming to IEC /EN 60947-5-1 ☺
Rated thermal current	Ith	10 A - pre-wired 4 A - M12 connection
Rated insulation voltage	Ui	500 V AC
Rated impulse withstand voltage	Uimp	4 kV
Insulation resistance	min	100 MΩ (DC 500 V)
Contact resistance	max	25 mΩ (initial)
Enclosure material		self-extinguishing, shock-proof glass fibre reinforced technopolymer
Enclosure protection		IP67
Operating temperature		-25 ... +80°C (-13 ... +176°F)
Pollution degree		3
Protection against electric shock		Class II (double Insulation) ☐ Double insulation makes ground terminal unnecessary
Electrical life expectancy	min	150.000 cycles
Mechanical life expectancy	min	1 x 10 ⁷ cycles
Vibration	IEC 68-2-6 excursion	10-55 Hz ± 1Hz 0.35 mm, 1 octave/min
Fixing		2 x M4 screws

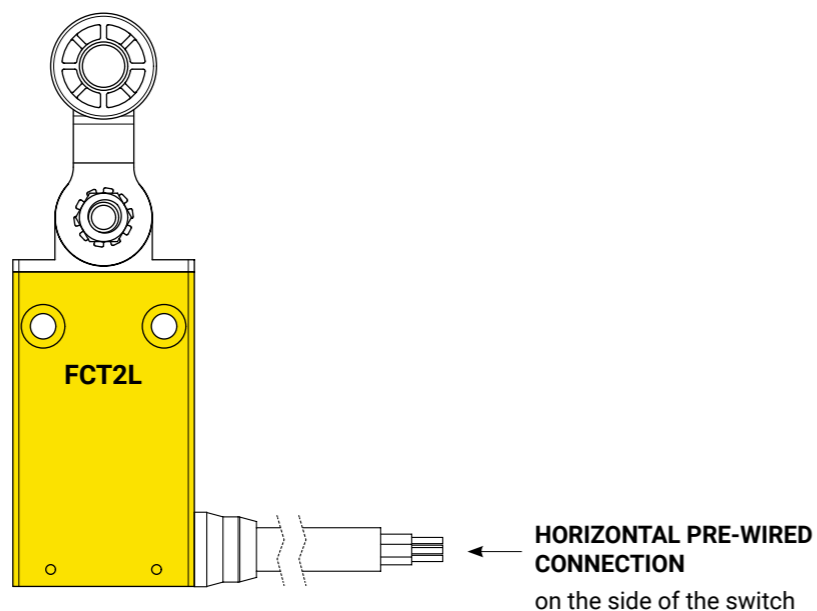
STRUCTURE DESCRIPTION

PRE-WIRED CONNECTION

L HORIZONTAL PRE-WIRED CONNECTION

ACTUATORS →
Available:
plunger, lever, roller, rod, spring

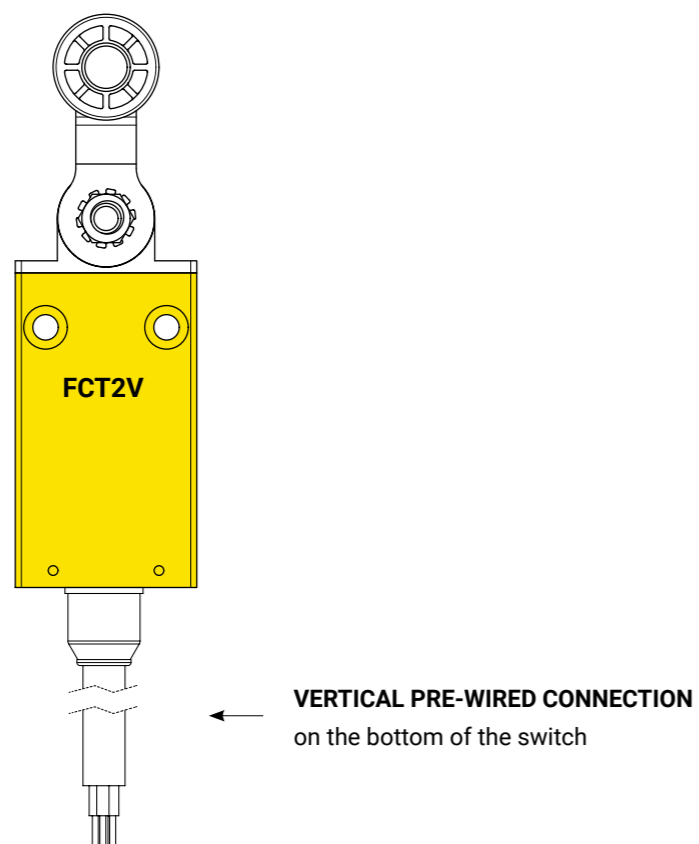
INTERNAL CONTACT ELEMENTS →
X11: 1NO+1NC - slow action (Za)
Z11: 1NO+1NC - snap action (Zb)



V VERTICAL PRE-WIRED CONNECTION

ACTUATORS →
Available:
plunger, lever, roller, rod, spring

INTERNAL CONTACT ELEMENTS →
X11: 1NO+1NC - slow action (Za)
Z11: 1NO+1NC - snap action (Zb)



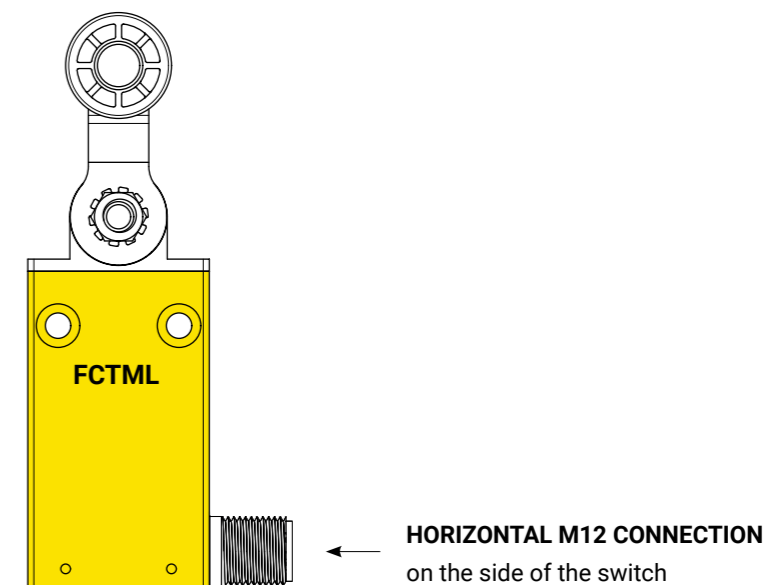
STRUCTURE DESCRIPTION

M12 CONNECTION

L HORIZONTAL M12 CONNECTION

ACTUATORS →
Available:
plunger, lever, roller, rod, spring

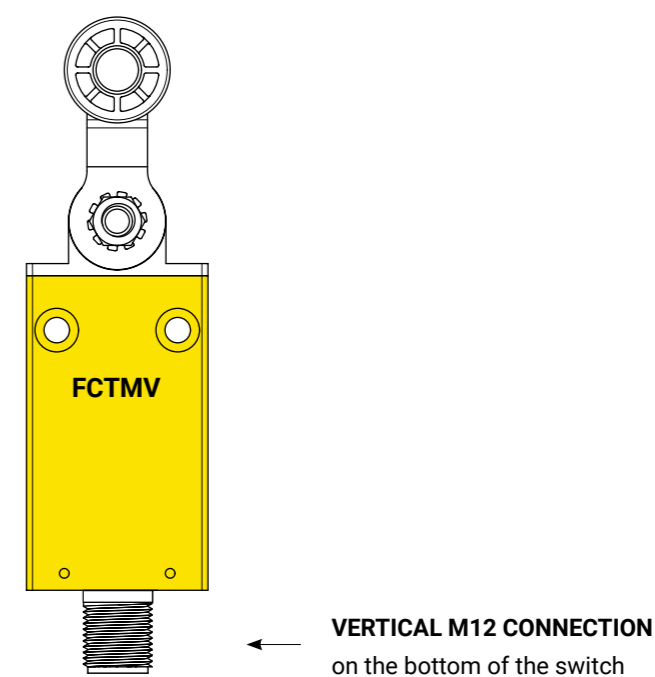
INTERNAL CONTACT ELEMENTS →
X11: 1NO+1NC - slow action (Za)
Z11: 1NO+1NC - snap action (Zb)



V VERTICAL M12 CONNECTION

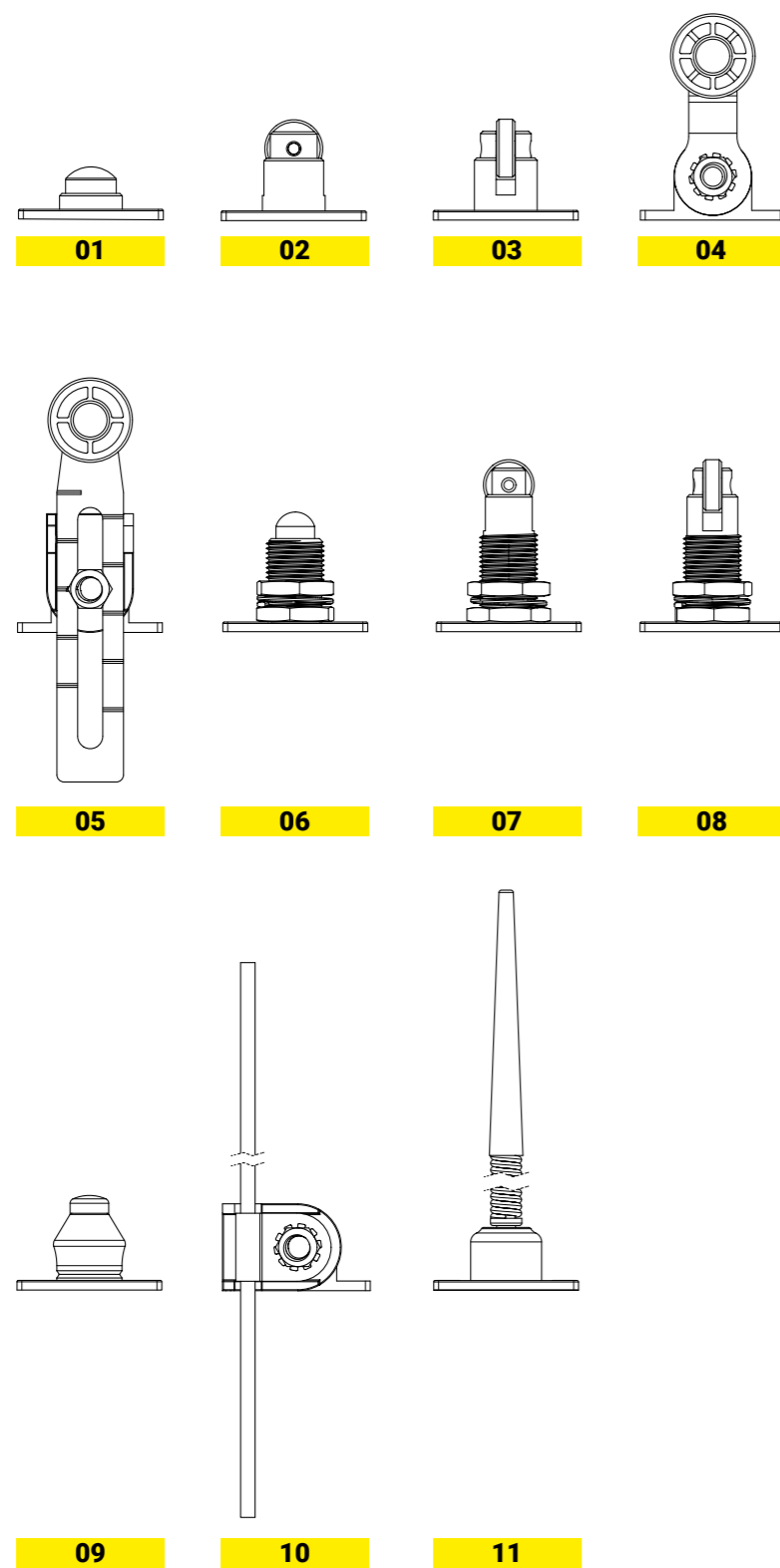
ACTUATORS →
Available:
plunger, lever, roller, rod, spring

INTERNAL CONTACT ELEMENTS →
X11: 1NO+1NC - slow action (Za)
Z11: 1NO+1NC - snap action (Zb)

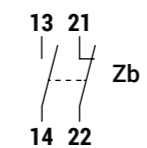


FCT - PRODUCT SELECTION OVERVIEW

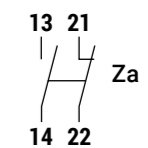
1 ACTUATORS



2 CONTACT BLOCKS



X11
1NO+1NC - slow action (Zb)

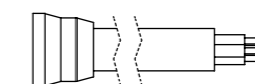


Z11
1NO+1NC - snap action (Za)

CONTACT TYPES		CATEGORIES RATINGS	
X11	1NO+1NC slow action (Zb)	A300 Q300	AC15: 400 V - 4 A
Z11	1NO+1NC snap action (Za)		DC13: 24V - 6 A

3 CONNECTION TYPE

PRE-WIRED



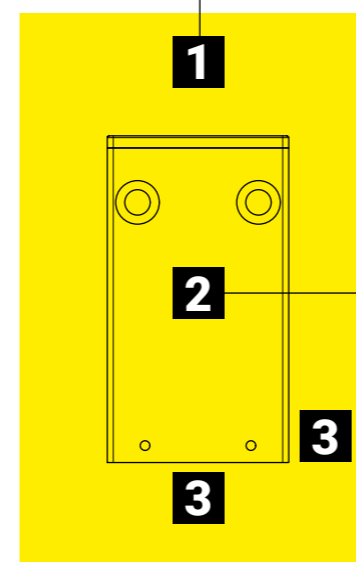
Pre-wired connection
(standard with 2 m cable)

Custom pre-wired connection
(with custom cable length)

M12-CONNECTED

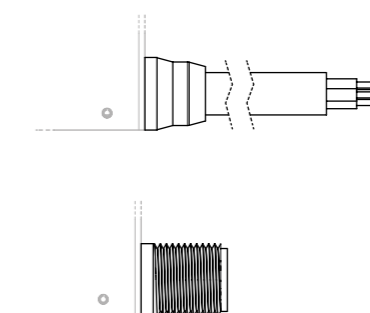


M12 connection

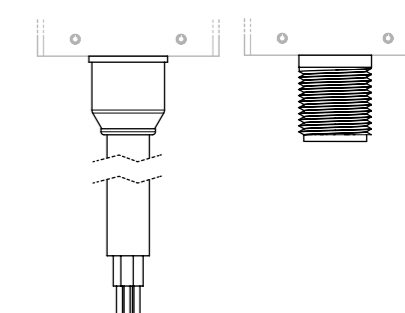


3 CONNECTION ORIENTATION

L = horizontal
(side connection)



V = vertical
(bottom connection)

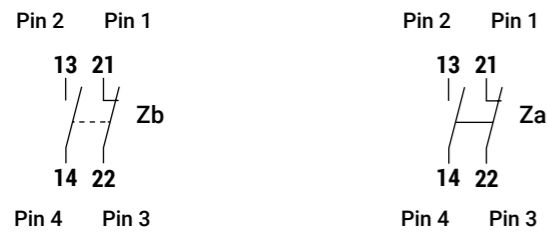


FCT - CODE SELECTION OVERVIEW

F C T			0 1	1 1	D
SERIES	CONNECTION TYPE	CONNECTION ORIENTATION	HEAD AND ACTUATOR	CONTACT TYPE	HOUSING
FCT thermoplastic limit switches	2 pre-wired with 2 m cable (standard) x pre-wired with custom cable length (length = x meters) M M12 connector	L horizontal output V vertical output	01 metal end plunger 02 steel roller plunger 03 90° steel roller plunger 04 metal revolving lever with Ø17.5 nylon roller 05 adjustable metal revolving lever with Ø17.5 nylon roller 06 metal end plunger with threaded flange 07 steel roller plunger with threaded flange 08 90° steel roller plunger with threaded flange 09 metal end plunger with rubber protection 10 adjustable steel rod lever 11 thermoplastic end flexible rod	X11 1NO+1NC slow action Zb Z11 1NO+1NC snap action Za	D plastic with 20 mm fixing holes spacing

WIRING

INTERNAL CABLE WIRING

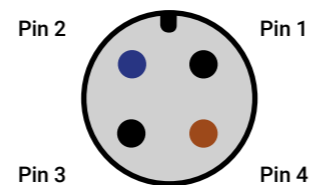


X11
1NO+1NC - slow action (Zb)

Z11
1NO+1NC - snap action (Za)

WIRING

CONNECTOR PIN ASSIGNMENT



PIN	CABLE COLOUR
1	BLACK
2	BLUE
3	BLACK
4	BROWN

FCT01

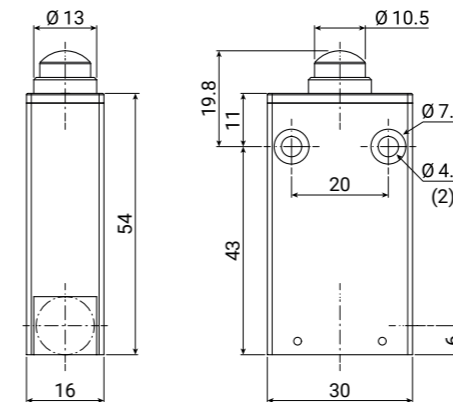
Thermoplastic pre-wired or M12-connected limit switch with metal end plunger IP67



FCT SERIES

FCT series	X connection type	X connection orientation	01 head and actuator	XXX contact type	D conduit entry
FCT thermoplastic limit switch	2 pre-wired with 2 m cable (standard) x pre-wired with custom cable length M M12-connected	L horizontal output V vertical output	01 metal end plunger	X11: 1NO+1NC slow action (Zb) Z11: 1NO+1NC snap action (Za)	D plastic with 20 mm fixing holes spacing

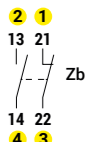
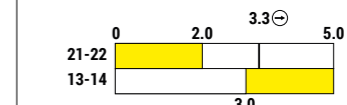
technical drawing - sizes in mm



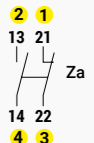
(2) mounting holes

contact type

X11
1NO+1NC
slow action
(Zb)

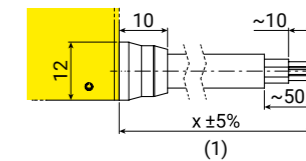


Z11
1NO+1NC
snap action
(Za)

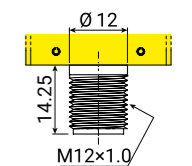
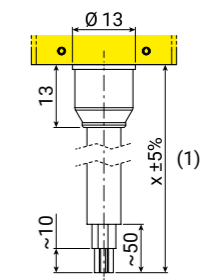
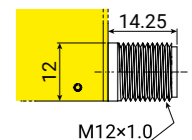


technical drawing connection output - sizes in mm

PRE-WIRED



M12-CONNECTED



(1) x = cable length in meters

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action)		POT (travel)	POF (force)	
X11: 1NO+1NC slow action (Zb)	A300 Q300	AC15: 120 V - 3 A 240 V - 1.5 A DC13: 125 V - 0.55 A 240 V - 0.27 A	2.0 mm	3.0 mm	12 N	3.3 mm	20 N	5.0 mm
Z11: 1NO+1NC snap action (Za)			2.0 mm	-	9.8 N	5.2 mm	24 N	5.5 mm

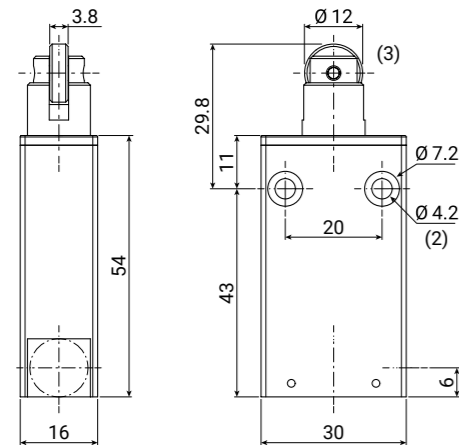
FCT02

Thermoplastic pre-wired or M12-connected limit switch with steel roller plunger
IP67



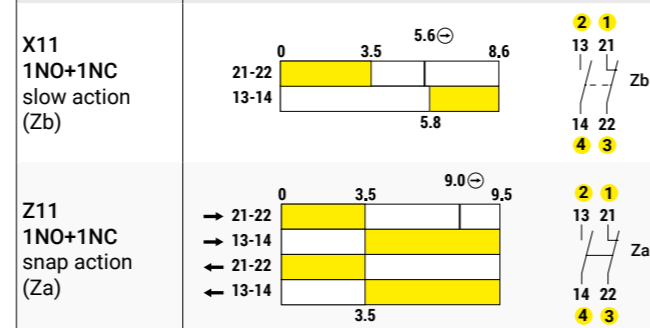
FCT series	X connection type	X connection orientation	02 head and actuator	XXX contact type	D conduit entry
FCT	thermoplastic limit switch	2 pre-wired with 2 m cable (standard) x pre-wired with custom cable length M M12-connected	L horizontal output V vertical output	02 steel roller plunger X11: 1NO+1NC slow action (Zb) Z11: 1NO+1NC snap action (Za)	D plastic with 20 mm fixing holes spacing

technical drawing - sizes in mm



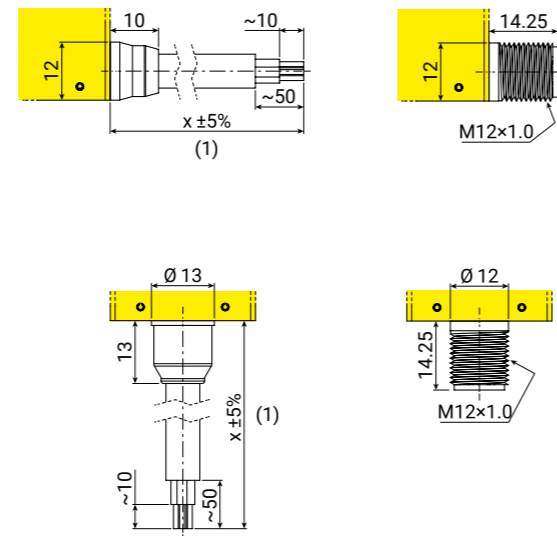
(2) mounting holes
(3) steel roller

contact type operation diagrams



technical drawing connection output - sizes in mm

PRE-WIRED M12-CONNECTED



(1) x = cable length in meters

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action)		POT (travel)	POF (force)	
X11: 1NO+1NC slow action (Zb)	A300 Q300	AC15: 120 V - 3 A 240 V - 1.5 A DC13: 125 V - 0.55 A 240 V - 0.27 A	3.5 mm	5.8 mm	12 N	5.6 mm	20 N	8.6 mm
Z11: 1NO+1NC snap action (Za)			3.5 mm	-	9.8 N	9.0 mm	24 N	9.5 mm

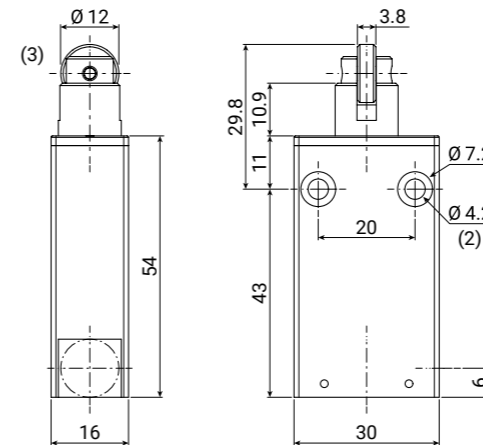
FCT03

Thermoplastic pre-wired or M12-connected limit switch with 90° steel roller plunger
IP67



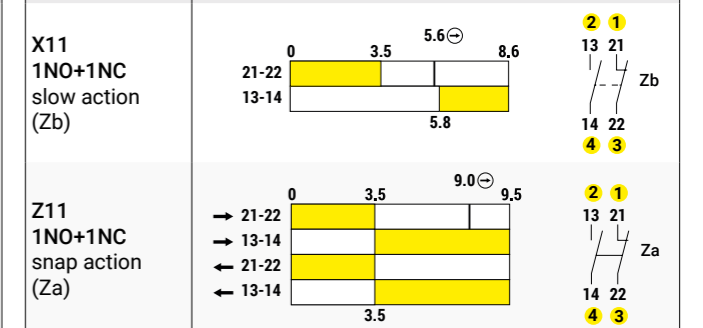
FCT series	X connection type	X connection orientation	03 head and actuator	XXX contact type	D conduit entry
FCT	thermoplastic limit switch	2 pre-wired with 2 m cable (standard) x pre-wired with custom cable length M M12-connected	03 90° steel roller plunger	X11: 1NO+1NC slow action (Zb) Z11: 1NO+1NC snap action (Za)	D plastic with 20 mm fixing holes spacing

technical drawing - sizes in mm



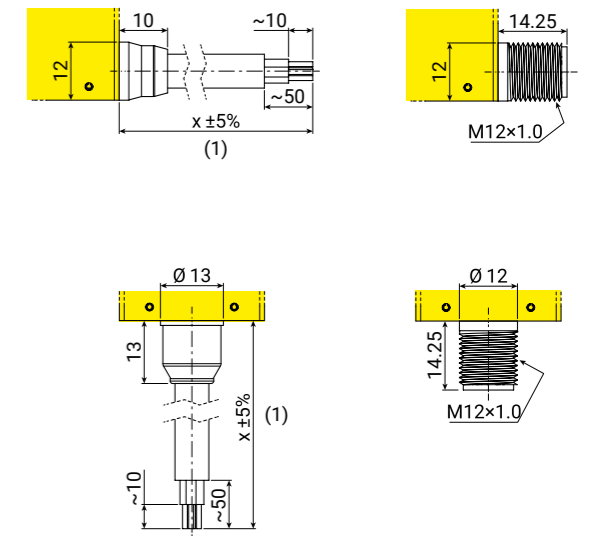
(2) mounting holes
(3) steel roller

contact type operation diagrams



technical drawing connection output - sizes in mm

PRE-WIRED M12-CONNECTED



(1) x = cable length in meters

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action)		POT (travel)	POF (force)	
X11: 1NO+1NC slow action (Zb)	A300 Q300	AC15: 120 V - 3 A 240 V - 1.5 A DC13: 125 V - 0.55 A 240 V - 0.27 A	3.5 mm	5.8 mm	12 N	5.6 mm	20 N	8.6 mm
Z11: 1NO+1NC snap action (Za)			3.5 mm	-	9.8 N	9.0 mm	24 N	9.5 mm

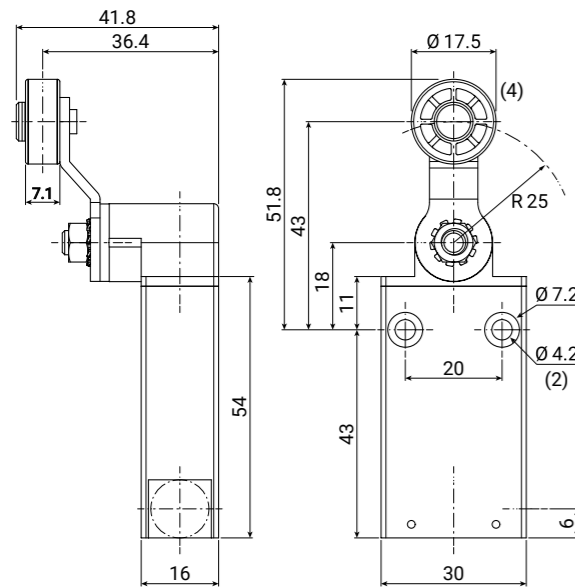
FCT04

Thermoplastic pre-wired or M12-connected limit switch with metal revolving lever with Ø17.5 nylon roller
IP67



FCT series	X connection type	X connection orientation	04 head and actuator	XXX contact type	D conduit entry
FCT	thermoplastic limit switch	2 pre-wired with 2 m cable (standard) x pre-wired with custom cable length M M12-connected	L horizontal output V vertical output	04 metal revolving lever with Ø17.5 nylon roller X11: 1NO+1NC slow action (Zb) Z11: 1NO+1NC snap action (Za)	D plastic with 20 mm fixing holes spacing

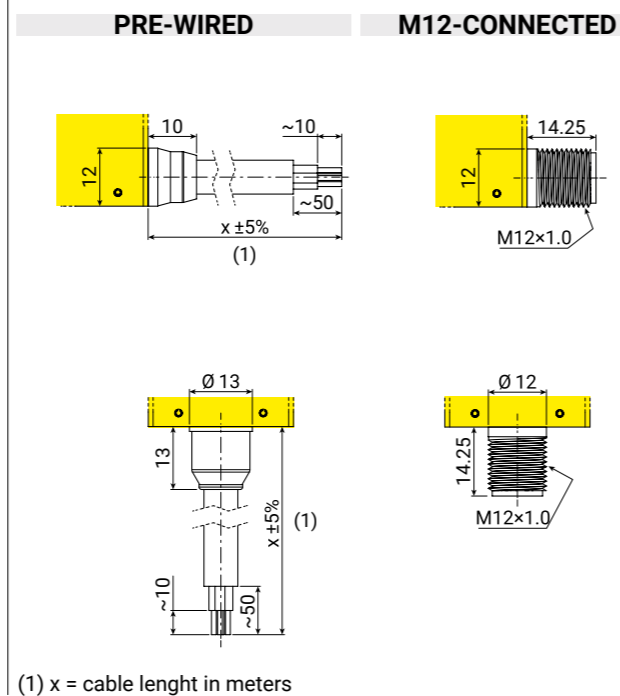
technical drawing - sizes in mm



(2) mounting holes
(4) nylon roller

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
Z11 1NO+1NC snap action (Za)	

technical drawing connection output - sizes in mm



(1) x = cable length in meters

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action)		POT (travel)	POF (force)	
X11: 1NO+1NC slow action (Zb)	A300 Q300	AC15: 120 V - 3 A 240 V - 1.5 A DC13: 125 V - 0.55 A 240 V - 0.27 A	35°	50°	2 N	60°	4 N	80°
Z11: 1NO+1NC snap action (Za)			35°	-	3 N	75°	6 N	85°

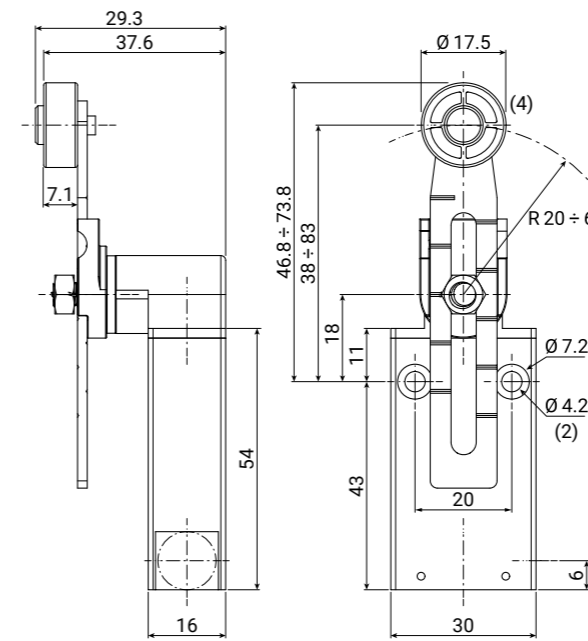
FCT05

Thermoplastic pre-wired or M12-connected limit switch with adjustable metal revolving lever with Ø17.5 nylon roller
IP67



FCT series	X connection type	X connection orientation	05 head and actuator	XXX contact type	D conduit entry
FCT	thermoplastic limit switch	2 pre-wired with 2 m cable (standard) x pre-wired with custom cable length M M12-connected	05 adjustable metal revolving lever with Ø17.5 nylon roller	X11: 1NO+1NC slow action (Zb) Z11: 1NO+1NC snap action (Za)	D plastic with 20 mm fixing holes spacing

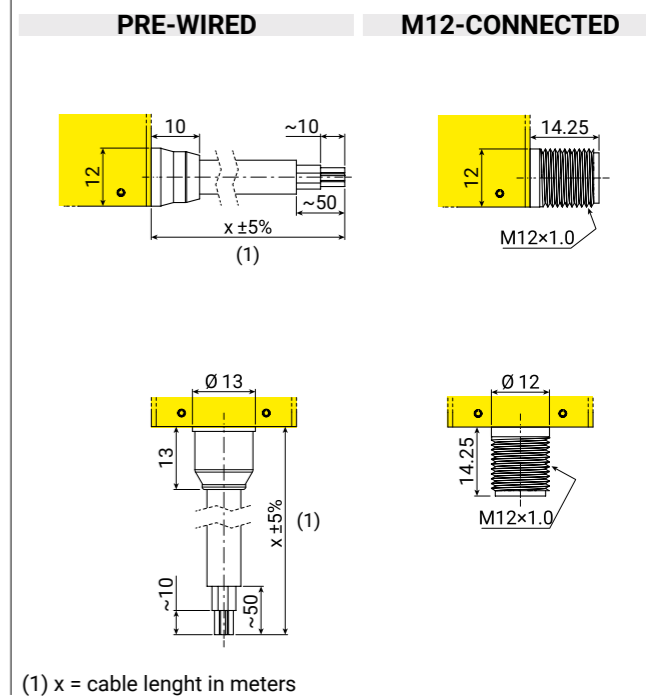
technical drawing - sizes in mm



(2) mounting holes
(4) nylon roller

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
Z11 1NO+1NC snap action (Za)	

technical drawing connection output - sizes in mm



(1) x = cable length in meters

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action)		POT (travel)	POF (force)	
X11: 1NO+1NC slow action (Zb)	A300 Q300	AC15: 120 V - 3 A 240 V - 1.5 A DC13: 125 V - 0.55 A 240 V - 0.27 A	35°	50°	2 N	60°	4 N	80°
Z11: 1NO+1NC snap action (Za)			35°	-	3 N	75°	6 N	85°

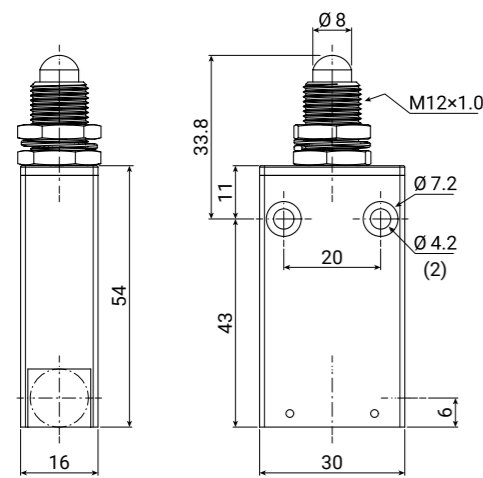
FCT06

Thermoplastic pre-wired or M12-connected limit switch with metal end plunger with threaded flange
IP67



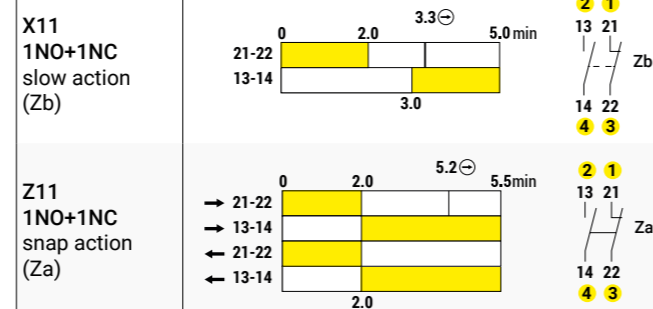
FCT series	X connection type	X connection orientation	06 head and actuator	XXX contact type	D conduit entry
FCT thermoplastic limit switch	2 pre-wired with 2 m cable (standard) x pre-wired with custom cable length M M12-connected	L horizontal output V vertical output	06 metal end plunger with threaded flange	X11: 1NO+1NC slow action (Zb) Z11: 1NO+1NC snap action (Za)	D plastic with 20 mm fixing holes spacing

technical drawing - sizes in mm



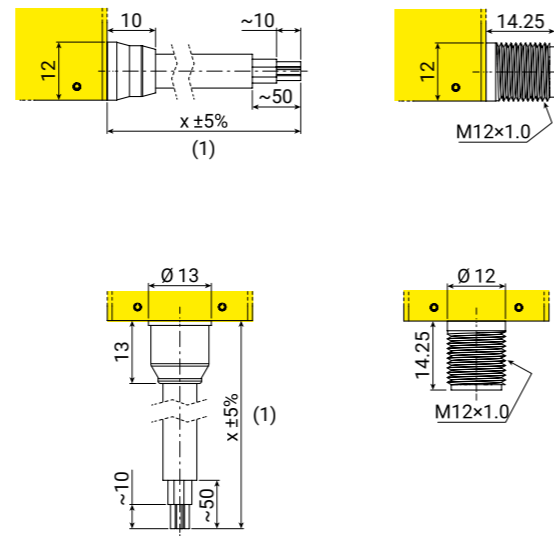
(2) mounting holes

contact type



technical drawing connection output - sizes in mm

PRE-WIRED M12-CONNECTED



(1) x = cable length in meters

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action)		POT (travel)	POF (force)	
X11: 1NO+1NC slow action (Zb)	A300 Q300	AC15: 120 V - 3 A 240 V - 1.5 A DC13: 125 V - 0.55 A 240 V - 0.27 A	2.0 mm	3.5 mm	12 N	3.3 mm	20 N	5.0 mm
Z11: 1NO+1NC snap action (Za)			2.0 mm	-	9.8 N	5.2 mm	24 N	5.5 mm

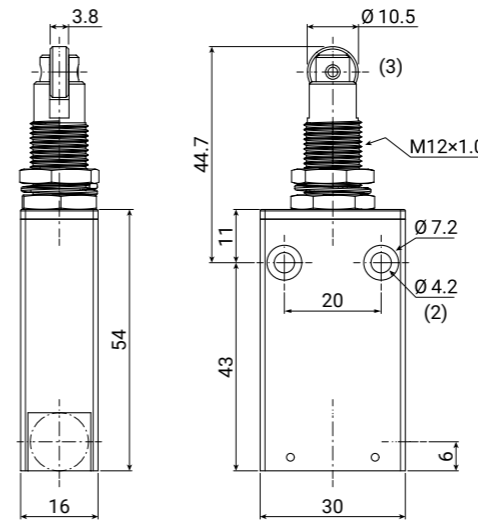
FCT07

Thermoplastic pre-wired or M12-connected limit switch with steel roller plunger with threaded flange
IP67



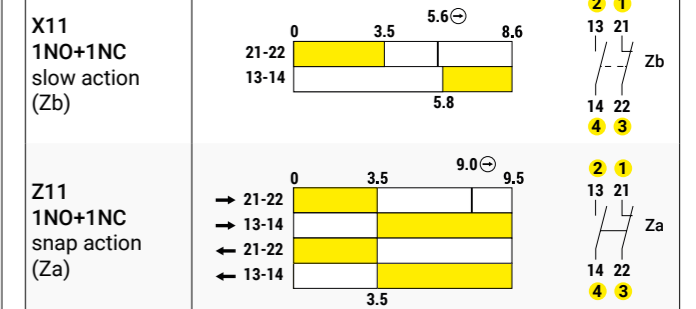
FCT series	X connection type	X connection orientation	07 head and actuator	XXX contact type	D conduit entry
FCT thermoplastic limit switch	2 pre-wired with 2 m cable (standard) x pre-wired with custom cable length M M12-connected	L horizontal output V vertical output	07 steel roller plunger with threaded flange	X11: 1NO+1NC slow action (Zb) Z11: 1NO+1NC snap action (Za)	D plastic with 20 mm fixing holes spacing

technical drawing - sizes in mm



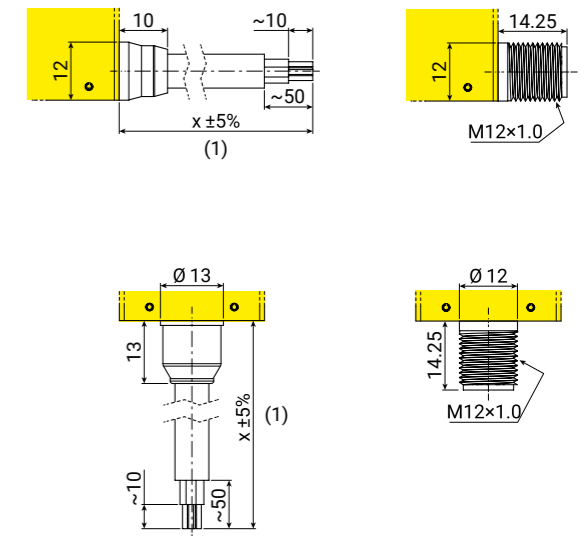
(2) mounting holes
(3) steel roller

contact type



technical drawing connection output - sizes in mm

PRE-WIRED M12-CONNECTED



(1) x = cable length in meters

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action)		POT (travel)	POF (force)	
X11: 1NO+1NC slow action (Zb)	A300 Q300	AC15: 120 V - 3 A 240 V - 1.5 A DC13: 125 V - 0.55 A 240 V - 0.27 A	3.5 mm	5.8 mm	12 N	5.6 mm	20 N	8.6 mm
Z11: 1NO+1NC snap action (Za)			3.5 mm	-	9.8 N	9.0 mm	24 N	9.5 mm

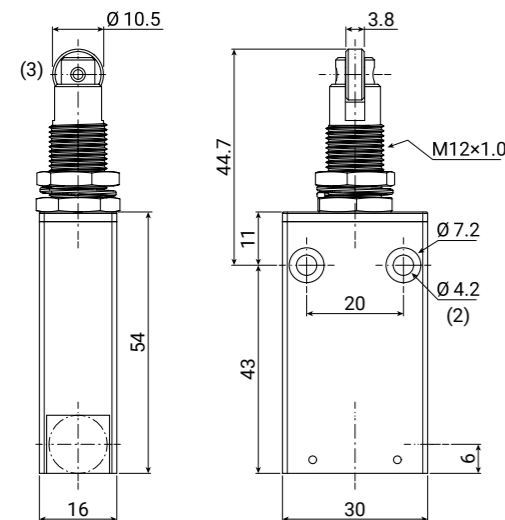
FCT08

Thermoplastic pre-wired or M12-connected limit switch with 90° steel roller plunger with threaded flange
IP67



FCT series	X connection type	X connection orientation	08 head and actuator	XXX contact type	D conduit entry
FCT thermoplastic limit switch	2 pre-wired with 2 m cable (standard) x pre-wired with custom cable length M M12-connected	L horizontal output V vertical output	08 90° steel roller plunger with threaded flange	X11: 1NO+1NC slow action (Zb) Z11: 1NO+1NC snap action (Za)	D plastic with 20 mm fixing holes spacing

technical drawing - sizes in mm

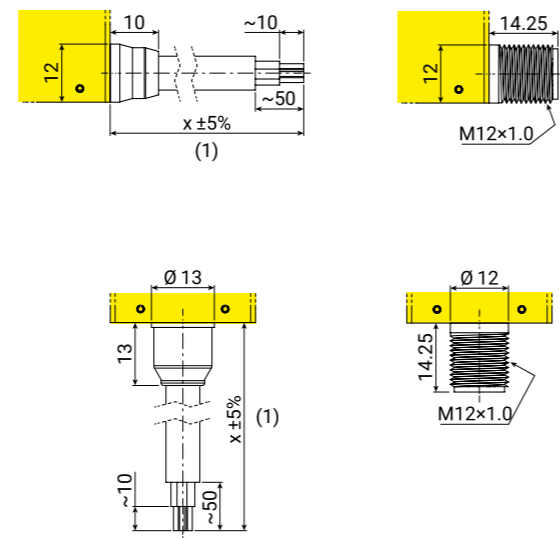


(2) mounting holes
(3) steel roller

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
Z11 1NO+1NC snap action (Za)	

technical drawing connection output - sizes in mm

PRE-WIRED **M12-CONNECTED**



(1) x = cable length in meters

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action)		POT (travel)	POF (force)	
X11: 1NO+1NC slow action (Zb)	A300 Q300	AC15: 120 V - 3 A 240 V - 1.5 A DC13: 125 V - 0.55 A 240 V - 0.27 A	3.5 mm	5.8 mm	12 N	5.6 mm	20 N	8.6 mm
Z11: 1NO+1NC snap action (Za)			3.5 mm	-	9.8 N	9.0 mm	24 N	9.5 mm

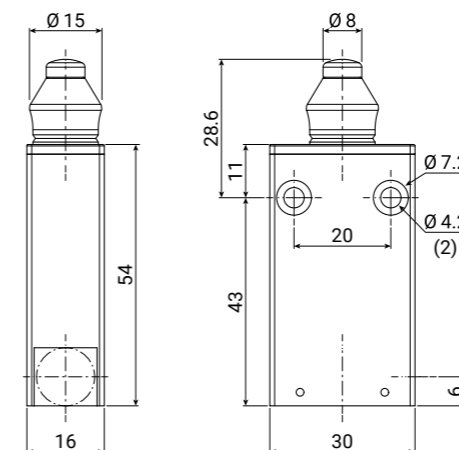
FCT09

Thermoplastic pre-wired or M12-connected limit switch with metal end plunger with rubber protection
IP67



FCT series	X connection type	X connection orientation	09 head and actuator	XXX contact type	D conduit entry
FCT thermoplastic limit switch	2 pre-wired with 2 m cable (standard) x pre-wired with custom cable length M M12-connected	L horizontal output V vertical output	09 metal end plunger with rubber protection	X11: 1NO+1NC slow action (Zb) Z11: 1NO+1NC snap action (Za)	D plastic with 20 mm fixing holes spacing

technical drawing - sizes in mm

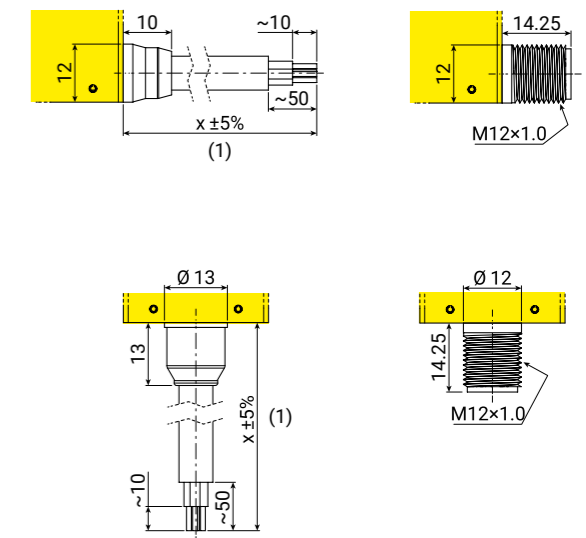


(2) mounting holes

contact type	operation diagrams
X11 1NO+1NC slow action (Zb)	
Z11 1NO+1NC snap action (Za)	

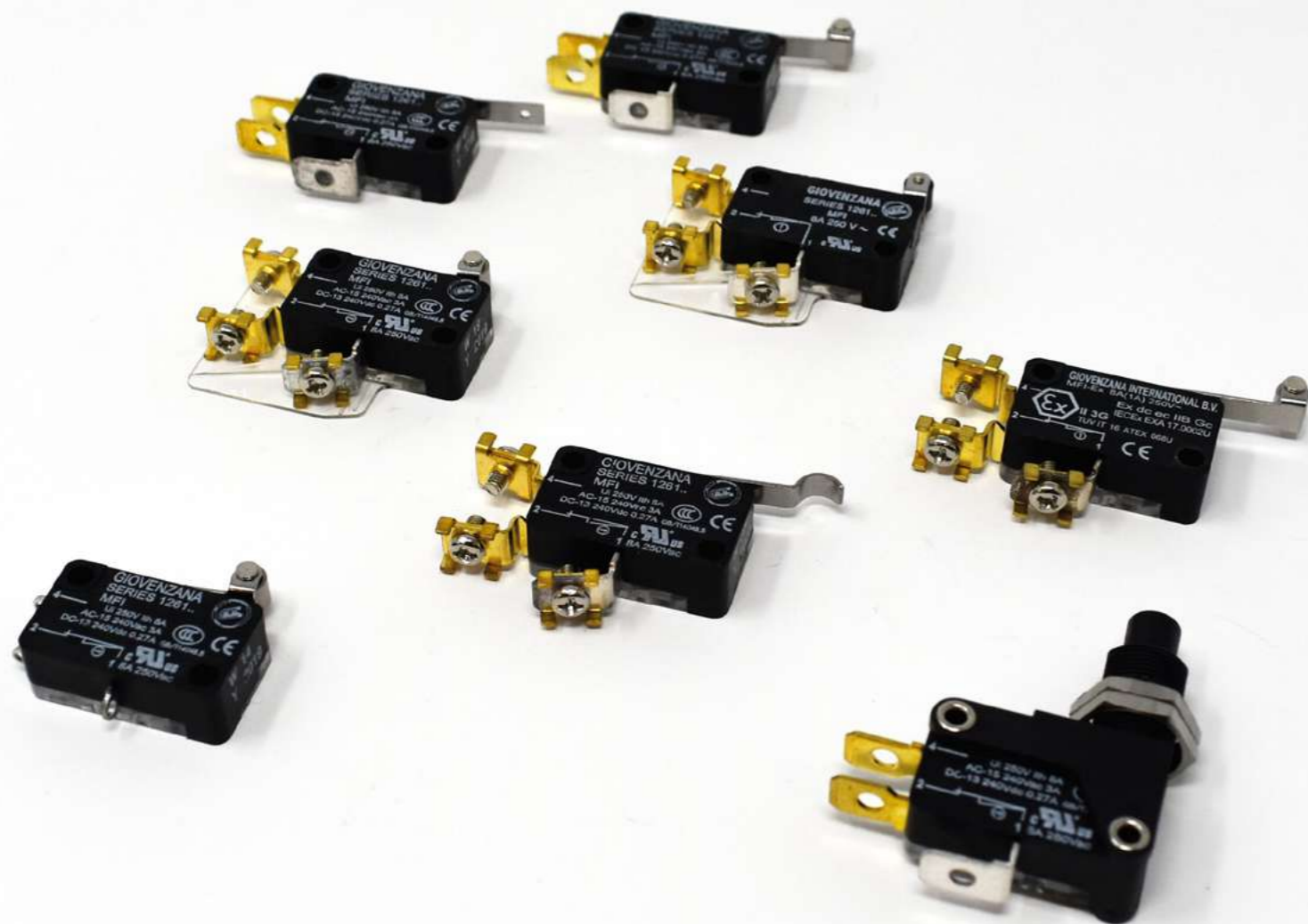
technical drawing connection output - sizes in mm

PRE-WIRED **M12-CONNECTED**



(1) x = cable length in meters

contact type	categories	ratings	operational travel		operating force OF	positive opening		total travel TT
			PT1	PT2 (slow action)		POT (travel)	POF (force)	
X11: 1NO+1NC slow action (Zb)	A300 Q300	AC15: 120 V - 3 A 240 V - 1.5 A DC13: 125 V - 0.55 A 240 V - 0.27 A	2.5 mm	3.5 mm	12 N	3.3 mm	20 N	5.0 mm
Z11: 1NO+1NC snap action (Za)			2.5 mm	-	9.8 N	5.2 mm	24 N	5.5 mm



OVERVIEW



A **microswitch** is a switch used in electronics, to interrupt or deflect currents of small intensity. It has a contact mechanism that is covered by a shell and has a control bar outside the switch itself. A microswitch requires very little force to operate, the contact distance of the switch is quite small.

A microswitch is a solution designed to control the movement of a mechanical part and is used in household appliances, electronic equipment, automatic machines and electric cars.

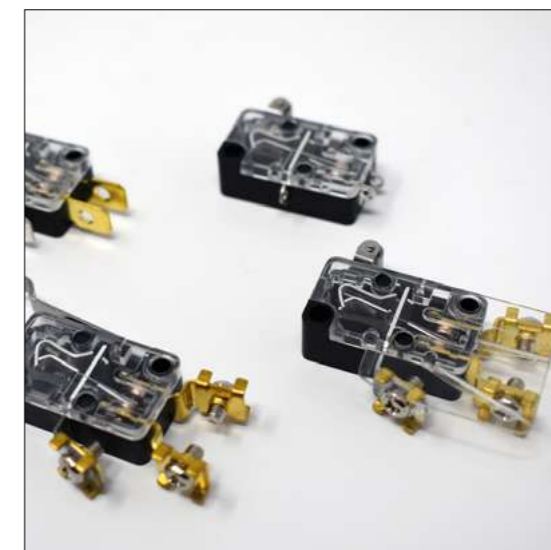
Giovenzana offers different types of microswitches that can be easily adapted to different equipment and needs.

Available six different series of micro switches, normalized with self-cleaning contacts and different actuating types:

- **MFI series:** with 6.3 × 0.8 mm faston terminals;
- **MFI.S series:** with solder terminals;
- **MFI.ST series:** with screw terminals (M3 for wire 1.5 mm²);
- **MFI.STP series:** with screw terminals (M3 for wire 1.5 mm²) and plate protection;
- **MFI.T series:** with 6.3 × 0.8 mm faston terminals and tower actuator with threaded flange;
- **MFI.EX series:** ATEX and IECEx microswitches for use in hazardous areas and potentially explosive atmospheres. Discover them in our dedicated catalogue.

MAIN FEATURES

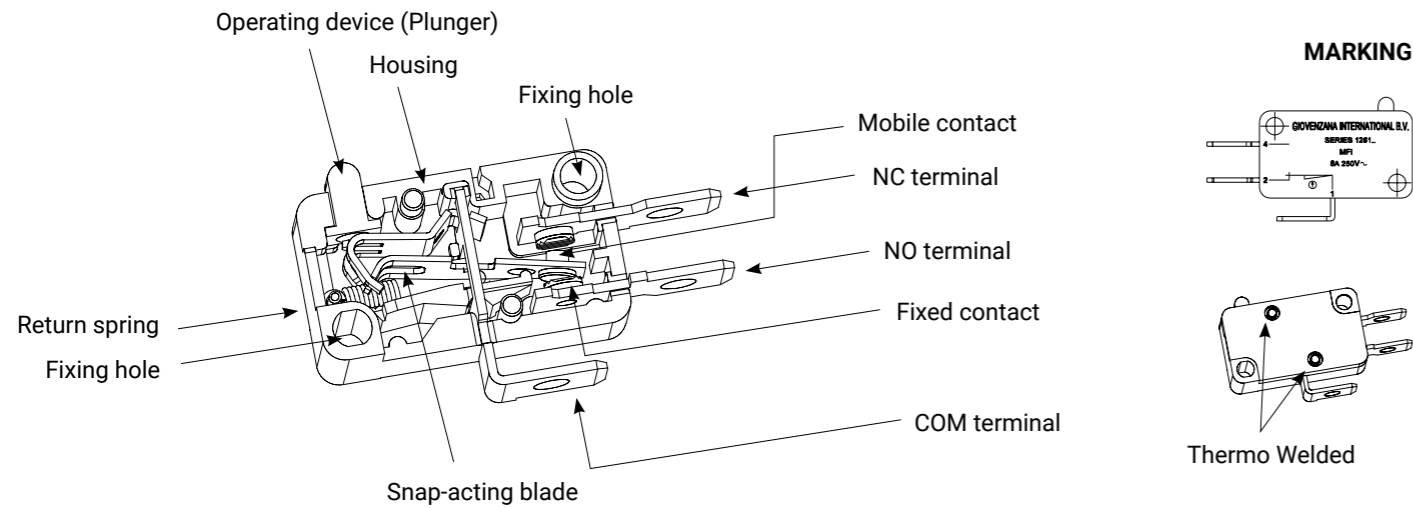
- Fast and reliable switching, independent from actuating speed.
- High electrical ratings with small dimensions.
- High repeat accuracy of switching points and forces.
- Low operating force.
- NC positive opening. ⊕
- Very long service life.
- Equipped with self cleaning switching contacts in silver alloy.
- Contacts: 1NC+1NO (snap action).



SPECIFICATIONS

Standards		IEC/EN 61058, UL 1054
Approvals		CE, CCC, cRUus
Operating temperature		-25 ... +85°C (-13 ... +185°F)
Minimum life expectancy	mechanical	1 × 10 ⁶ cycles
	electrical	5 × 10 ⁵ cycles
Rated thermal current	I _{th}	8 A
Rated insulation voltage	U _i	250 V AC
Rated impulse withstand voltage	U _{imp}	1500 V
Rated operating current	I _e	resistive load: 8 A - 250 V inductive load: 3 A - 250 V
Pollution degree		2
Protection against electric shock		class II

STRUCTURE DESCRIPTION



The microswitches are activated by a spring (or snap) mechanism. Pressing the actuator activates the switching operation, with a predefined force and travel. The switching speed itself is largely independent of the actuating speed.

OPERATING LEVERS

A control lever can be connected to a snap switch to meet the specific requirements of a given application. This usually changes the travel and forces involved in the switching operation, depending on the length of the levers. By connecting an appropriate actuating lever, it's possible to increase travel and/or reduce the required actuating force.

CONTROL DEVICE (PLUNGER)

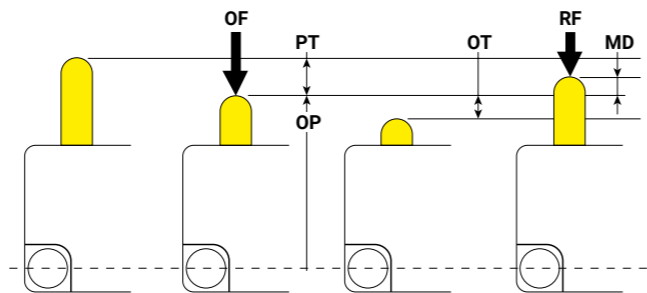
Applying force to the trigger of a snap switch releases the snap mechanism, which in turn triggers the switching operation.

POSITIVE OPENING

An additional internal mechanism, consisting of non resistant parts, forces the opening of the NC contacts in case of accidental welding (overload, short circuit, ...) or failure of the trigger mechanism. The models equipped with this function are particularly suitable for safety related applications according to ISO13849-1 or EN60204-1. To ensure the correct operation of the positive opening, the control device shall be pressed upwards in the positive opening position.

TRAVELS AND ACTUATING FORCE

OF [N]	Operating Force Force, applied to the actuator, required to operate the contacts
RF [N]	Release force Value to which the force applied to the actuator must be reduced to allow the contacts to return to the release position and reset
PT [mm]	Pretravel The distance or angle that the operator travels from the starting position to the operating position
OT [mm]	Overtravel The distance or angle that the operator travels from the operating position to the total travel position
MD [mm]	Differential movement The distance or angle that the operator travels from the activation position to the release position in which the reset occurs
OP [mm]	Operating position Position of the actuator in which the contacts are activated with a snap action, reached when the actuating force is applied



MFI - PRODUCT SELECTION BY TERMINAL TYPE

Technical drawing	Series - Terminals	Code	Actuator
	<p>MFI series 6.3 x 0.8 mm faston terminals</p>	MFI	Pin plunger
		MFI.1	Long roller lever
		MFI.2	Simulated roller lever
		MFI.3	Roller lever
		MFI.4	Long lever
		MFI.5	Medium Lever
		MFI.6	Short lever
MFI.7	16 mm roller lever		
	<p>MFI.S series solder terminals</p>	MFI .S	Pin plunger
		MFI.1S	Long roller lever
		MFI.2S	Simulated roller lever
		MFI.3S	Roller lever
		MFI.4S	Long lever
		MFI.5S	Medium Lever
		MFI.6S	Short lever
MFI.7S	16 mm roller lever		
	<p>MFI.ST series screw terminals M3 for wire 1.5 mm²</p>	MFI .ST	Pin plunger
		MFI.1ST	Long roller lever
		MFI.2ST	Simulated roller lever
		MFI.3ST	Roller lever
		MFI.4ST	Long lever
		MFI.5ST	Medium Lever
		MFI.6ST	Short lever
MFI.7ST	16 mm roller lever		
	<p>MFI.STP series screw terminals M3 for wire 1.5 mm² + plate protection</p>	MFI .STP	Pin plunger
		MFI.1STP	Long roller lever
		MFI.2STP	Simulated roller lever
		MFI.3STP	Roller lever
		MFI.4STP	Long lever
		MFI.5STP	Medium Lever
		MFI.6STP	Short lever
MFI.7STP	16 mm roller lever		
	<p>MFI.T 6.3 x 0.8 mm faston terminals and tower actuator with threaded flange</p>	MFI .T	Tower actuator with threaded flange

MFI - CODE SELECTION OVERVIEW

M	F	I	.			
SERIES		ACTUATOR		TERMINAL TYPE		
MFI micro switches		blank pin plunger 1 long roller lever 2 simulated roller lever 3 roller lever 4 long lever 5 medium lever 6 short lever 7 16 mm roller lever		blank 6.3 × 0.8 mm faston S solder ST screw STP screw + plate protection T tower actuator with threaded flange		
				OF [N]	Operating Force	
				RF [N]	Release force	
				PT [mm]	Pretravel	
				OT [mm]	Overtravel	
				MD [mm]	Differential movement	
				OP [mm]	Operating position	

Pin plunger

OF	max	5.1 N
RF	min	1.9 N
PT	max	1.4 mm
OT	min	0.8 mm
MD	max	0.3 mm
OP		14.4 ± 0.5 mm

Long roller lever

OF	max	3.2 N
RF	min	1.0 N
PT	max	3.3 mm
OT	min	0.8 mm
MD	max	0.8 mm
OP		17.4 ± 0.8 mm

Simulated roller lever

OF	max	3.2 N
RF	min	1.0 N
PT	max	3.3 mm
OT	min	0.8 mm
MD	max	0.8 mm
OP		17.4 ± 0.8 mm

Roller lever

OF	max	5.1 N
RF	min	1.9 N
PT	max	1.4 mm
OT	min	0.6 mm
MD	max	0.6 mm
OP		20.3 ± 0.8 mm

Long lever

OF	max	1.3 N
RF	min	0.15 N
PT	max	7.6 mm
OT	min	2.2 mm
MD	max	2.2 mm
OP		15.1 ± 2.6 mm

(1) Stainless steel lever (2) Plastic material roller (3) Stainless steel roller

Medium lever

OF	max	3.2 N
RF	min	1.2 N
PT	max	3.3 mm
OT	min	0.8 mm
MD	max	0.8 mm
OP		15.1 ± 1.2 mm

Short lever

OF	max	5.1 N
RF	min	1.9 N
PT	max	1.6 mm
OT	min	0.6 mm
MD	max	0.6 mm
OP		15.1 ± 0.6 mm

16 mm roller lever

OF	max	4.5 N
RF	min	1.9 N
PT	max	1.8 mm
OT	min	0.8 mm
MD	max	0.6 mm
OP		21.1 ± 0.6 mm

Tower actuator with threaded flange

OF	max	6.0 N
RF	min	2.0 N
PT	max	2.2 mm
OT	min	3.3 mm
MD	max	0.5 mm
OP		21.2 ± 0.8 mm

FASTON TERMINALS

SOLDER TERMINALS

SCREW TERMINALS



OVERVIEW



A micro switch, better known as a snap switch, contains a spring mechanism that opens and closes connections between 2 devices, quickly changing the current direction.

Giovenzana offers micro switches with a **IP40 degree of protection (with MZA8000 terminal enclosure)**, with high temperature resistance and a long service life. The compact, ergonomic and functional design meets the needs of various applications in the industrial field.

The wide choice of actuators allows most installation requirements to be covered. They are mainly used in workshop equipment, communication devices, test instruments, household appliances, electro-medical equipment, electrical automation instruments, lifts and elevators, etc.

The MZ series micro switches are divided into two lines characterized by different electrical connection:

- **MZS**: with screw terminals;
- **MZW**: with solder terminals.

These two lines, in turn, are divided into two groups characterized by normal body (the micro switches of **Group 13**) and by raised body (the micro switches of **Group 17**).

MAIN FEATURES

- High precision snap action micro switches.
- A variety of actuators are available.
- The spring mechanism opens and closes the electrical connections within the micro switches.
- The power supply direction changes rapidly between the devices connected to the micro switches.
- Wide operating speed margins.
- Available in general purpose.



SPECIFICATIONS

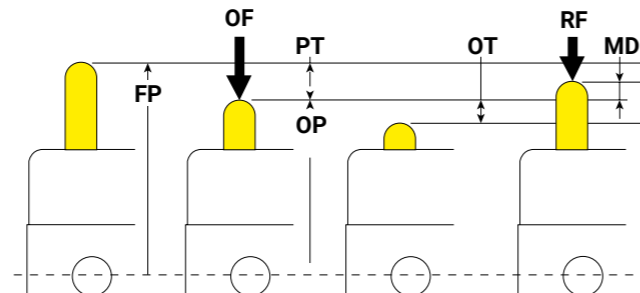
Approvals		CE, UL			
Rating					
Rated contact voltage	UL 61058	125 V AC	250 V AC	125 V DC	250 V DC
Maximum contact current		15 A	15 A	0.5 A	0.25 A
Electrical characteristics					
Maximum contact resistance	initial	15 mΩ			
Minimum insulation resistance	at 500 V DC	100 MΩ			
Dielectric withstanding voltage	for 1 minute	1000 V AC (50 or 60 Hz)			
Mechanical characteristics					
Operating speed		0.1 mm/s ... 1 m/s			
Operating frequency		30 operations per minute			
Vibration		10 ... 55 Hz, 1.5 mm double amplitude			
Minimum operating life	electrical	1 × 10 ⁵ cycles			
	mechanical	1 × 10 ⁶ cycles			
Climatic characteristics					
Operating temperature	UL certified	0 ... +55°C (maximum humidity of 60%)			
Degree of protection	with accessory	IP40			

MZ - PRODUCT SELECTION BY TERMINAL TYPE

Screw terminals	Solder terminals	Code	Actuator
		1300	Pin plunger
		1301	Hinge lever
		1303	Short hinge roller lever
		1305	Slim spring plunger
		1306	Short spring plunger
		1307	Panel mount plunger
		1308	Panel mount roller plunger
		1701	Hinge lever
		1702	Short hinge lever
		1703	Hinge roller lever
		1704	Short hinge roller lever
		1744	Unidirectional short hinge roller lever
		MZA8000	Terminal enclosure

TRAVELS AND ACTUATING FORCE

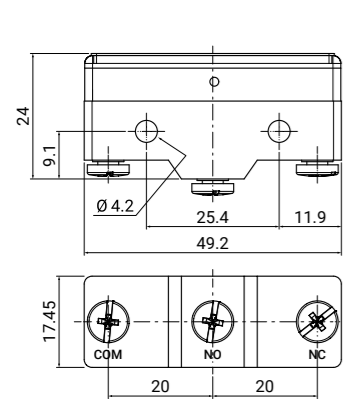
OF [N]	Operating Force Force, applied to the actuator, required to operate the contacts
RF [N]	Release force Value to which the force applied to the actuator must be reduced to allow the contacts to return to the release position and reset
PT [mm]	Pretravel The distance or angle that the operator travels from the starting position to the operating position
OT [mm]	Overtravel The distance or angle that the operator travels from the operating position to the total travel position
MD [mm]	Differential movement The distance or angle that the operator travels from the activation position to the release position in which the reset occurs
FP [mm]	Initial position Initial position of the actuator (no forces applied)
OP [mm]	Operating position Position of the actuator in which the contacts are activated with a snap action, reached when the actuating force is applied



MZ - PRODUCT SELECTION BY OPERATING LEVERS

SCREW TERMINALS		SOLDER TERMINALS	
MZS13	MZS17	MZW13	MZW17

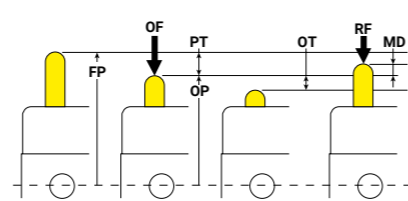
MZS13 SCREW TERMINALS - CODE SELECTION OVERVIEW



M Z	S	1 3	
SERIES	TERMINAL TYPE	BODY CONFIGURATION	ACTUATOR TYPE
MZ micro switches	S screw terminals	13 normal	00 pin plunger 01 hinge lever 03 short hinge roller lever 05 slim spring plunger 06 short spring plunger 07 panel mount plunger 08 panel mount roller plunger 18 panel mount cross roller plunger

TRAVELS AND ACTUATING FORCES

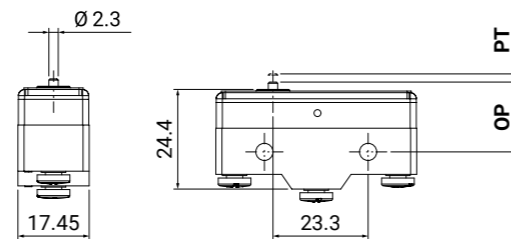
OF	[N]	Operating Force
RF	[N]	Release force
PT	[mm]	Pretravel
OT	[mm]	Overtravel
MD	[mm]	Differential movement
FP	[mm]	Initial position
OP	[mm]	Operating position



Pin plunger



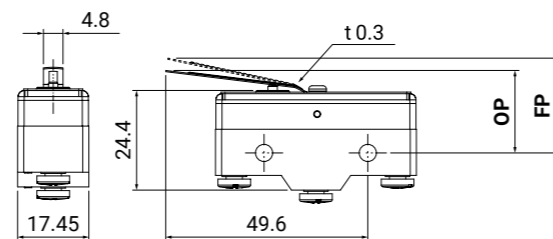
OF	max	250 .. 350 g
RF	min	114 g
PT	max	0.4 mm
OT	min	0.13 mm
MD	max	0.10 mm
FP	max	-
OP		15.9 ± 0.4 mm



Hinge lever



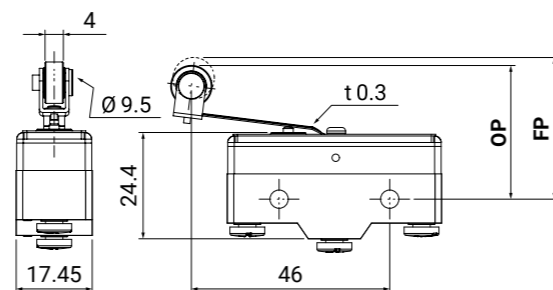
OF	max	141 g
RF	min	14 g
PT	max	4 mm
OT	min	1.6 mm
MD	max	1.3 mm
FP	max	20.6 mm
OP		17.4 ± 0.8 mm



Short hinge roller lever



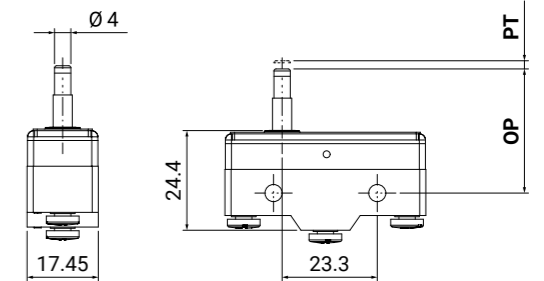
OF	max	141 g
RF	min	14 g
PT	max	4 mm
OT	min	1.6 mm
MD	max	1.3 mm
FP	max	31.8 mm
OP		28.6 ± 0.8 mm



Slim spring plunger



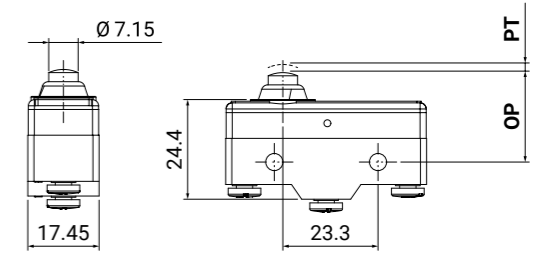
OF	max	250 .. 350 g
RF	min	114 g
PT	max	0.4 mm
OT	min	1.6 mm
MD	max	0.10 mm
FP	max	-
OP		28.2 ± 0.5 mm



Short spring plunger



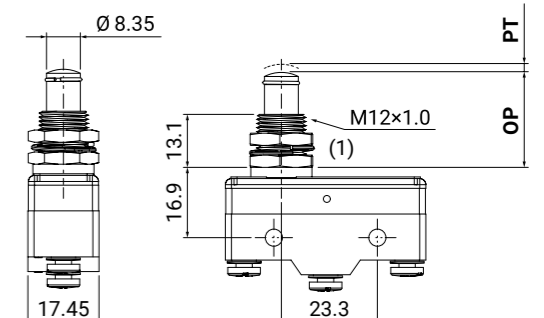
OF	max	250 .. 350 g
RF	min	114 g
PT	max	0.4 mm
OT	min	1.6 mm
MD	max	0.10 mm
FP	max	-
OP		21.5 ± 0.5 mm



Panel mount plunger



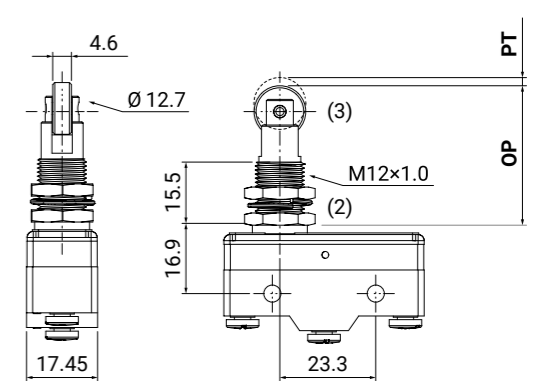
OF	max	250 .. 350 g
RF	min	114 g
PT	max	0.4 mm
OT	min	5.5 mm
MD	max	0.10 mm
FP	max	-
OP		21.8 ± 0.8 mm



Panel mount roller plunger



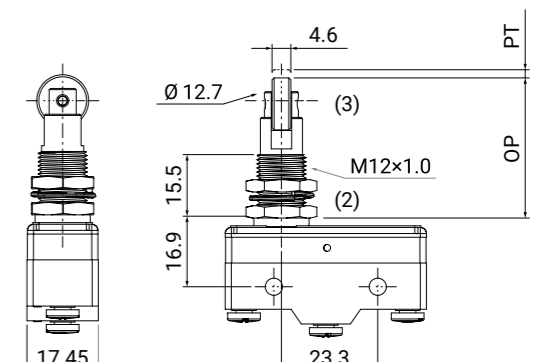
OF	max	250 .. 350 g
RF	min	114 g
PT	max	0.4 mm
OT	min	3.58 mm
MD	max	0.10 mm
FP	max	-
OP		33.4 ± 1.2 mm



Panel mount cross roller plunger



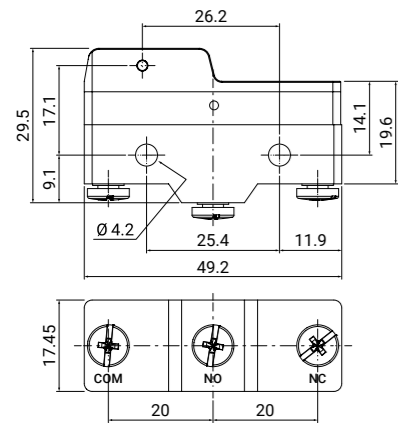
OF	max	250 .. 350 g
RF	min	114 g
PT	max	0.4 mm
OT	min	3.58 mm
MD	max	0.10 mm
FP	max	-
OP		33.4 ± 1.2 mm



(1) 2 hexagonal brass nuts 3x15 mm (2) 2 hexagonal brass nuts 3x17 mm (3) Stainless steel roller

(1) 2 hexagonal brass nuts 3x15 mm (2) 2 hexagonal brass nuts 3x17 mm (3) Stainless steel roller

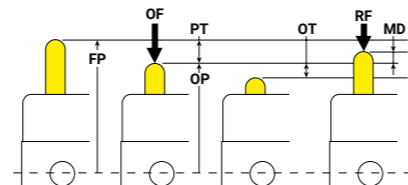
MZS17 SCREW TERMINALS - CODE SELECTION OVERVIEW



M Z	S	1 7	
SERIES	TERMINAL TYPE	BODY CONFIGURATION	ACTUATOR TYPE
MZ micro switches	S screw terminals	17 raised	01 hinge lever 02 short hinge lever 03 hinge roller lever 04 short hinge roller lever 44 unidirectional short hinge roller lever

TRAVELS AND ACTUATING FORCES

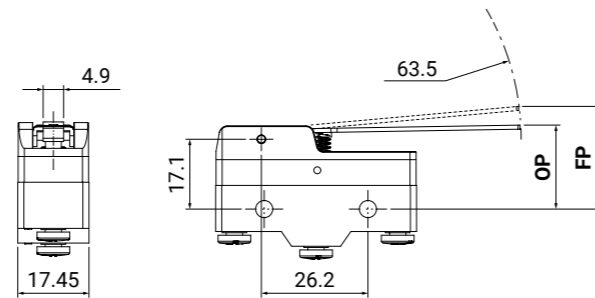
OF	[N]	Operating Force
RF	[N]	Release force
PT	[mm]	Pretravel
OT	[mm]	Overtravel
MD	[mm]	Differential movement
FP	[mm]	Initial position
OP	[mm]	Operating position



Hinge lever



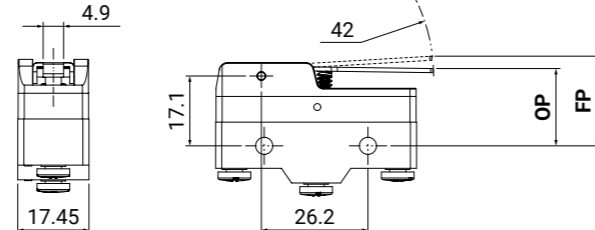
OF	max	70 g
RF	min	14 g
PT	max	10 mm
OT	min	5.6 mm
MD	max	1.27 mm
FP	max	28.2 mm
OP		19 ± 0.8 mm



Short hinge lever



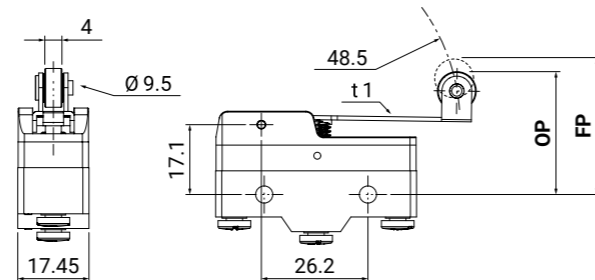
OF	max	90 g
RF	min	18 g
PT	max	7 mm
OT	min	3.5 mm
MD	max	1 mm
FP	max	26.2 mm
OP		19.8 ± 0.8 mm



Hinge roller lever



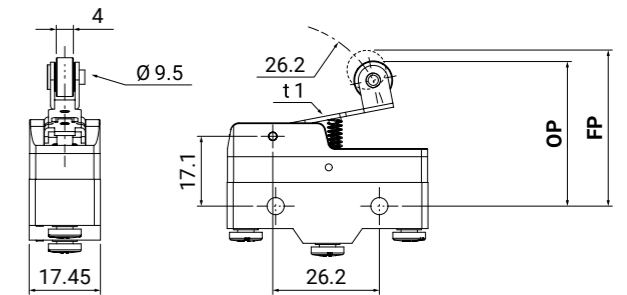
OF	max	100 g
RF	min	22 g
PT	max	7.1 mm
OT	min	4 mm
MD	max	1.02 mm
FP	max	36.5 mm
OP		30.2 ± 0.8 mm



Short hinge roller lever



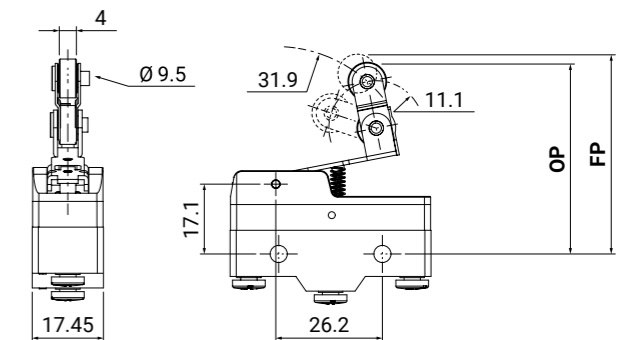
OF	max	160 g
RF	min	42 g
PT	max	2.7 mm
OT	min	2.4 mm
MD	max	0.5 mm
FP	max	32.5 mm
OP		30.2 ± 0.4 mm



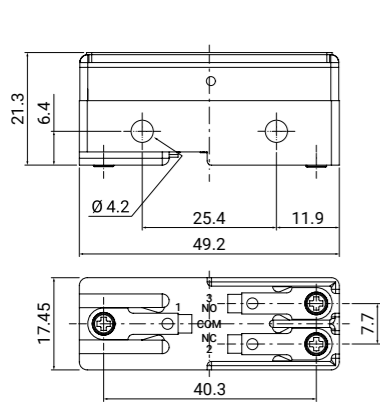
Unidirectional short hinge roller lever



OF	max	170 g
RF	min	42 g
PT	max	2.7 mm
OT	min	2.4 mm
MD	max	0.51 mm
FP	max	43.6 mm
OP		41.3 ± 0.8 mm



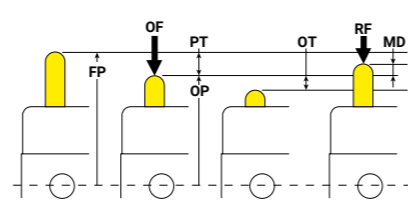
MZW13 SOLDER TERMINALS - CODE SELECTION OVERVIEW



M Z	W	1 3	
SERIES	TERMINAL TYPE	BODY CONFIGURATION	ACTUATOR TYPE
MZ micro switches	W solder terminals	13 normal	00 pin plunger 01 hinge lever 03 short hinge roller lever 05 slim spring plunger 06 short spring plunger 07 panel mount plunger 08 panel mount roller plunger 18 panel mount cross roller plunger

TRAVELS AND ACTUATING FORCES

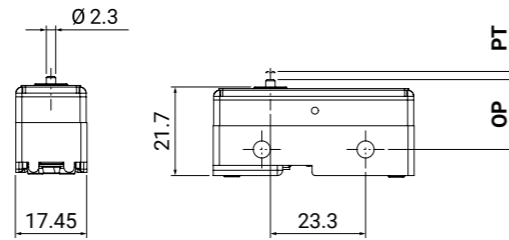
OF	[N]	Operating Force
RF	[N]	Release force
PT	[mm]	Pretravel
OT	[mm]	Overtravel
MD	[mm]	Differential movement
FP	[mm]	Initial position
OP	[mm]	Operating position



Pin plunger



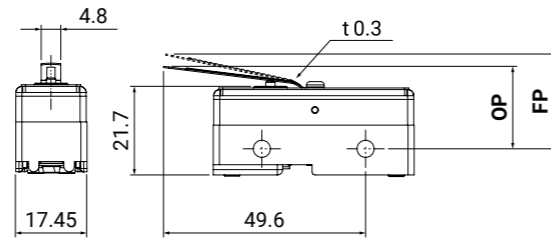
OF	max	250 .. 350 g
RF	min	114 g
PT	max	0.4 mm
OT	min	0.13 mm
MD	max	0.10 mm
FP	max	-
OP		15.9 ± 0.4 mm



Hinge lever



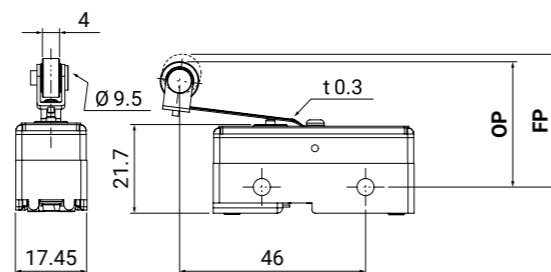
OF	max	141 g
RF	min	14 g
PT	max	4 mm
OT	min	1.6 mm
MD	max	1.3 mm
FP	max	20.6 mm
OP		17.4 ± 0.8 mm



Short hinge roller lever



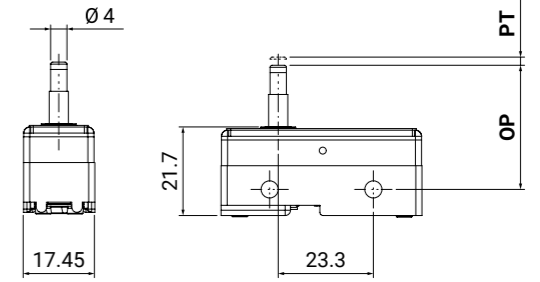
OF	max	141 g
RF	min	14 g
PT	max	4 mm
OT	min	1.6 mm
MD	max	1.3 mm
FP	max	31.8 mm
OP		28.6 ± 0.8 mm



Slim spring plunger



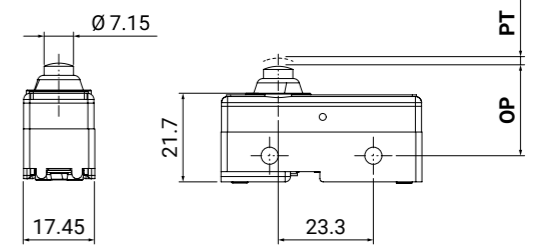
OF	max	250 .. 350 g
RF	min	114 g
PT	max	0.4 mm
OT	min	1.6 mm
MD	max	0.10 mm
FP	max	-
OP		28.2 ± 0.5 mm



Short spring plunger



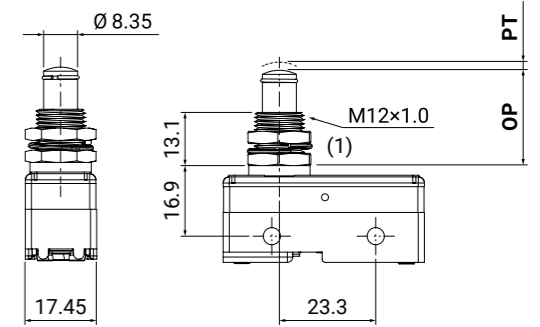
OF	max	250 .. 350 g
RF	min	114 g
PT	max	0.4 mm
OT	min	1.6 mm
MD	max	0.10 mm
FP	max	-
OP		21.5 ± 0.5 mm



Panel mount plunger



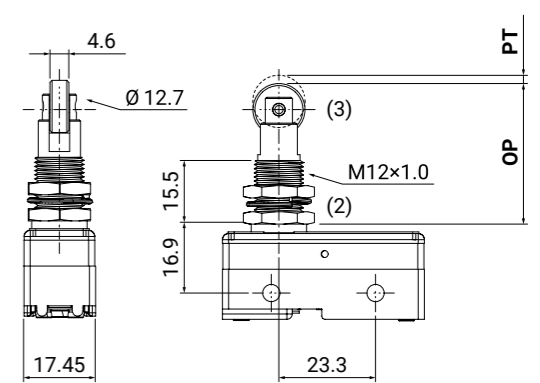
OF	max	250 .. 350 g
RF	min	114 g
PT	max	0.4 mm
OT	min	5.5 mm
MD	max	0.10 mm
FP	max	-
OP		21.8 ± 0.8 mm



Panel mount roller plunger



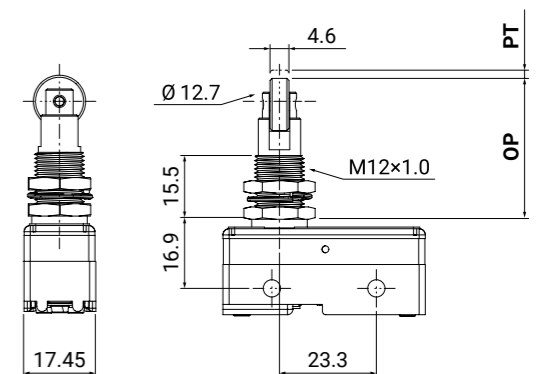
OF	max	250 .. 350 g
RF	min	114 g
PT	max	0.4 mm
OT	min	3.58 mm
MD	max	0.10 mm
FP	max	-
OP		33.4 ± 1.2 mm



Panel mount cross roller plunger



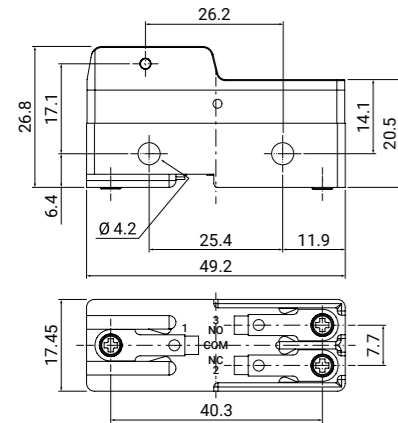
OF	max	250 .. 350 g
RF	min	114 g
PT	max	0.4 mm
OT	min	3.58 mm
MD	max	0.10 mm
FP	max	-
OP		33.4 ± 1.2 mm



(1) 2 hexagonal brass nuts 3x15 mm (2) 2 hexagonal brass nuts 3x17 mm (3) Stainless steel roller

(1) 2 hexagonal brass nuts 3x15 mm (2) 2 hexagonal brass nuts 3x17 mm (3) Stainless steel roller

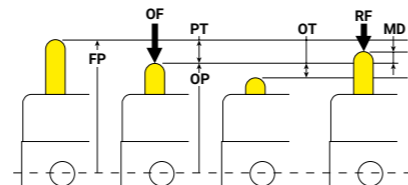
MZW17 SOLDER TERMINALS - CODE SELECTION OVERVIEW



M Z	W	1 7	
SERIES	TERMINAL TYPE	BODY CONFIGURATION	ACTUATOR TYPE
MZ micro switches	W solder terminals	17 raised	01 hinge lever 02 short hinge lever 03 hinge roller lever 04 short hinge roller lever 44 unidirectional short hinge roller lever

TRAVELS AND ACTUATING FORCES

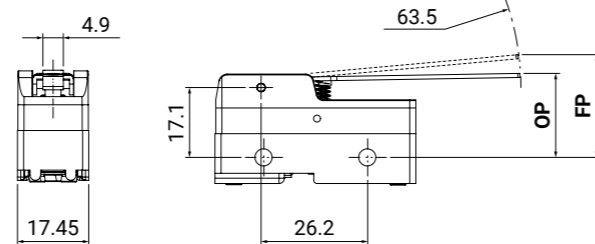
OF	[N]	Operating Force
RF	[N]	Release force
PT	[mm]	Pretravel
OT	[mm]	Overtravel
MD	[mm]	Differential movement
FP	[mm]	Initial position
OP	[mm]	Operating position



Hinge lever



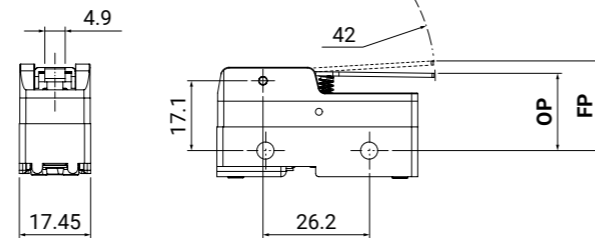
OF	max	70 g
RF	min	14 g
PT	max	10 mm
OT	min	5.6 mm
MD	max	1.27 mm
FP	max	28.2 mm
OP		19 ± 0.8 mm



Short hinge lever



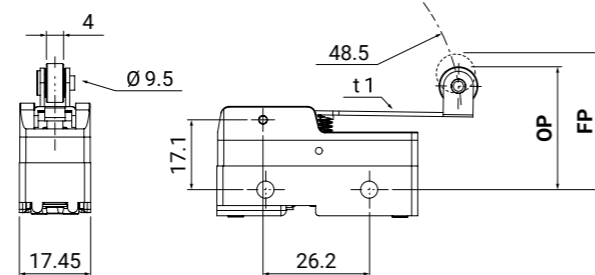
OF	max	90 g
RF	min	18 g
PT	max	7 mm
OT	min	3.5 mm
MD	max	1 mm
FP	max	26.2 mm
OP		19.8 ± 0.8 mm



Hinge roller lever



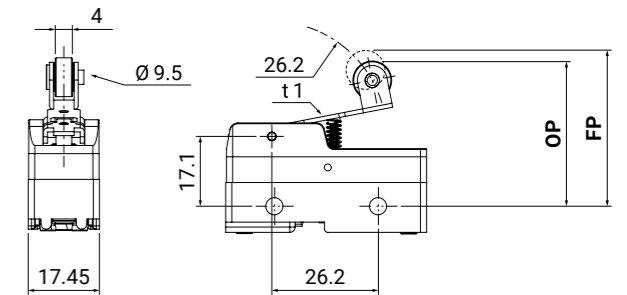
OF	max	100 g
RF	min	22 g
PT	max	7.1 mm
OT	min	4 mm
MD	max	1.02 mm
FP	max	36.5 mm
OP		30.2 ± 0.8 mm



Short hinge roller lever



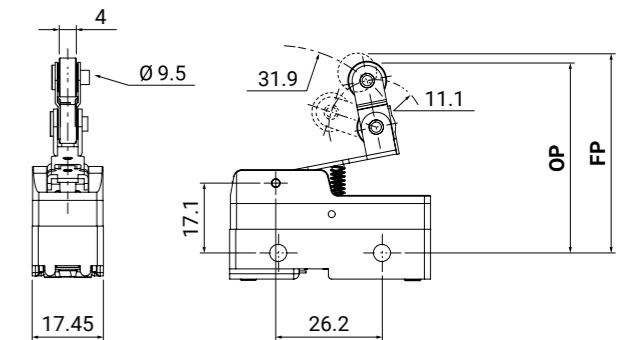
OF	max	160 g
RF	min	42 g
PT	max	2.7 mm
OT	min	2.4 mm
MD	max	0.5 mm
FP	max	32.5 mm
OP		30.2 ± 0.4 mm



Unidirectional short hinge roller lever



OF	max	170 g
RF	min	42 g
PT	max	2.7 mm
OT	min	2.4 mm
MD	max	0.51 mm
FP	max	43.6 mm
OP		41.3 ± 0.8 mm





NOTES

Lined area for notes.



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