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

Listed

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

total isoliert

SUVA CNA INSAI

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.

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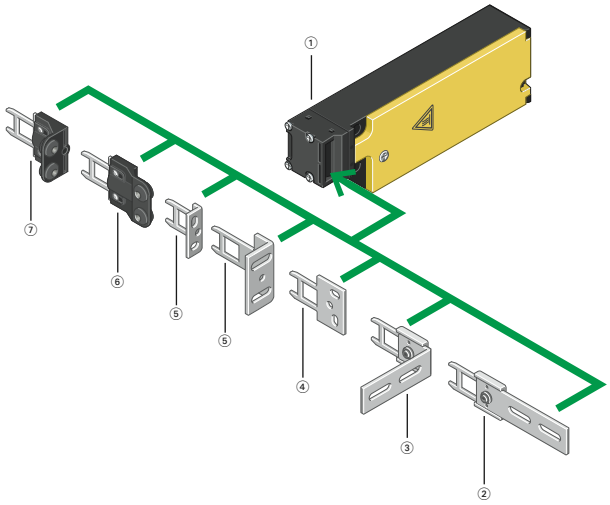
Product Identification

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



Notes

① **Basic device** (see **Page 4**)
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 5**)
For doors that do not close precisely

③ **Angled flexible actuator** (see **Page 5**)
For doors that do not close precisely

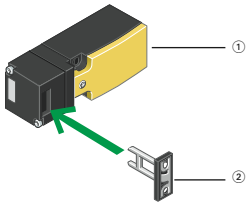
④ **Flat actuator** (see **Page 5**)
For sliding doors

⑤ **Angled actuator** (see **Page 5**)
For swing doors

⑥ **Flat compensating actuator** (see **Page 5**)
For increased tolerance compensation in the direction of door closure

⑦ **Angled compensating actuator** (see **Page 5**)
For increased tolerance compensation in the direction of door closure

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

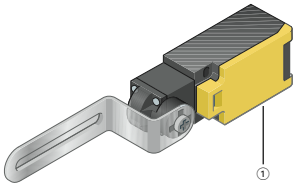


Notes

① **Complete device** (see **Page 3**)
For personnel protection
Contacts: 1NC, 1NO/1NO or 2NC
Five directions of operation possible

② **Actuator** (see **Page 5**)
Multiple coding protection against tampering

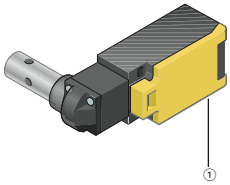
Door Flap Safety Switch (LSR-...TKG)



Note

① **Complete device** (see **Page 3**)
For personnel protection
Contacts: 1NO/1NC or 2NC
For swing doors with fixed connection to the door/hinge pin

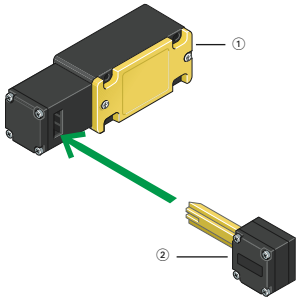
Door Hinge Safety Switch (LSR-...TS)



Note

① **Complete device** (see **Page 3**)
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 3**)
Narrow enclosure version
For personnel protection
Contacts: 1NO, 1NO/1NC

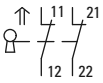
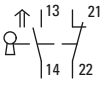
② **Actuator** (see **Page 5**)
Multiple coding
For horizontal or vertical operation

Product Selection

LS-Titan Miniature DIN Safety Interlock Switches

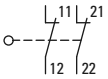
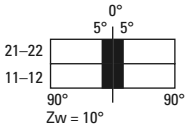
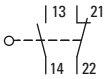
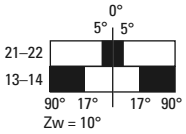
Key Interlock Switch

Key Interlock Switch—LS-…ZB ①

Contacts	Contact Sequence	Contact Travel	Connection	Catalog Number (Includes Key)
2NC with positive opening		—	Cage Clamp®	**LS-02-ZB**
		—	Screw terminal	**LS-S02-ZB**
1NO and 1NC with positive opening		—	Cage Clamp	**LS-11-ZB**
		—	Screw terminal	**LS-S11-ZB**
		Snap action contacts	Cage Clamp	**LS-11S-ZB**
			Screw terminal	**LS-S11S-ZB**

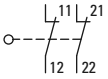
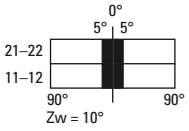
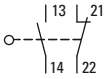
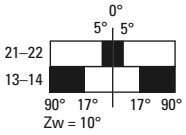
Door-Flap Switch

Door-Flap Switch—LSR-…TKG ①

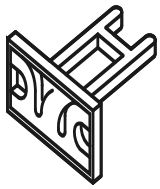
Contacts	Contact Sequence	Contact Travel	Connection	Catalog Number (Includes Key)
2NC with positive opening			Screw terminal	**LSR-S02-1-I-TKG**
1NO and 1NC with positive opening			Screw terminal	**LSR-S11-1-I-TKG**

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 8**.

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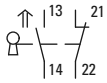
LS-Titan Full-Size DIN Safety Interlock Switches

Key Interlock Switch

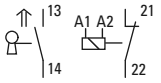
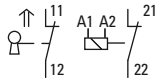
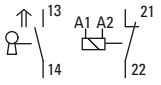
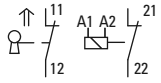
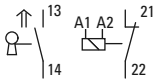
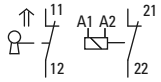
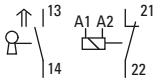
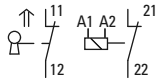
Full-Size DIN—LS4-…ZB ①②

Contacts	Contact Sequence	Contact Travel	Connection	Catalog Number (Includes Key)
1NC with positive opening		—	Screw terminal	**LS4-S01-1-I-ZB**
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

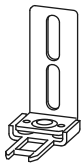
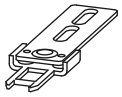
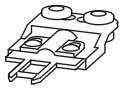
Operation	Operating Voltage	Contacts	Contact Sequence	Catalog Number
Power to unlock (mechanical bypass present)	24 Vdc	1NO and 1NC with positive opening		**LS-S11-24DFT-ZBZ-X**
		2NC with positive opening		**LS-S02-24DFT-ZBZ-X**
	120 Vac (50/60 Hz)	1NO and 1NC with positive opening		**LS-S11-120AFT-ZBZ-X**
		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 8**.
② For mounting instructions, see **Page 7**.
③ Key ordered separately, see **Page 5**.

LS-Titan Solenoid Safety Interlock Keys

Keys Only—LS-…ZBZ ①②

	Description	Application	Catalog Number
LS-XG-ZBZ 	Flat actuator	For sliding doors	**LS-XG-ZBZ**
LS-X…-ZBZ 	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**
LS-XF-ZBZ 	Angled, flexible actuator	For doors that do not close precisely	**LS-XF-ZBZ**
LS-XFG-ZBZ 	Even, flexible coasting actuator	For doors that do not close precisely	**LS-XFG-ZBZ**
LS-XNG-ZBZ 	Flat, compensating actuator	Increased tolerance in closing direction for inaccurately closing doors	**LS-XNG-ZBZ**
LS-XNW-ZBZ 	Angled, compensating actuator	Increased tolerance in closing direction for inaccurately closing doors	**LS-XNW-ZBZ**

Notes

① Switch body ordered separately, see **Page 4**.

② For mounting instructions, see **Page 7**.

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Technical Data and Specifications

LS-Titan Safety Interlock Switches

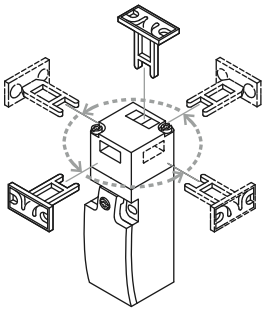
	Units		LS-...ZBZ	LS-...ZB	LS4...ZB
General					
Standards			IEC/EN 60947	IEC/EN 60947	IEC/EN 60947
Climatic proofing			①	①	①
Ambient temperature		°C	–25… +0	–25… +70	–25… +70
Mounting position			As required	As required	As required
Protection type			IP65	IP65	IP65
Terminal capacities					
Solid		mm^2	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.

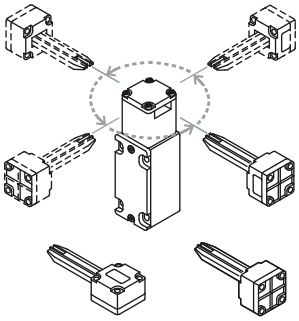
Mounting Instructions

LS-…ZB, TKG, TS



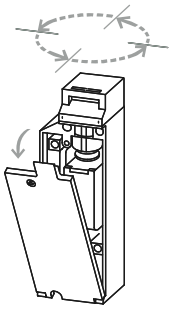
Actuator can be repositioned for horizontal or vertical installation. The operating heads can be rotated manually in 90° steps to suit the specified direction of operation.

LS4-…ZB

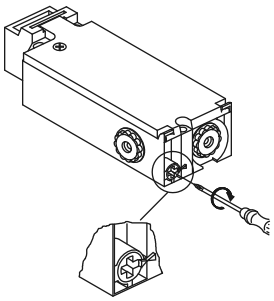


Actuator can be repositioned for horizontal or vertical installation. The operating heads can be rotated manually in 90° steps to suit the specified direction of operation.

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**.