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AUTOMATION • LIMIT & MICRO SWITCHES

GIOVENZANA INTERNATIONAL B.V.

GIOVENZANA
INTERNATIONAL B.V.

LIMIT SWITCHES
MICRO SWITCHES

GIOVENZANA
INTERNATIONAL B.V.

Automation - Lift - Handling System - Atex

QUALITY AS A LIFE STYLE

www.giovenzana.com

GIOVENZANA INTERNATIONAL B.V.: AUTOMATION TECHNOLOGIES

AUTOMATION

The solutions offered by **Giovenzana** are the results of the market analysis of industrial electrical accessories requirements in conformity with all relevant international standards. The range includes:

- Phoenix cam switches from 12A to 200A;
- Regolus switch disconnectors from 16A to 160A;
- Pegasus, Orion and NEMA auxiliary controls;
- Thermoplastic limit switches, with manual reset, safety limit switches, M12 & pre-wired thermoplastic limit switches;
- Foot switches and micro switches.

QUALITY

Giovenzana, leader in the elevator and lifting equipment field, has gained a prominent position in the automation sector with the launch of industrial control devices into the market. For many years, all commercial and industrial operations have been integrated within the **UNI EN ISO 9001:2015** quality system.
CSQ certificate N 9105. GIOV.
Quality system is the end users guarantee that all production stages are closely followed under strict control and adhere to the requirements set by the company both in terms of customer expectations and compliance to the relevant international standards as proved by the various certificates **Giovenzana** holds for its products.
By the **UNI EN ISO 14001:2015**, **Giovenzana** keeps up with new technologies in order to reduce raw materials consumption, energy and natural resources and to minimize waste and emissions. This reduces the environmental impact.
The certification CSQ N 9191. GIBV.

COMPLIANCE

All **Giovenzana** products are manufactured according to the most relevant Cee directives. **Giovenzana** certifies this compliance with a declaration of conformity.

CERTIFICATIONS

In order to reach its high quality level **Giovenzana**'s products are tested by multiple third parties. In order to obtain the UL mark, **Giovenzana** submits their products to Underwriter Laboratories Inc., one of the most eminent independent certification companies in the World.

CEE DIRECTIVES

From January 1st, 1997 it is compulsory to CE mark all electromechanical products; this has been outlined by an important regulation: 2006/95/CE Low Voltage Directives.

CE MARK

European directives, applied to all national regulations, set the minimum requirements in term of safety of all electrical material sold within the EU.
Compliance to these requirements is certified by the manufacturer by the CE mark placed on the products.

STANDARDS

Giovenzana's products comply with both the European EN and the American UL standards.
These regulations, such as CEI EN 60204-1 (CEI 44-5) with regards to the safety requirements of the electrical circuits on board industrial machinery, define the characteristics, performance and use of the products.

EN EUROPEAN STANDARDS

The EN European standards are originated from IEC International standards and are the result of the collaboration between CENELEC (European Committee for Electrotechnical Standardization) member countries.
These standards cover and eliminate existing national standards that may be contradictory and non-compliant.

LIMIT SWITCHES AND MICRO SWITCHES - Rev. 02_2018

PRODUCTS INDEX - LIMIT SWITCHES & MICRO SWITCHES

PRODUCTS INDEX - LIMIT SWITCHES & MICRO SWITCHES

OPERATING FORCE FTN SERIES

	TYPE	CONTACT BLOCK		OPERATING TRAVEL		OPERATING FORCE	POSITIVE OPENING		TOTAL TRAVEL
				PT	PT2nd	OF	Travel	Force	
	FTN140	X11	1 NC/1 NO Slow Action	30°	41°	5.2 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	5.2 N			
		Z11	1 NC/1 NO Snap Action	28°	-	4.5 N			
		W12	2 NC/1 NO Slow Action	30°	41°	5.2 N			
		W03	3 NC Slow Action	30°	-	5.2 N			
	FTN140L	X11	1 NC/1 NO Slow Action	30°	41°	5.2 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	5.2 N			
		Z11	1 NC/1 NO Snap Action	35°	-	5.3 N			
		W12	2 NC/1 NO Slow Action	30°	41°	5.2 N			
		W03	3 NC Slow Action	30°	-	5.2 N			
	FTN140R	X11	1 NC/1 NO Slow Action	30°	41°	5.2 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	5.2 N			
		Z11	1 NC/1 NO Snap Action	28°	-	4.5 N			
		W12	2 NC/1 NO Slow Action	30°	41°	5.2 N			
		W03	3 NC Slow Action	30°	-	5.2 N			
	FTN140RL	X11	1 NC/1 NO Slow Action	30°	41°	5.2 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	5.2 N			
		Z11	1 NC/1 NO Snap Action	35°	-	5.3 N			
		W12	2 NC/1 NO Slow Action	30°	41°	5.2 N			
		W03	3 NC Slow Action	30°	-	5.2 N			
	FTN141	X11	1 NC/1 NO Slow Action	30°	41°	6.5 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	6.5 N			
		Z11	1 NC/1 NO Snap Action	35°	-	5.3 N			
		W12	2 NC/1 NO Slow Action	30°	41°	6.5 N			
		W03	3 NC Slow Action	30°	-	6.5 N			
	FTN142	X11	1 NC/1 NO Slow Action	-	-	-	N/A	N/A	N/A
		W02	2 NC Slow Action	12°	-	5.2 N			
		Z11	1 NC/1 NO Snap Action	12°	-	4.5 N			
		W12	2 NC/1 NO Slow Action	-	-	-			
		W03	3 NC Slow Action	12°	-	5.2 N			
	FTN143	X11	1 NC/1 NO Slow Action	30°	41°	6.5 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	6.5 N			
		Z11	1 NC/1 NO Snap Action	35°	-	5.3 N			
		W12	2 NC/1 NO Slow Action	30°	41°	6.5 N			
		W03	3 NC Slow Action	30°	-	6.5 N			
	FTN144	X11	1 NC/1 NO Slow Action	30°	41°	6.5 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	6.5 N			
		Z11	1 NC/1 NO Snap Action	28°	-	5.3 N			
		W12	2 NC/1 NO Slow Action	30°	41°	6.5 N			
		W03	3 NC Slow Action	30°	-	6.5 N			
	FTN198	X11	1 NC/1 NO Slow Action	-	-	-			
		W02	2 NC Slow Action	-	-	-			
		Z11	1 NC/1 NO Snap Action	Coming soon!					
		W12	2 NC/1 NO Slow Action	-	-	-			
		W03	3 NC Slow Action	-	-	-			

DESCRIPTION

The **FTN1R series** limit switches with manual reset, conform to EN 50047, have been developed to provide a range of options including a various choice of snap acting and slow acting and a wide range of actuator heads.
The **FTN1R series** offers the option of rotating the head in 90° increments before installation to allow ease of mounting.

Giovenzana limit switches can be used in various applications in automation, lift and handling system fields.
Operation of these limit switches is achieved by the sliding action of the guard or the moving object deflecting the plunger or lever.
For safety applications it's important that upon actuation, the guard or other moving objects should not pass completely over the switch and allow the plunger or lever to return to its original position.

TECHNICAL DATA - HOUSING

Made of glass- reinforced polymer, self-extinguishing, shock-proof thermoplastic resin and with double insulation	⧈
FTN1R Series one threaded conduit entry	Standard: M16
Protection degree	IP67 according to EN60529 with cable gland having equal or higher protection degree

GENERAL DATA

Positive opening operation	NC contact ⊖
Utilization category	AC15 A600
Minimum admissible current	5V, 5mA, DC
Insulation resistance	100MΩ min (DC 500V)
Contact resistance	25mΩ max (Initial)
Enclosure material	UL approved glass-filled polybutylene terephthalate
Operating temperature	Min -25°C (-18°F) / Max 80°C (+176°F)
Mechanical life expectancy	$1x10^6$ cycles min
Electrically life expectancy	150.000 cycles min
Vibration resistance	IEC 68-2-6, 10-55Hz ± 1Hz, Excursion: 0.35mm, 1 octave/min
Conduit entry	Various
Fixing	2xM4

ELECTRICAL DATA

Rated thermal current (Ith)	10A
Rated insulation voltage (Ui)	600V AC
Rated impulse withstand voltage (Uimp)	2500V AC
Pollution degree	3
Protection against electric shock	Class II (Double insulation)

STANDARDS & APPROVALS

Standards	EN60947-5-1, UL508, EN50047, EN1088
Approvals	cULus, EAC and CCC for all applicable directives

QUALITY MARKS

c UL us CCC EAC CE

MAIN FEATURES

- Each model features a positive opening mechanism (NC contacts only) and equipped with a lockable head.
- Conforms to EN (TUV) standards corresponding to the CE marking.
- ⊖ Positive opening operation of NC (Normally Closed) contacts conforming to IEC/EN 60947-5-1.
- Double insulation makes ground terminal unnecessary.
- Wide standard operating temperature range: -25°C to 80°C.
- Full range of actuator heads and levers suitable for safety applications.
- Sealing up to IP67.
- Wide switch variations (Snap action and slow action basic switches).

ACCORDING TO STANDARDS

EN81.20
EN81.50

Safety contacts according to EN60947-5-1.
Protection degree higher than IP4x.
Mechanical endurance higher than $1x10^6$ cycles.

INSTALLATION FOR SAFETY APPLICATIONS

Use only switches marked with the simbol ⊖ .
Always connect the safety circuit to the **NC contact** (normally closed contacts: 11-12 / 21-22 / 31-32) as required by **EN ISO 14119 paragraph 5.4** and as stated in the standard **EN81.20 paragraph 5.11.2.2.1**.

TAKE CARE!

If not expressly indicated in this chapter, for the correct installation and utilization of all articles see the instructions given on pages 92-93.

DATA TYPE APPROVED BY UL

Utilization categories:

FTN1R SERIES	**Q300**	**A600**	1 NC/1 NO Slow Action
			2 NC Slow Action
		B600	1 NC/1 NO Snap Action
		A300	2 NC/1 NO Slow Action (3 poles)
			3 NC Slow Action (3 poles)

Data of the housing type 1.
For all contact blocks use 60 or 75°C copper (Cu) conductor and wire size No. 14 - 18 AWG.
Terminal tightening torque of 7.1 lb in (0.8 Nm).
In conformity with standard: UL508, CSA 22.2 No. 14 - 10.

c UL® us

Please contact our technical service for the list of approved products.

PROTECTION CLASS

IP67

Designed to be used even in the most severe environmental situations, these devices pass the immersion test IP67 in conformity with EN 60529.

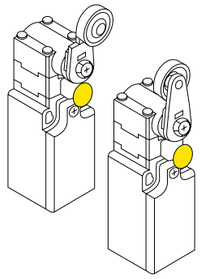
DOUBLE INSULATION

⧈ Materials of group II, according to IEC 536, are made with double insulation. This consists of doubling the insulation capability by means of an additional divider in order to eliminate any electrical shock risk and avoid the need for any additional protections.

POSITIVE OPENING

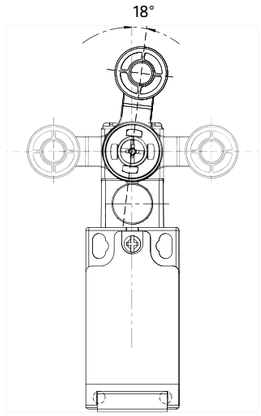
⊖ A limit switch complies to the specification when all the normally closed contact elements of the switch can be changed, with certainty, to the open position (no flexible link between the moving contacts and the operator of the switch, to which an actuating force is applied). Positive opening doesn't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

OVERTURNING LEVERS



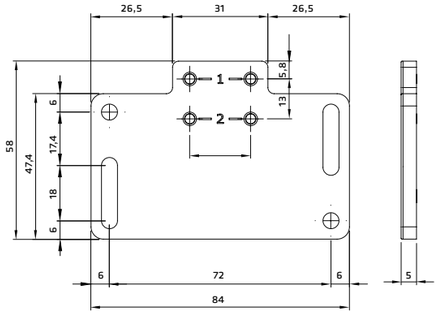
It's possible to fasten the lever on switches on straight or reverse side, maintaining the positive coupling. In this way it is possible to obtain two different work plans of the lever.

ADJUSTABLE LEVERS



In switches with revolving lever it is possible to adjust the lever with 18° steps for the whole 360° range. The positive movement transmission is always guaranteed thanks to the particular geometrical coupling between the lever and the revolving shaft.

ADAPTIVE PLATE



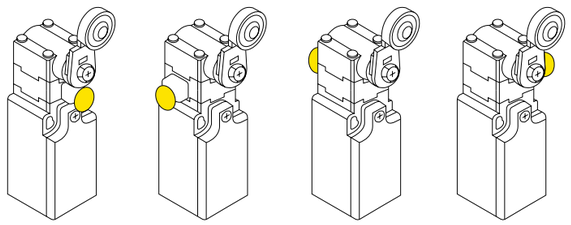
Fixing plate equipped with large slots for adjusting the operating point developed for backwards compatibility with old products.
Each plate has a double pair of fixing holes.

The plate is sold in kit with **KIT-FTN** code.

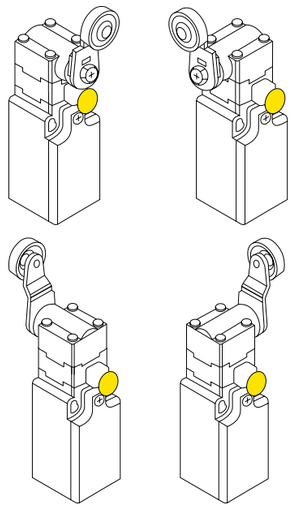
The **KIT-FTN** is inclusive of:
- 1 plate (code 12907009);
- 2 self-tapping screws 4x28 mm;
- 2 washers ø4 mm.

ROTATING RESET DEVICE

The device can be rotated independently from the above actuator, making the product highly flexible in the positioning.
The reset is obtained by pulling back the blue button, as prescribed by standards, to avoid that unwanted objects could reset it accidentally.



ROTATING HEADS



In all switches, it is possible to rotate the head in 90° steps.

STRUCTURE DESCRIPTION

Metal Lever Setting

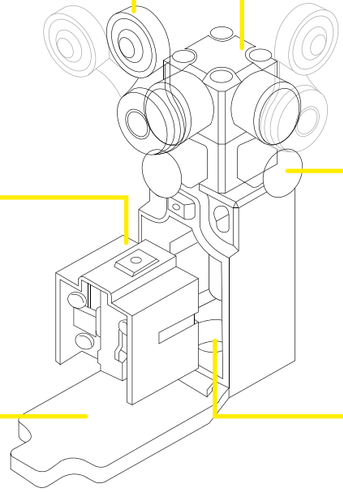
Grooves which engage the lever every 18° are cut in the operation indicator disk to prevent the lever from slipping against the rotary shaft.

Contact block

Has a positive opening mechanism separating the contacts when the contacts are welded.

Cover

The cover, with a hinge on its lower part, can be opened by removing the screw of the cover, which ensures ease of maintenance and wiring.



Head

With roller lever models, the direction of the switch head can be adjusted to any of the four directions by loosening the roller lever switch screws at the four corners of the head.

Reset Head

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

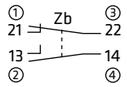
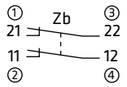
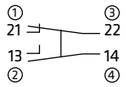
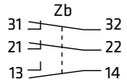
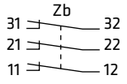
Conduit Entry

Standard: M16.
On request: M20, 1/2NPT, PG11, PG13.5.

PRODUCT SELECTION

FTN	1R	31	X11	M
Series	**Function**	**Head and actuators**	**Contact Types**	**Thread dimension of lead exit**
	1R - With Reset Function	**31** - Push plunger type **32** - Roller lever type **33** - One-way roller arm lever type **34** - Roller plunger type **37** - Rod lever type **38** - Roller arm type **39** - Adjustable roller arm type (Long Arm) **40** - Adjustable roller arm type (Big Arm) **40R** - Two ways adjustable roller arm type **41** - Big roller arm type **43** - Mental roller arm type **44** - Adjustable roller arm type (Standard Arm)	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action Slow Action & Snap Action: Type "Zb"	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector

CONTACT BLOCK FORM

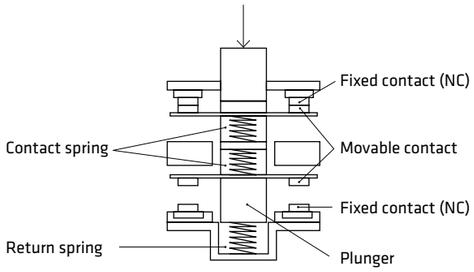
Contact Types	X11	W02	Z11	W12	W03
Contact Form	1NC/1NO Slow Action	2NC Slow Action	1NC/1NO Snap Action	2NC/1NO Slow Action	3NC Slow Action
Electrical Schemes					
Connector pin Arrangement				No Connector type	

M12 Connector pin arrangement - on request

POSITIVE OPEN MECHANISM

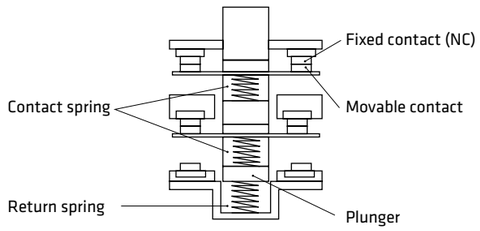
1NC/NO Contact (Slow action)

Only the NC contacts have a positive opening function.
When metal deposition occurs, the contacts are separated from each other by pushing in the plunger.

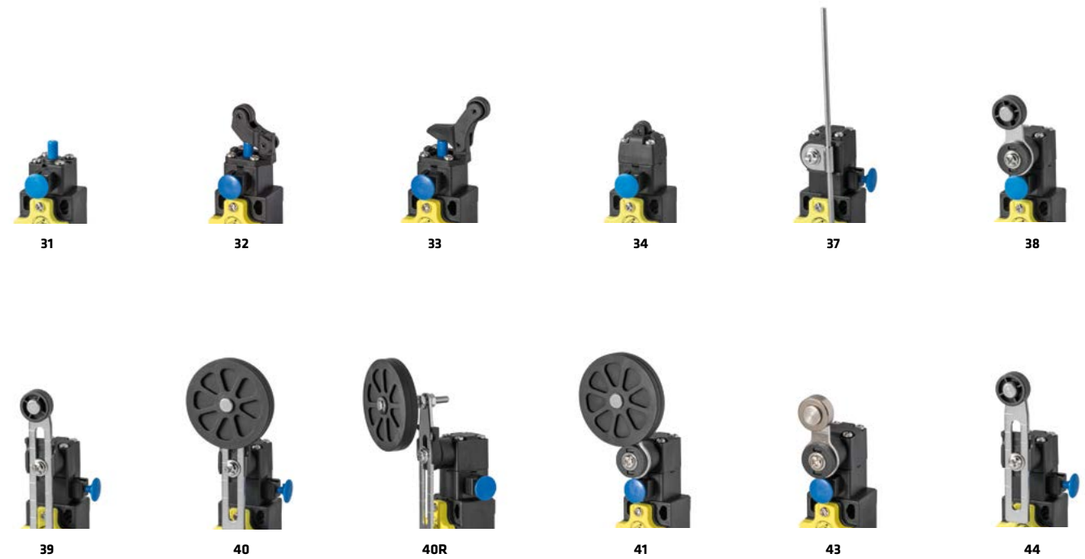


2NC Contact (Slow action)

Both NC contacts incorporate a positive opening function.
When metal deposition occurs, the contacts are separated from each other by pushing in the plunger.



SELECTION DIAGRAM

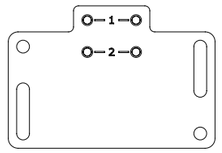


ACTUATORS

X11 - 1NC/1NO Slow Action
W02 - 2NC Slow Action
Z11 - 1NC/1NO Snap Action
W12 - 2NC/1NO Slow Action
W03 - 3NC Slow Action

Accessory sell separately

KIT-FTN is inclusive of:
- 1 plate (code 12907009);
- 2 self-tapping screws 4x28 mm;
- 2 washers ø4 mm.



Threaded conduit entry

Standard:
BLANK - M16

On request:
M - M20
N - 1/2NPT
G1 - PG11
G3 - PG13.5
C - Connector

Wiring

Customized wirings are available on request, with connectors and cables in accordance with customers' specifications.

CONTACT BLOCKS

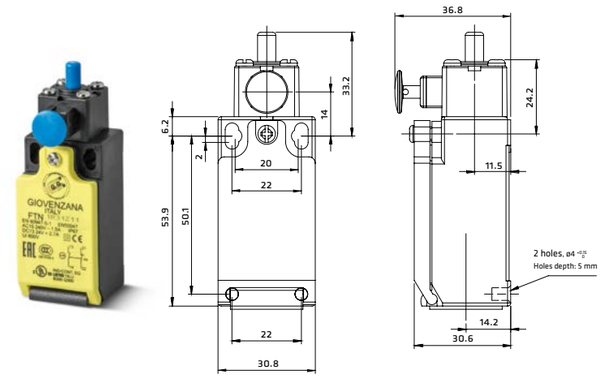
ADAPTIVE PLATE

CONDUIT ENTRY

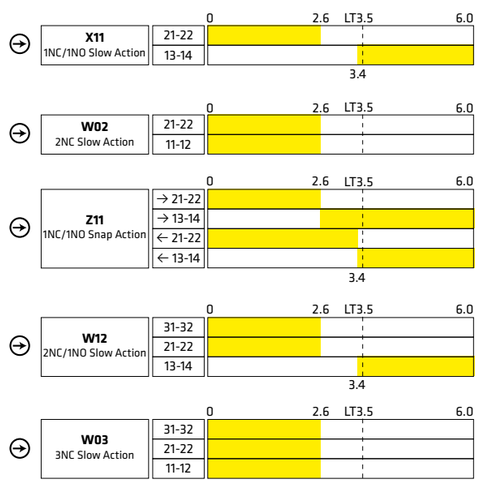
FTN1R SERIES

FTN1R31: Push plunger type

FTN	1R	31	X11	M
Series	Function	Head and actuators	Contact Types	Thread dimension of lead exit
	1R - With Reset Function	**31** - Push plunger type	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action **Slow Action & Snap Action: Type "Zb"**	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector

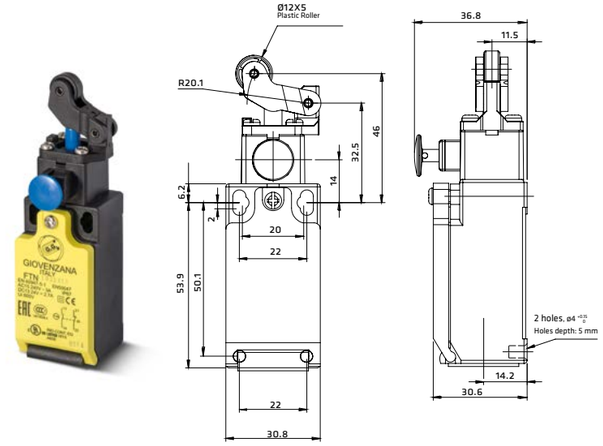


OPERATION DIAGRAMS

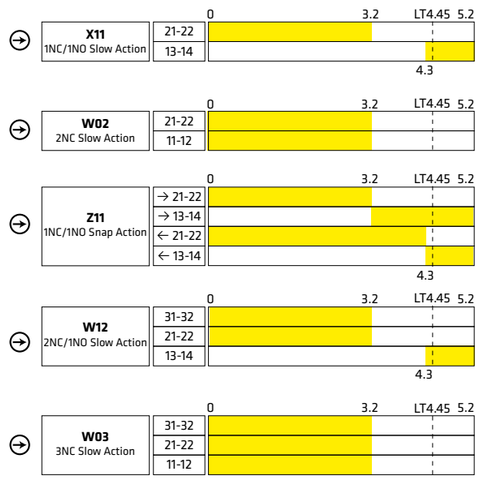


FTN1R32: Roller lever type

FTN	1R	32	X11	M
Series	Function	Head and actuators	Contact Types	Thread dimension of lead exit
	1R - With Reset Function	**32** - Roller lever type	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action **Slow Action & Snap Action: Type "Zb"**	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector

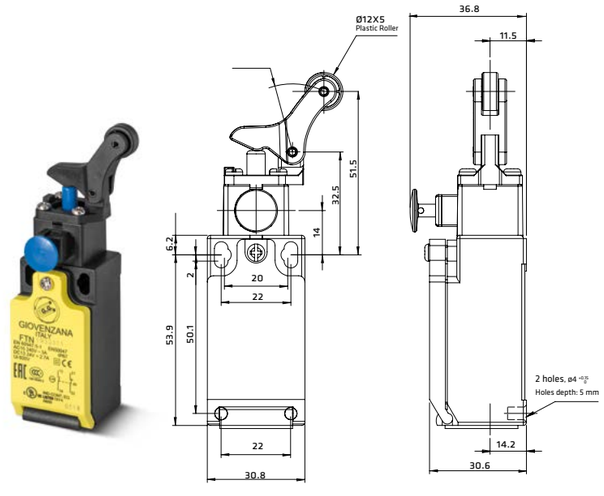


OPERATION DIAGRAMS

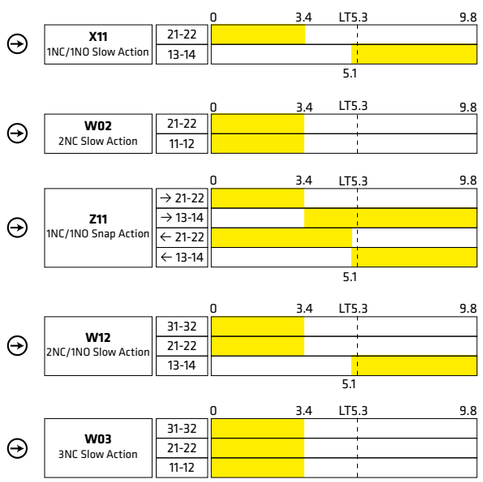


FTN1R33: One-way roller arm lever type

FTN	1R	33	X11	M
Series	Function	Head and actuators	Contact Types	Thread dimension of lead exit
	1R - With Reset Function	**33** - One-way roller arm lever type	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action **Slow Action & Snap Action: Type "Zb"**	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector

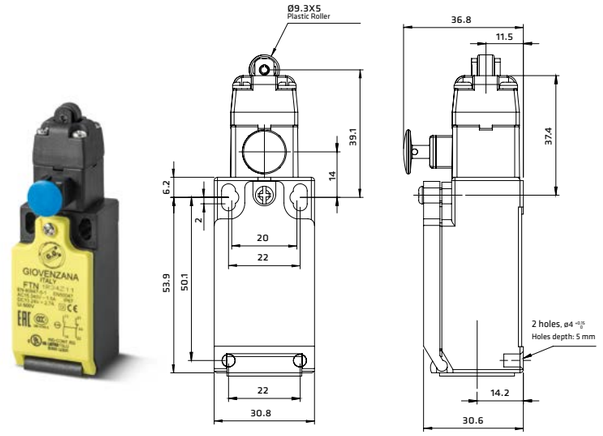


OPERATION DIAGRAMS

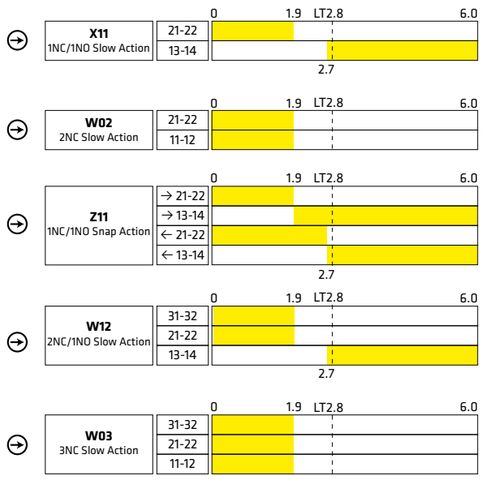


FTN1R34: Roller plunger type

FTN	1R	34	X11	M
Series	Function	Head and actuators	Contact Types	Thread dimension of lead exit
	1R - With Reset Function	**34** - Roller plunger type	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action **Slow Action & Snap Action: Type "Zb"**	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector

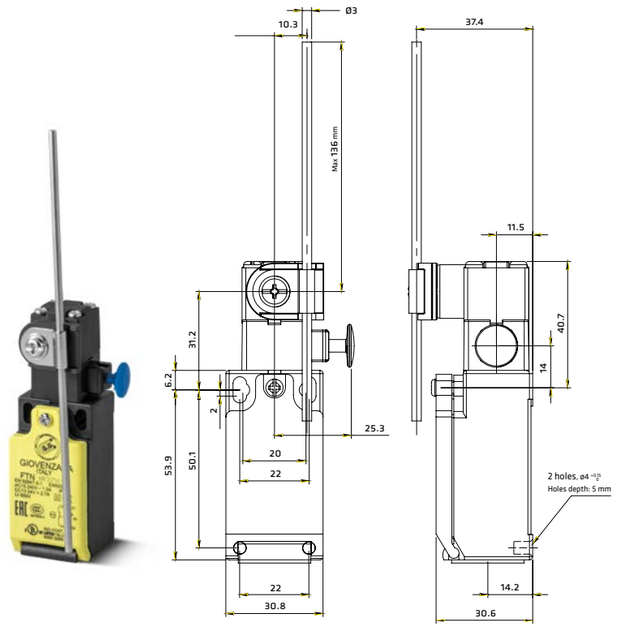


OPERATION DIAGRAMS

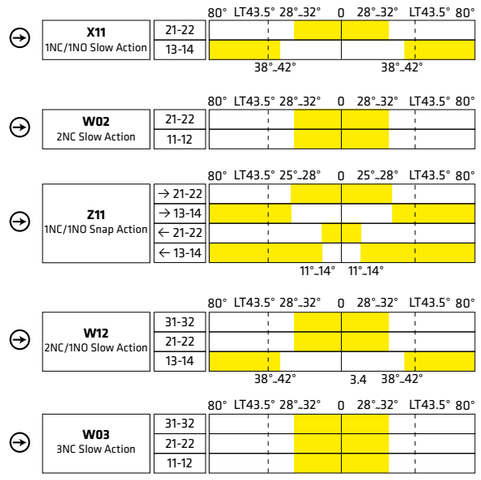


FTN1R37: Rod lever type

FTN	1R	37	X11	M
Series	Function	Head and actuators	Contact Types	Thread dimension of lead exit
	1R - With Reset Function	**37** - Rod lever type	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action **Slow Action & Snap Action: Type "Zb"**	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector

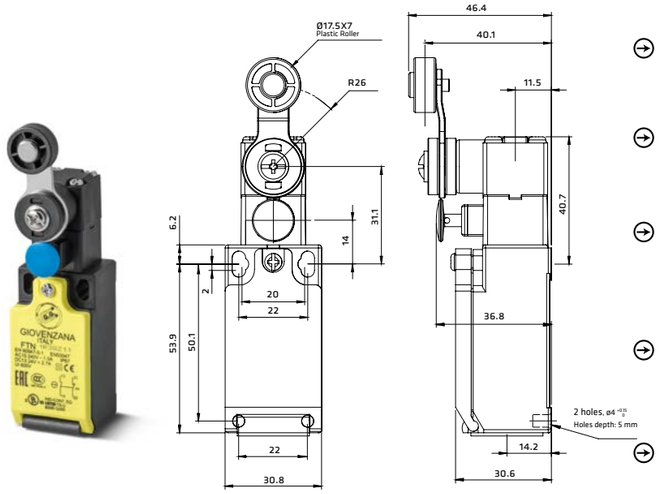


OPERATION DIAGRAMS

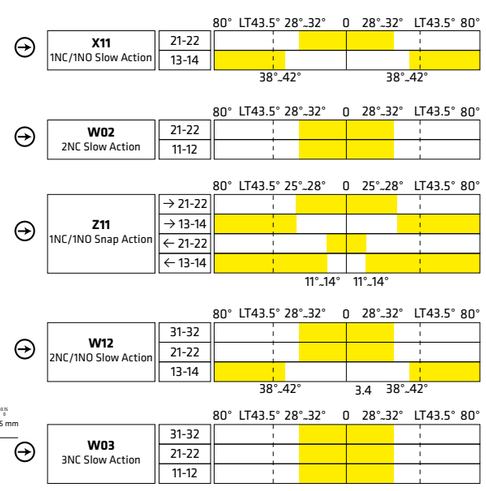


FTN1R38: Roller arm type

FTN	1R	38	X11	M
Series	Function	Head and actuators	Contact Types	Thread dimension of lead exit
	1R - With Reset Function	**38** - Roller arm type	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action **Slow Action & Snap Action: Type "Zb"**	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector

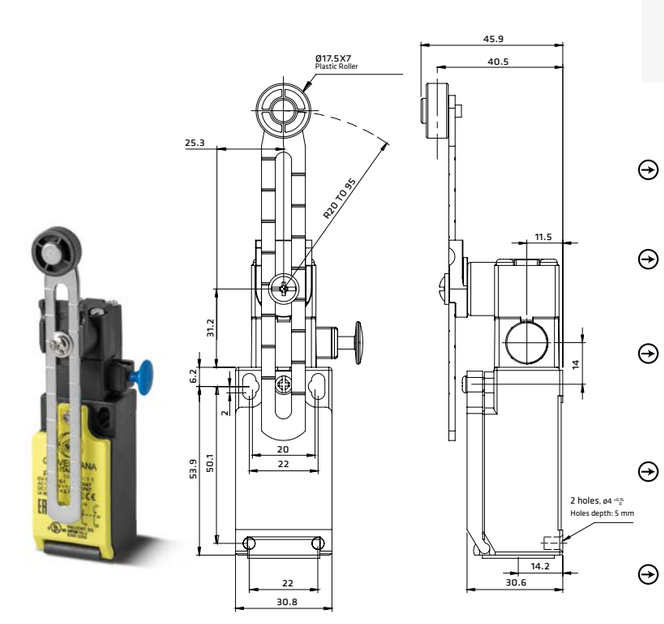


OPERATION DIAGRAMS

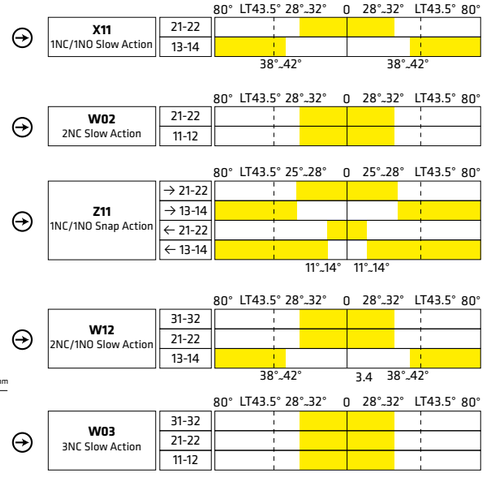


FTN1R39: Adjustable roller arm type (Long Arm)

FTN	1R	39	X11	M
Series	Function	Head and actuators	Contact Types	Thread dimension of lead exit
	1R - With Reset Function	**39** - Adjustable roller arm type (Long Arm)	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action **Slow Action & Snap Action: Type "Zb"**	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector

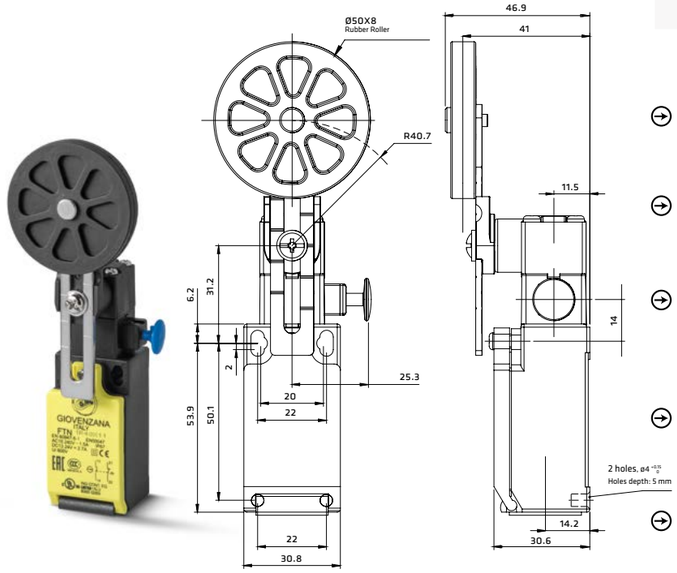


OPERATION DIAGRAMS

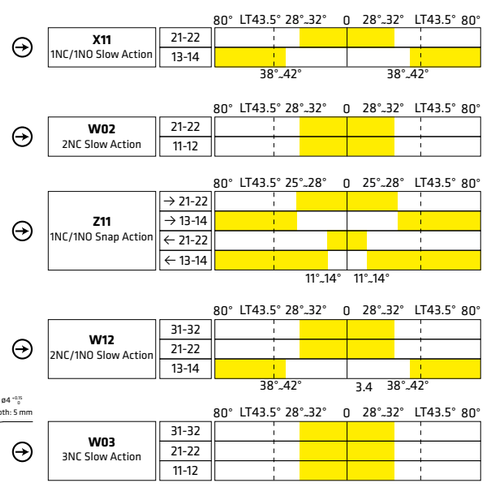


FTN1R40: Adjustable roller arm type (Big Arm)

FTN	1R	40	X11	M
Series	Function	Head and actuators	Contact Types	Thread dimension of lead exit
	1R - With Reset Function	**40** - Adjustable roller arm type (Big Arm)	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action **Slow Action & Snap Action: Type "Zb"**	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector

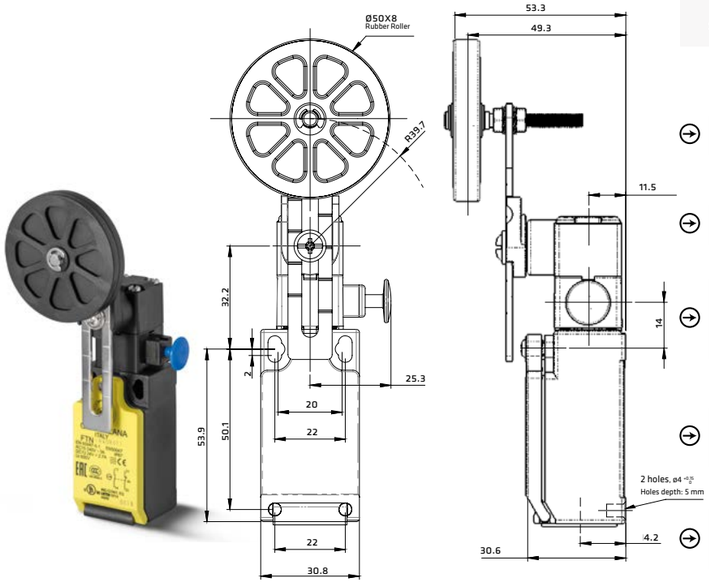


OPERATION DIAGRAMS

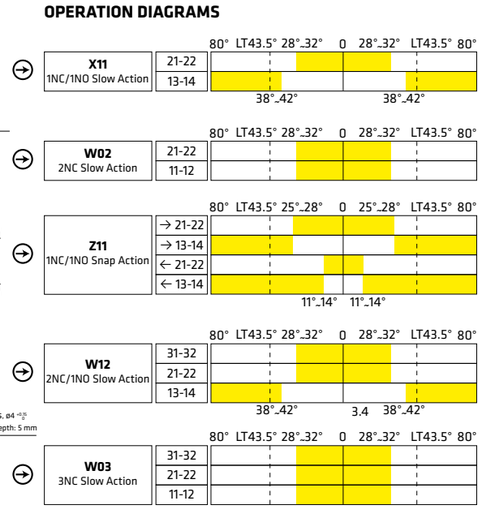


FTN1R40R: Two ways adjustable roller arm type

FTN	1R	40R	X11	M
Series	**Function**	**Head and actuators**	**Contact Types**	**Thread dimension of lead exit**
	1R - With Reset Function	**40R** - Two ways adjustable roller arm type	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action **Slow Action & Snap Action: Type "Zb"**	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector

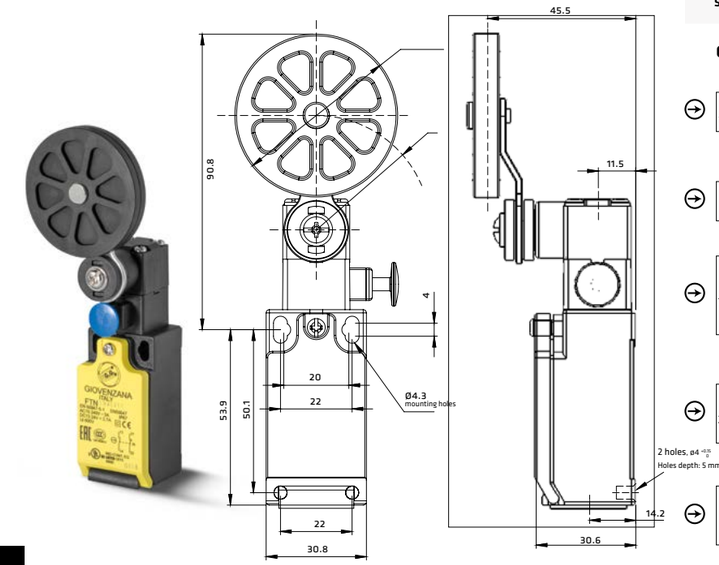


OPERATION DIAGRAMS

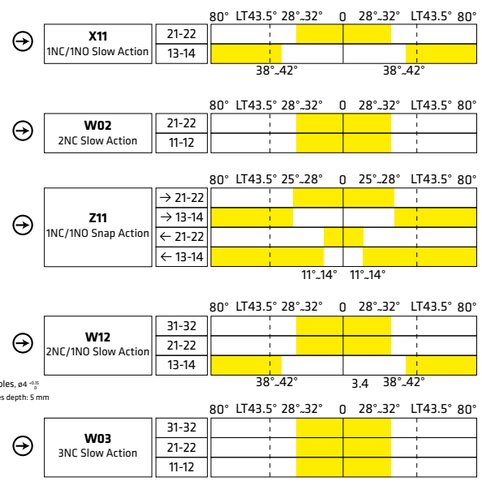


FTN1R41: Big roller arm type

FTN	1R	41	X11	M
Series	**Function**	**Head and actuators**	**Contact Types**	**Thread dimension of lead exit**
	1R - With Reset Function	**41** - Big roller arm type	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action **Slow Action & Snap Action: Type "Zb"**	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector

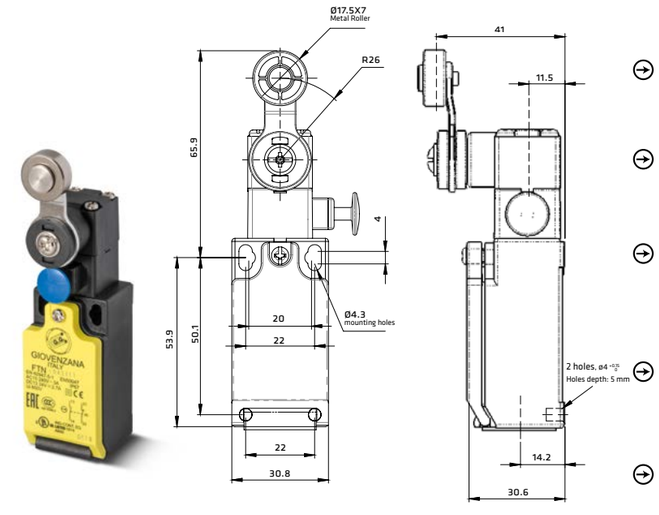


OPERATION DIAGRAMS

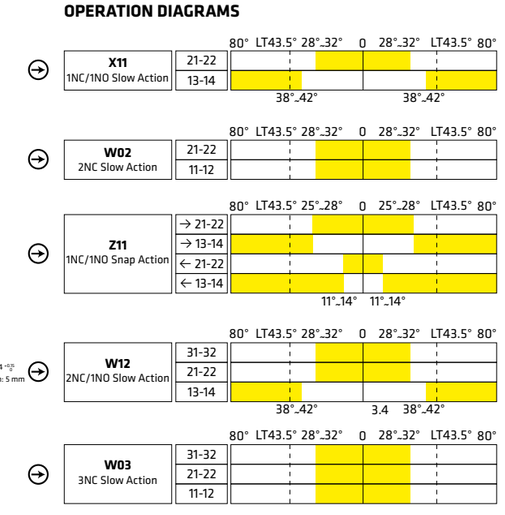


FTN1R43: Mental roller arm type

FTN	1R	43	X11	M
Series	**Function**	**Head and actuators**	**Contact Types**	**Thread dimension of lead exit**
	1R - With Reset Function	**43** - Mental roller arm type	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action **Slow Action & Snap Action: Type "Zb"**	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector

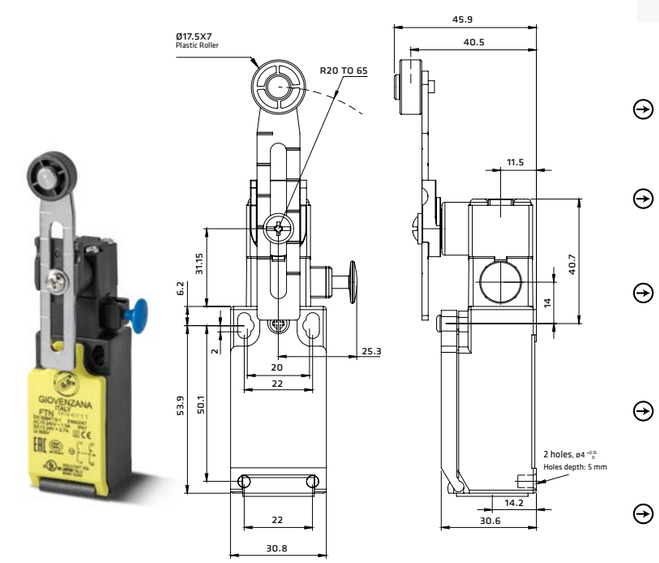


OPERATION DIAGRAMS

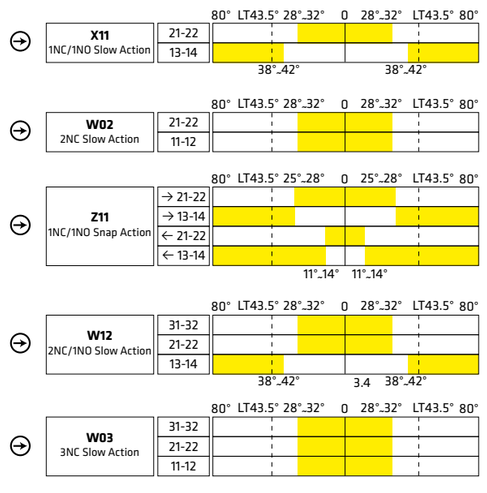


FTN1R44: Adjustable roller arm type (Standard Arm)

FTN	1R	44	X11	M
Series	**Function**	**Head and actuators**	**Contact Types**	**Thread dimension of lead exit**
	1R - With Reset Function	**44** - Adjustable roller arm type (Standard Arm)	**X11** - 1NC/1NO Slow Action **W02** - 2NC Slow Action **Z11** - 1NC/1NO Snap Action **W12** - 2NC/1NO Slow Action **W03** - 3NC Slow Action **Slow Action & Snap Action: Type "Zb"**	Standard: **BLANK** - M16 On request: **M** - M20 **N** - 1/2NPT **G1** - PG11 **G3** - PG13.5 **C** - Connector



OPERATION DIAGRAMS



OPERATING FORCE FTN1R SERIES

	TYPE	CONTACT BLOCK		OPERATING TRAVEL		OPERATING FORCE	POSITIVE OPENING		TOTAL TRAVEL
				PT	PT2nd	OF	Travel	Force	
	FTN1R31	X11	1 NC/1 NO Slow Action	2.2 mm	3.0 mm	7.26 N	3.2 mm	19.0 N	6.0 mm
		W02	2 NC Slow Action	2.2 mm	-	7.42 N			
		Z11	1 NC/1 NO Snap Action	1.9 mm	-	6.71 N			
		W12	2 NC/1 NO Slow Action	2.2 mm	3.0 mm	7.26 N			
		W03	3 NC Slow Action	2.2 mm	-	7.42 N			
	FTN1R32	X11	1 NC/1 NO Slow Action	3.0 mm	4.5 mm	5.21 N	5.7 mm	19.0 N	5.2 mm
		W02	2 NC Slow Action	3.0 mm	-	5.26 N			
		Z11	1 NC/1 NO Snap Action	2.9 mm	-	4.74 N			
		W12	2 NC/1 NO Slow Action	3.0 mm	4.5 mm	5.21 N			
		W03	3 NC Slow Action	3.0 mm	-	5.26 N			
	FTN1R33	X11	1 NC/1 NO Slow Action	4.0 mm	6.0 mm	6.37 N	4.6 mm	19.0 N	9.8 mm
		W02	2 NC Slow Action	4.0 mm	-	6.98 N			
		Z11	1 NC/1 NO Snap Action	3.6 mm	-	5.76 N			
		W12	2 NC/1 NO Slow Action	4.0 mm	6.0 mm	6.37 N			
		W03	3 NC Slow Action	4.0 mm	-	6.98 N			
	FTN1R34	X11	1 NC/1 NO Slow Action	2.2 mm	3.0 mm	7.26 N	3.2 mm	19.0 N	6.0 mm
		W02	2 NC Slow Action	2.2 mm	-	7.42 N			
		Z11	1 NC/1 NO Snap Action	1.9 mm	-	6.71 N			
		W12	2 NC/1 NO Slow Action	2.2 mm	3.0 mm	7.26 N			
		W03	3 NC Slow Action	2.2 mm	-	7.42 N			
	FTN1R37	X11	1 NC/1 NO Slow Action	30°	41°	1.8 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	1.8 N			
		Z11	1 NC/1 NO Snap Action	28°	-	1.9 N			
		W12	2 NC/1 NO Slow Action	30°	41°	1.8 N			
		W03	3 NC Slow Action	30°	-	1.8 N			
	FTN1R38	X11	1 NC/1 NO Slow Action	30°	41°	6.5 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	6.5 N			
		Z11	1 NC/1 NO Snap Action	28°	-	5.3 N			
		W12	2 NC/1 NO Slow Action	30°	41°	6.5 N			
		W03	3 NC Slow Action	30°	-	6.5 N			
	FTN1R39	X11	1 NC/1 NO Slow Action	30°	41°	1.8 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	1.8 N			
		Z11	1 NC/1 NO Snap Action	28°	-	1.9 N			
		W12	2 NC/1 NO Slow Action	30°	41°	1.8 N			
		W03	3 NC Slow Action	30°	-	1.8 N			
	FTN1R40	X11	1 NC/1 NO Slow Action	30°	41°	5.2 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	5.2 N			
		Z11	1 NC/1 NO Snap Action	28°	-	4.5 N			
		W12	2 NC/1 NO Slow Action	30°	41°	5.2 N			
		W03	3 NC Slow Action	30°	-	5.2 N			
	FTN1R40R	X11	1 NC/1 NO Slow Action	30°	41°	6.5 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	6.5 N			
		Z11	1 NC/1 NO Snap Action	35°	-	5.3 N			
		W12	2 NC/1 NO Slow Action	30°	41°	6.5 N			
		W03	3 NC Slow Action	30°	-	6.5 N			

OPERATING FORCE FTN1R SERIES

	TYPE	CONTACT BLOCK		OPERATING TRAVEL		OPERATING FORCE	POSITIVE OPENING		TOTAL TRAVEL
				PT	PT2nd	OF	Travel	Force	
	FTN1R41	X11	1 NC/1 NO Slow Action	30°	41°	6.5 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	6.5 N			
		Z11	1 NC/1 NO Snap Action	35°	-	5.3 N			
		W12	2 NC/1 NO Slow Action	30°	41°	6.5 N			
		W03	3 NC Slow Action	30°	-	6.5 N			
	FTN1R43	X11	1 NC/1 NO Slow Action	30°	41°	6.5 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	6.5 N			
		Z11	1 NC/1 NO Snap Action	35°	-	5.3 N			
		W12	2 NC/1 NO Slow Action	30°	41°	6.5 N			
		W03	3 NC Slow Action	30°	-	6.5 N			
	FTN1R44	X11	1 NC/1 NO Slow Action	30°	41°	6.5 N	45°	19.0 N	80°
		W02	2 NC Slow Action	30°	-	6.5 N			
		Z11	1 NC/1 NO Snap Action	28°	-	5.3 N			
		W12	2 NC/1 NO Slow Action	30°	41°	6.5 N			
		W03	3 NC Slow Action	30°	-	6.5 N			