

LS-Titan Safety Interlock Switches



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LS-Titan Safety Interlock Switches

Product Description

Eaton's LS-Titan™ safety interlock switches have been specifically designed for monitoring the position of protective guards, such as doors, flaps, hoods and grilles. All switches in this family are safety-rated, include positively opening NC contacts, and cannot be defeated using simple tools, such as pliers, screwdrivers and nails.

The LS-Titan safety interlock family is comprised of three types of safety switches: key interlock, door-flap and door-hinge switches.

Key interlock switches are a two-piece design, made up of the switch and key (actuator). The key portion of the switch is affixed to a movable door, cover or other such guard. The switch itself is mounted to a rigid portion of the machine. When the guard is opened, the key is removed from the switch, thereby positively breaking the NC contacts. This interrupts the control circuit, stopping machine operation.

The door-flap and door-hinge switches are one-piece designs, suitable for when a key cannot be mounted in the application. When an attempt is made to open a protected door hinge or flap during operation, these switches disconnect the power supply to the machine or installation. Both switches feature four-way adjustable heads.

All LS-Titan safety interlock switches are approved to protect personnel and processes.

Features

- Broad family of safety interlock switches in industry-standard enclosure sizes: miniature DIN; full-size DIN; and larger, solenoid key interlocks providing the highest degree of personnel and process protection
- Large selection of actuators (keys), including those for sliding doors, swing doors and doors that do not close precisely
- Miniature DIN models have a five-way adjustable head, while full-size DIN models have four-way adjustable heads
- Fully safety-rated as interlocking devices per EN 1088, with safety function by positive opening contacts per IEC/EN 60947-5-1
- Door-flap and door-hinge safety switches provide a unique solution when actuators (keys) cannot be used
- IP65 degree of protection

Standards and Certifications

- UL® listed
- CSA® approved
- CCC



- Positive opening NC contacts per EN 60947-5-1



Safety Notes

Do not use as a mechanical stop/shipping brace.

Any change to an original Eaton safety position switch is not permitted and automatically leads to the loss of all approvals.

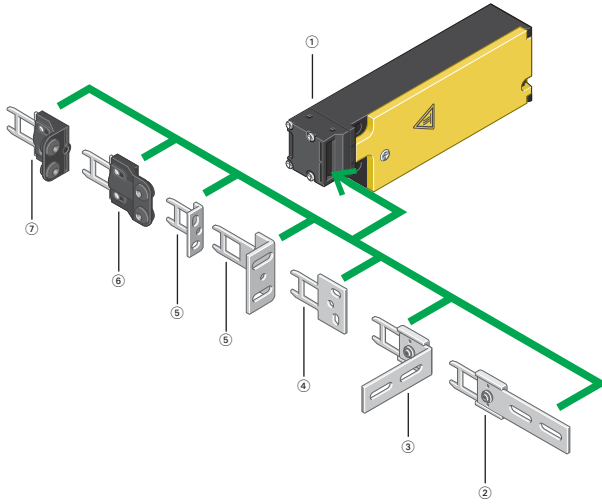
⚠ Switch must never be used as a mechanical stop.

For the most current information on this product, visit our web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578. For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Identification

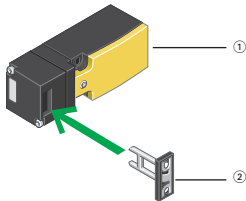
Solenoid Safety Interlock Switches (LS-...ZBZ)



Notes

- ① **Basic device** (see Page 6)
Spring or magnet-powered interlock
For increased personnel and process protection
Tamper-proof
Multiple coded actuators
Contacts: 1NO-1NC or 2NC
- ② **Flat flexible actuator** (see Page 7)
For doors that do not close precisely
- ③ **Angled flexible actuator** (see Page 7)
For doors that do not close precisely
- ④ **Flat actuator** (see Page 7)
For sliding doors
- ⑤ **Angled actuator** (see Page 7)
For swing doors
- ⑥ **Flat compensating actuator** (see Page 7)
For increased tolerance compensation in the direction of door closure
- ⑦ **Angled compensating actuator** (see Page 7)
For increased tolerance compensation in the direction of door closure

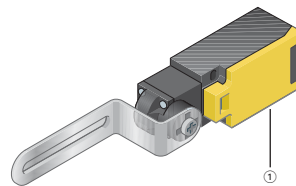
Miniature DIN Safety Interlock Switch (LS-...ZB)



Notes

- ① **Complete device** (see Page 5)
For personnel protection
Contacts: 1NC, 1NO-1NO or 2NC
Five directions of operation possible
- ② **Actuator** (see Page 5)
Included with switch
Multiple coding protection against tampering

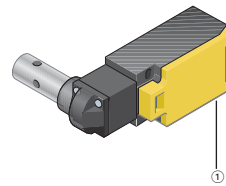
Door Flap Safety Switch (LSR-...TKG)



Note

- ① **Complete device** (see Page 5)
For personnel protection
Contacts: 1NO-1NC or 2NC
For swing doors with fixed connection to the door/hinge pin

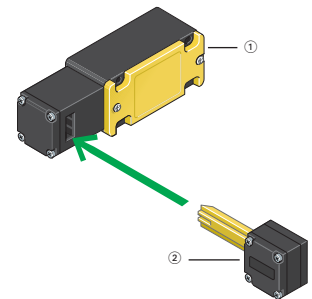
Door Hinge Safety Switch (LSR-...TS)



Note

- ① **Complete device** (see Page 5)
For personnel protection
Contacts: 1NO-1NC or 2NC
For swing doors with fixed connection to the door/hinge pin

Full-Size DIN Safety Interlock Switch (LS4-...ZB)



Notes

- ① **Complete device** (see Page 6)
Narrow enclosure version
For personnel protection
Contacts: 1NO, 1NO-1NC
- ② **Actuator**
Included with switch, not orderable as a separate item
Multiple coding
For horizontal or vertical operation

Product Selection

LS-Titan Miniature DIN Safety Interlock Switches

Key Interlock Switch

Key Interlock Switch—LS...ZB ①



Contacts	Contact Sequence	Contact Travel	Connection	Catalog Number (Includes Key)
2NC with positive opening		—	Screw terminal	LS-S02-ZB
1NO and 1NC with positive opening		—	Screw terminal	LS-S11-ZB
		Snap action contacts	Screw terminal	LS-S11S-ZB

Door-Flap Switch

Door-Flap Switch—LSR...TKG ①



Contacts	Contact Sequence	Contact Travel	Connection	Catalog Number (Includes Key)
2NC with positive opening			Screw terminal	LSR-S02-1-I-TKG
1NO and 1NC with positive opening			Screw terminal	LSR-S11-1-I-TKG

Door-Hinge Switch

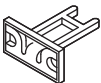
Door-Hinge Switch—LSR...TS ①



Contacts	Contact Sequence	Contact Travel	Connection	Catalog Number (Includes Key)
2NC with positive opening			Screw terminal	LSR-S02-1-I-TS
1NO and 1NC with positive opening			Screw terminal	LSR-S11-1-I-TS

Replacement Safety Interlock Key

Replacement Safety Interlock Key ①



Description	Catalog Number
Replacement key for miniature DIN key interlock switches (only models LS...ZB).	LS-XB-ZB

Note

① For dimensions, see Page 10.

LS-Titan Full-Size DIN Safety Interlock Switches

Key Interlock Switch

Full-Size DIN—LS4-...ZB ^{①②}



Contacts	Contact Sequence	Contact Travel	Connection	Catalog Number (Includes Key)
1NO and 1NC with positive opening		—	Screw terminal	LS4-S11-1-I-ZB

LS-Titan Solenoid Safety Interlock Switches

Switch Body without Key



Switch Body without Key—LS-...ZBZ ^{①②③}



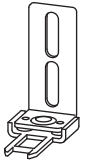
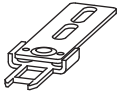
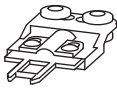

Operation	Operating Voltage	Contacts	Contact Sequence	Catalog Number (Key not Included)
Power to unlock (mechanical bypass present)	24 Vdc	1NO and 1NC with positive opening		LS-S11-24DFT-ZBZ-X
		2NC with positive opening		LS-S02-24DFT-ZBZ-X
	120 Vac (50/60 Hz)	1NO and 1NC with positive opening		LS-S11-120AFT-ZBZ-X
		2NC with positive opening		LS-S02-120AFT-ZBZ-X
Power to lock (mechanical bypass present)	24 Vdc	1NO and 1NC with positive opening		LS-S11-24DMT-ZBZ-X
		2NC with positive opening		LS-S02-24DMT-ZBZ-X
	120 Vac (50/60 Hz)	1NO and 1NC with positive opening		LS-S11-120AMT-ZBZ-X
		2NC with positive opening		LS-S02-120AMT-ZBZ-X

Notes

- ① For dimensions, see **Page 10**.
- ② For mounting instructions, see **Page 9**.
- ③ Key ordered separately, see **Page 7**.

LS-Titan Solenoid Safety Interlock Keys

Keys Only—LS...ZBZ ^{①②}

	Description	Application	Catalog Number
 <p>LS-XG-ZBZ</p>	Flat actuator	For sliding doors	LS-XG-ZBZ
 <p>LS-X...ZBZ</p>	Angled actuator, short	For swing doors starting at 250 mm in width	LS-XW-ZBZ
	Angled actuator, long	For swing doors starting at 250 mm in width	LS-XWA-ZBZ
 <p>LS-XF-ZBZ</p>	Angled, flexible actuator	For doors that do not close precisely	LS-XF-ZBZ
 <p>LS-XFG-ZBZ</p>	Even, flexible coasting actuator	For doors that do not close precisely	LS-XFG-ZBZ
 <p>LS-XNG-ZBZ</p>	Flat, compensating actuator	Increased tolerance in closing direction for inaccurately closing doors	LS-XNG-ZBZ
 <p>LS-XNW-ZBZ</p>	Angled, compensating actuator	Increased tolerance in closing direction for inaccurately closing doors	LS-XNW-ZBZ

Notes

- ① Switch body ordered separately, see **Page 6**.
- ② For mounting instructions, see **Page 9**.

Technical Data and Specifications

LS-Titan Safety Interlock Switches

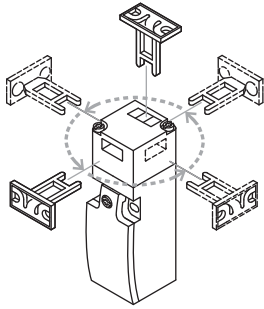
	Units		LS-...ZBZ	LS-...ZB	LS4...ZB
General					
Standards			IEC/EN 60947	IEC/EN 60947	IEC/EN 60947
Climatic proofing			①	①	①
Ambient temperature	°C		-25... +0	-25... +70	-25... +70
Mounting position			As required	As required	As required
Protection type			IP65	IP65	IP65
Terminal capacities					
Solid	mm ²		1 x (0.75-2.5)/2 x (0.75-1.5)	1 x (0.75-2.5)/2 x (0.75-1.5)	1 x (0.75-2.5)/2 x (0.75-1.5)
Flexible with ferrule	mm ²		1 x (0.75-2.5)/2 x (0.75-1.5)	1 x (0.75-2.5)/2 x (0.75-1.5)	1 x (0.75-2.5)/2 x (0.75-1.5)
Contacts/Switching Capacity					
Rated impulse withstand voltage	U _{imp}	Vac	4000	6000	6000
Rated insulation voltage	U _i	V	400	500	500
Overvoltage category/pollution degree			III/3	III/3	III/3
Burden Current					
AC-15					
24V	I _e	A	6	10	10
230V/240V	I _e	A	6	6	6
400V/415V	I _e	A	4	4	4
DC-13					
24V	I _e	A	3	3	3
110V	I _e	A	0.8	0.8	0.8
220V	I _e	A	0.3	0.3	0.3
Supply frequency		Hz	max. 400	max. 400	max. 400
Short-circuit rating to IEC/EN 60947-5-1 Max. fuse		A gG/gL	6	6	6
Repetition accuracy		mm	± 0.02	± 0.02	± 0.02
Mechanical Variables					
Lifespan					
Standard-action contact	Operations	x 10 ⁶	1	10	10
Snap-action contact	Operations	x 10 ⁶	—	—	—
Mechanical shock resistance (half-sinusoidal shock, 20 ms)					
Standard-action contact		g	10	25	5
Snap-action contact		g	—	—	—
Operating frequency	Operations/h		≤ 800	≤ 1800	≤ 1800
Actuation					
Mechanical					
Actuating force at beginning/end of stroke					
ZB/ZBZ (push in/pull out)	N		25/15	10/5	15/20
Mechanical holding force according to GS-ET-19 (04/2004)					
XG, XW	N		1500	N/A	N/A
XFF, XNG, XWA	N		1300	N/A	N/A
XF	N		750	N/A	N/A
XNW	N		500	N/A	N/A
Electromechanical					
For magnet					
Power consumption					
at 120 Vac	VA		8	N/A	N/A
at 230 Vac	VA		11	N/A	N/A
at 24 Vdc	W		8	N/A	N/A
Pickup and dropout values	x U _s		0.85-1.1	N/A	N/A
Magnet duty factor	% ED		100	N/A	N/A

Note

① Damp heat, constant, to IEC 60068-2-78; damp heat, cyclical, to IEC 60068-2-30.

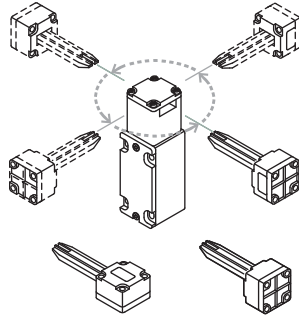
Mounting Instructions

LS-...ZB, TKG, TS



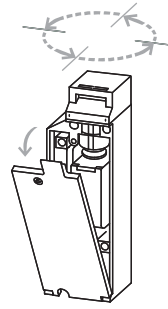
Actuator can be repositioned for horizontal or vertical installation. The operating heads can be rotated manually in 90° steps to suit the specified direction of operation.

LS4-...ZB

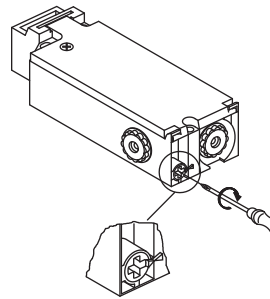


Actuator can be repositioned for horizontal or vertical installation. The operating heads can be rotated manually in 90° steps to suit the specified direction of operation.

LS-...ZBZ



The operating head can be rotated manually in 90° steps to suit the specified level of actuation.



In the event of a loss of voltage, (e.g., during commissioning), the spring-powered LS-...-...FT-ZBZ can be released with a screwdriver. **The auxiliary release mechanism must be sealed.**

45.1

Safety Products

LS-Titan Safety Interlock Switches

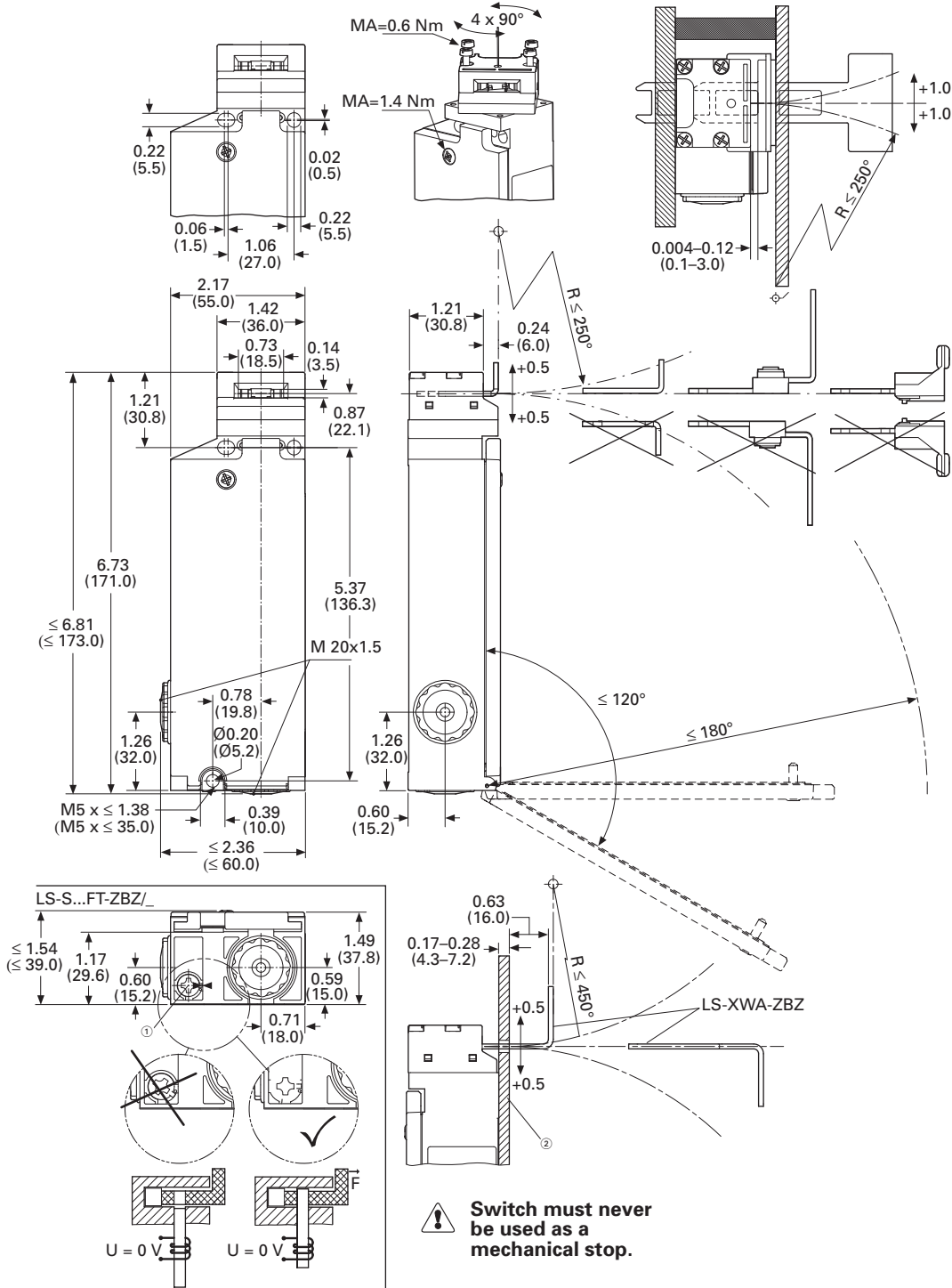
45

Dimensions

Approximate Dimensions in Inches (mm)

Safety Position Switches

LS...ZB



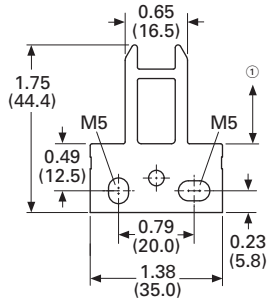
Notes

- ① The auxiliary release mechanism must be sealed for proper operation.
- ② Can be used as stop with the corresponding material selection and design.

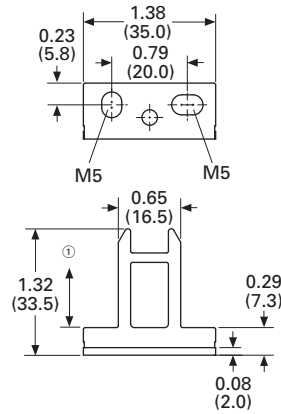
Approximate Dimensions in Inches (mm)

Actuators

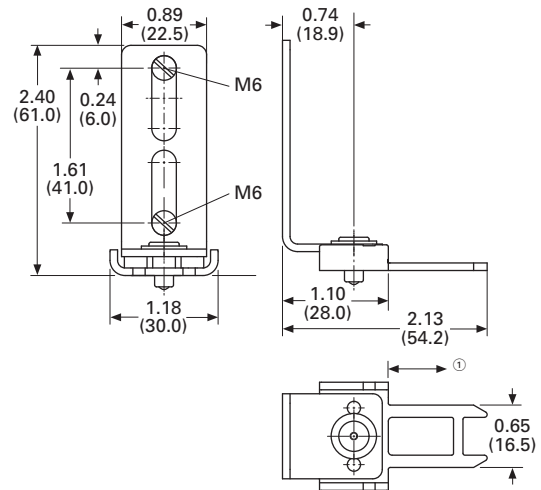
LS-XG-ZBZ



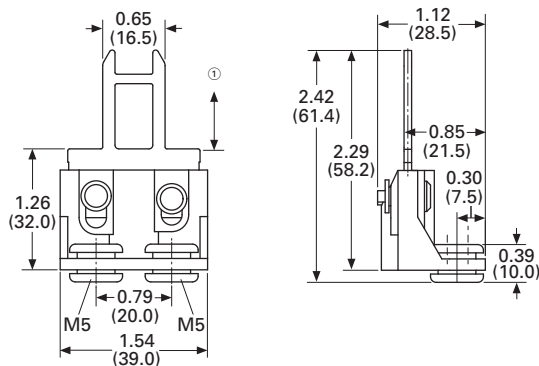
LS-XW-ZBZ



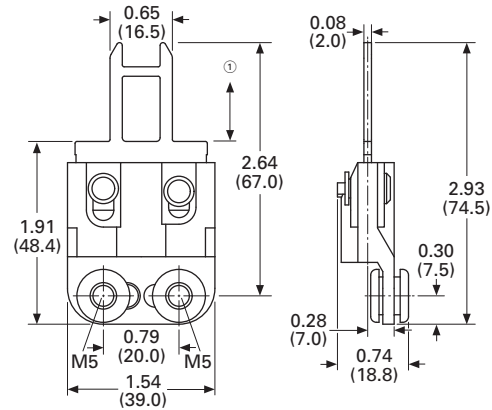
LS-XF-ZBZ



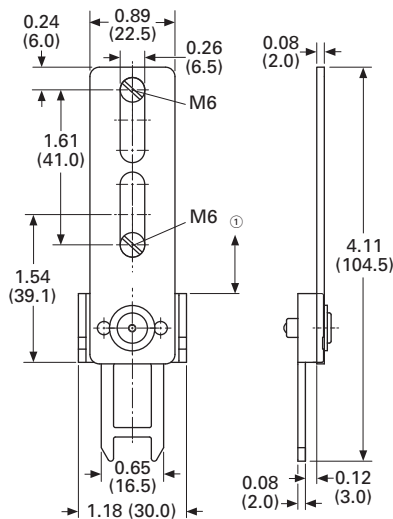
LS-XNW-ZBZ ②



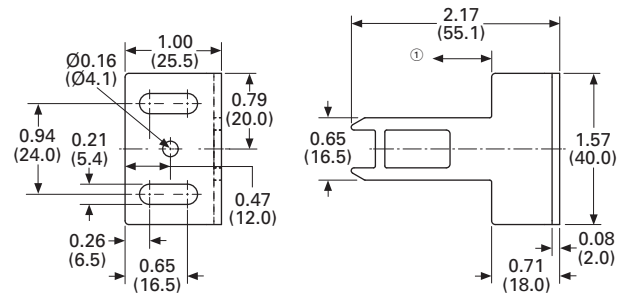
LS-XNG-ZBZ ②



LS-XFG-ZBZ



LS-XWA-ZBZ ③



Notes

- ① Distance to device head = 0.1–3.0 mm.
- ② Fixing only allowed with M5 fixing screw and washer according to DIN EN ISO 7093.
- ③ Pin with a 4 mm pin after mounting.

45.1

Safety Products

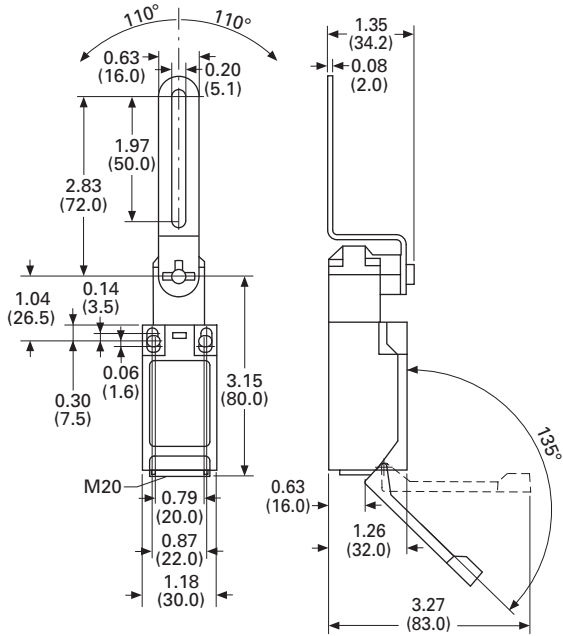
LS-Titan Safety Interlock Switches

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Approximate Dimensions in Inches (mm)

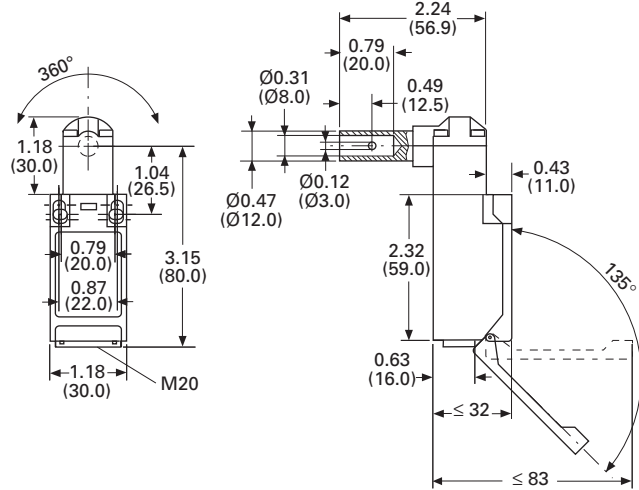
Safety Door Flap Switch

LSR-.../TKG



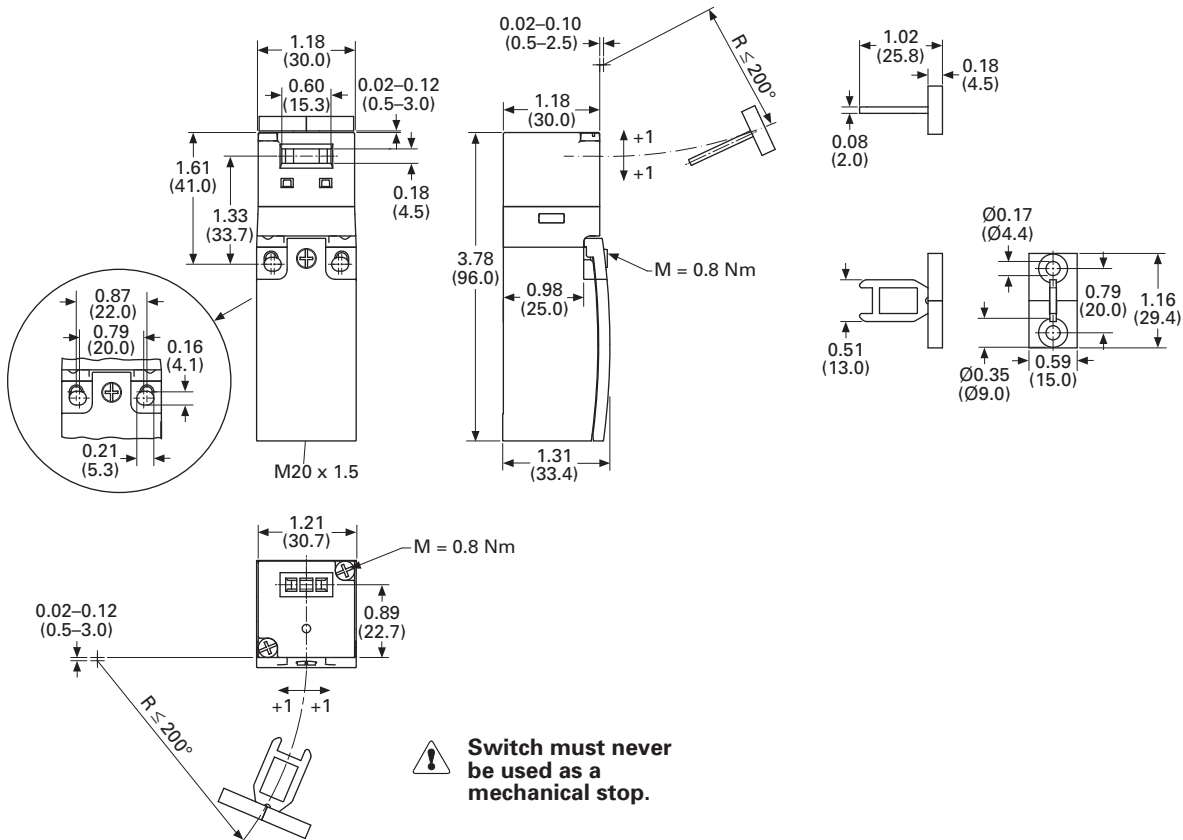
Safety Hinge Switch

LSR-.../TS



Safety Position Switches

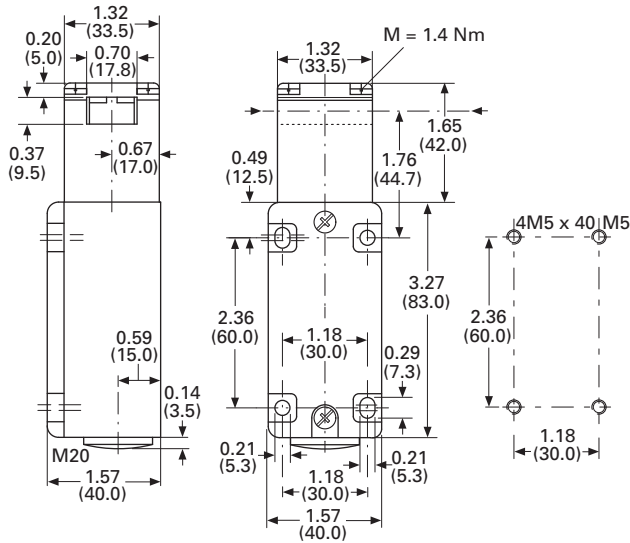
LS...-ZB



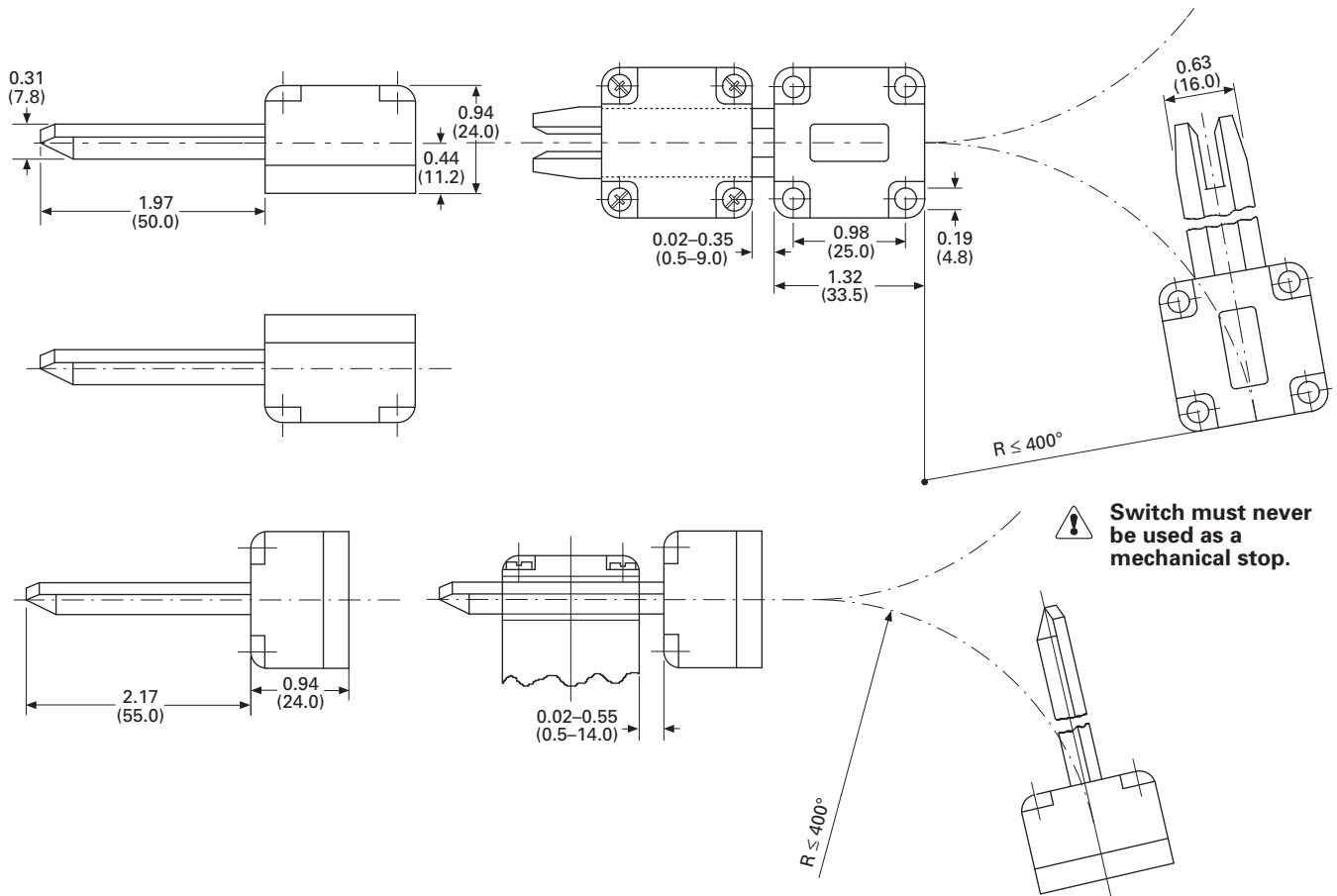
Approximate Dimensions in Inches (mm)

Safety Position Switches

LS4...ZB



Actuator—Included with Switch Above



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