Safety Rope Switch ZL-Series

Operating Instructions

English translation

Errors and technical changes reserved

Correct Use

Safety rope switches ZLM / ZLS / ZL2S are designed to be mounted on machines and sections of conveyors, which cannot be protected by guards (see Fig. 1). Safety rope switches can initiate the emergency command from any point along the installed rope length. A mushroom type E-Stop button (red) can be installed additionally on both sides of the ZLS and ZLSE. A red LED, which is visibile from far off, indicates the switching status. The safety rope switches are also available with stainless steel housing (ZLMS / ZLSE / ZL2SE).



Features

- *Switches off by breakage or tension loss*
- *Locking in switch-off position, manual resetting*
- *3 safety contacts NC / 1 NO*
- *Protect hazards up to 100 m*
- *Rope tension indicator (pulled, slack, initial pretensioning)*
- *Metal enclosure, IP67 (ZLM / ZLS / ZL2S)*
  stainless steel housing, IP69K (ZLMS / ZLSE / ZL2SE)



Function

When pulling the rope (Fig. 2), the safety contacts are positively opened and the auxiliary contacts are closed. Also on breakage or tension loss of the rope, the safety contacts are positively opened and the auxiliary contacts are closed. The switches are mechanically latched and can then only be returned to the operational condition by pressing the reset button as required by ISO 13850. This is only possible if the rope is correctly tensioned.

Correct tension can be observed by viewing the tension indicator in the viewing window of the switch (Fig. 3). This facilitated adjustment, maintenance and troubleshooting.

A mushroom type E-Stop button (red) can be installed additionally on both sides of the ZLS / ZLSE. With this button, an emergency stop is possible direct at the rope switch.

Maximal rope spans depends on the surrounding temperature (thermal extension of the steel rope).

Tensioning of rope is achieved by the recommended use of ZANDER´s tensioners / gripper accessory type ZTK / ZTKE.

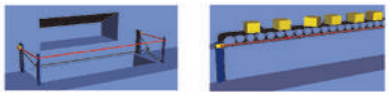

Fig. 1: Conveyors, machining centres, packaging machines...

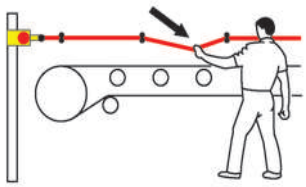

Fig. 2: Function safety rope switch

Installation

M5 mounting bolts must be used to fix the switch. Tightening torque has to be 4 Nm for mounting bolts to ensure reliable fixing. Tightening torque for the lid screws, conduit entry plugs and cable glands must be 1.5 Nm to ensure IP67.

Install on both sides of the rope a ZL-Switch. Pulleys may only be mounted such that a complete length of the rope can be observed. Rope support eyebolts must be fitted every 3 m. Also, 500 mm before each ZLS / ZLSE an eyebolt is necessary.

It is important that the first 500 mm are not part of the active protection coverage.

For rope tensioning, please use the Zander ZTK / ZTKE rope tensioning device. Upon installation, tension the rope to mid position as indicated by the green arrows in the viewing window of each switch. Before electrical commissioning, check operation of all switches and the control circuits by pulling the rope at various locations along the active protection area and unlock each switch by depressing the blue reset button. If required, increase the system tension further. Depending upon the checks along the active length of coverage.

If the mushroom type E-Stop button (red) is used (ZLS / ZLSE), test and reset each switch to ensure correct function of the safety control circuits.

The typical operating force for the rope is < 125 N for a max. 300 mm deffection.

Note:
Instead of a second safety rope switch, a safety spring can be used for rope lengths up to 30 m (ZLM / ZLMS), 60 m ZLS or 80 m ZLSE. It is recommended that a maximum of one corner pulley is used when using a safety spring .

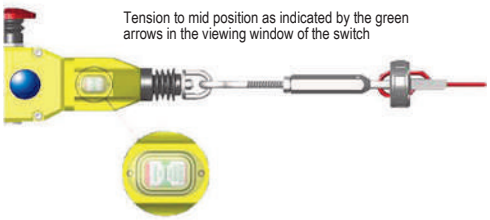

Fig. 3: Tensioning of rope by the use of ZANDER´s Tensioners type ZTK / ZTKE



Fig. 4: Mushroom type emergency stop button

To fit mushroom type emergency stop button

The Mushroom type emergency stop button can be installed left or right.
- Remove M12 blind screw from the mounting port.
- Apply threadlocking solution to the threads of the E-Stop mechanism.
- Insert the emergency stop mechanism into the mounting port and tighten to 1.5 Nm.
- After installation test and reset all safety circuits to ensure the proper function.

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Safety Rope Switch ZL-Series

Operating Instructions

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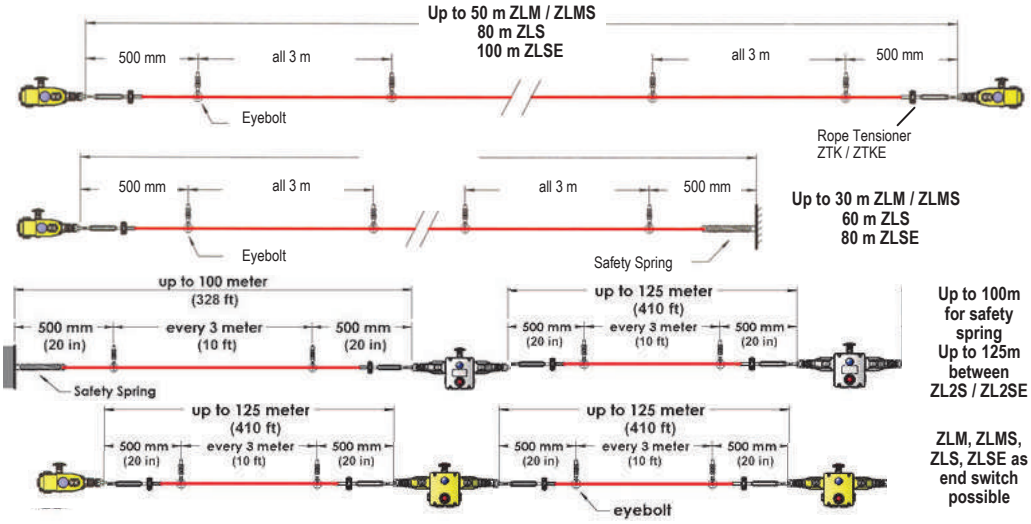
Mounting Options



Accessories

Universal Pulley
For proper rope deflection.
(Inside and outside use)
Galvanised
Order-No. 940092
Stainless steel
Order-No. 940096



Safety Spring
235 mm long
Stainless steel
Order-No. 940093

Rope Tensioner / Gripper Type ZTK
Withstands 1500 N force
Mount and adjust the rope at the ends.
Stainless steel optional.
Order-No. 940090
Stainless steel type ZTKE
Order-No. 940095



Eyebolt M8
51 mm thread length
84 mm whole length
Stainless steel optional.
Galvanised
Order-No. 940091
Stainless steel
Order-No. 40094



Thimble
With 2 clamps
Order-No. 940097
Stainless steel
Order-No. 940098



Ceiling hook M8 / M10
80 mm thread length,
125 mm total length (M8)
70 mm thread length,
120 mm total length (M10)
Stainless steel version optional.
Incl. 2x nut, 2x washer.
Order-No. 940060 (M8)
Order-No. 940061 (Stainless steel)
Order-No. 940099
(M10)



Safety Precautions



- Installation and commissioning of the device must be performed **only by authorized personnel.**
- Observe the country-specific regulations when installing the device.
- The electrical connection of the device is only allowed to be made with the device isolated.
- The wiring of the device must comply with this operating instructions, otherwise there is a risk that the safety function will be lost.
- It is not allowed to open the device, tamper with the device or bypass the safety devices.
- All relevant safety regulations and standards are to be observed.
- The overall concept of the control system, in which the device is incorporated must be validated by the user.
- Failure to observe the safety regulations can result in death, serious injury and serious damage.

Electrical Connection

Installation of the Safety Rope Switch systems must be in accordance with a risk assessment for the individual application.

For monitoring the ZL switches, the two redundant outputs must be connected to a safety emergency stop relay (e.g. ZANDER SR“C“) or a dual channel connection has to be made with the inputs of a safety PLC (Fig. 5).

***Note:** For additional safety relays connectivity, see the safety relays operating instructions.*

The electrical connection of the device is only allowed to be made with the device isolated.

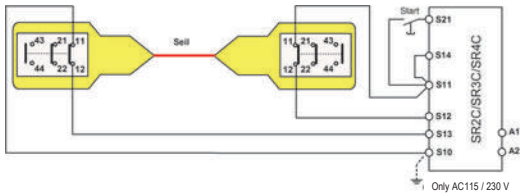


Fig. 5: Dual channel with short circuit monitoring and earth fault monitoring by the use of a ZANDER safety relay series SR.

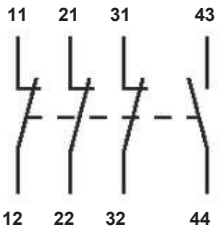


Fig. 6: Contact configuration safety rope switch ZLS / ZLSE

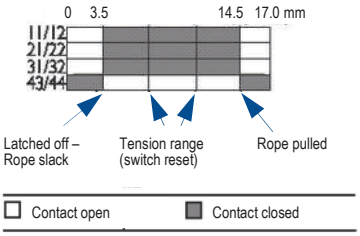


Fig 7: Contact action ZLM, ZLMS, ZLS, ZLSE

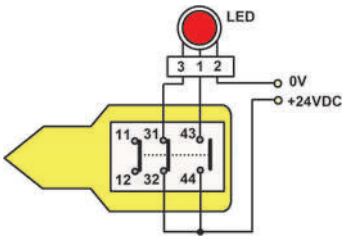


Fig. 8: **Internal LED**

The internal LED displays the switching state:

Terminal 1: +24 V: LED red flashing or steady; machine stopped
Terminal 3: +24 V: LED green steady; machine run
Terminal 2: 0 V

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Maintenance

Every week: Check correct operation of system at locations along all coverage length. Check for nominal tension setting, re-tension rope if necessary.

Every 6 months: Isolate power and remove cover. Check screw terminal tightness and check for signs of moisture ingress. Check that the machine stops by pulling or breakage (tension loss) of the rope.

Never repair any switch, actuator or integral rope. Replace any switch displaying signs of mechanical damage on casing or ropes.

Safety Characteristics

Safety Ratings	
$B10_d$	1.5 E^6
Utilization time	21 years
$MTTF_d$	214 years
d_{op}	365 days / year
h_{op}	24 hours / day
t_{cycle}	8 cycles / hour
Load case	100 mA load

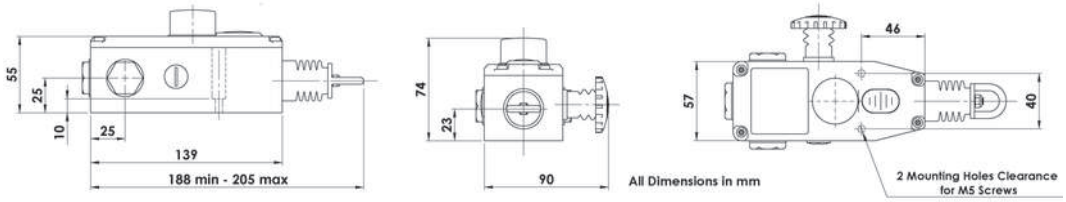
Note:
Additional data can be requested from the manufacturer for applications that deviate from these conditions.

Techn. Data

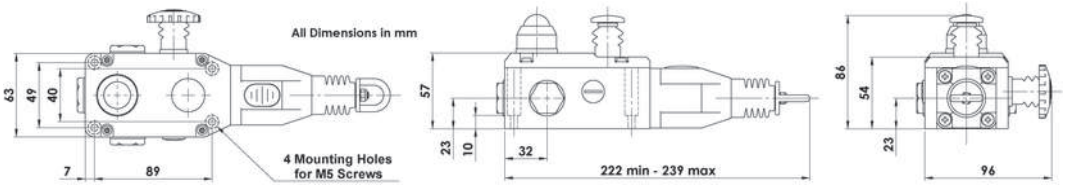
Corresponds to the standards	IEC 60947-5-5, IEC 60947-5-1, EN 60947-5-5, EN 60947-5-1, EN 60204-1, ISO 13850
Approvals	CE, TÜV
Safety contacts	3 NC (positive break) ; 4 NC (ZL2S)
Contact rating	AC15: 240 V / 3 A
Minimum switched current	DC 5 V / 10 mA
Short circuit overload protection	10 A Fuse Externally
Rated isolation voltage	Ui: 500 V
Withstand voltage	Uimp: 2500 V
Auxiliary contact	1 NO
Typical operating force, rope pulled	<125 N
Max. rope spans	50 m (ZLM / ZLMS) 80 m, 100 m ZLSE stainless steel up to 200m to safety spring or up to 250 m Dual Head (ZL2S)
LED	DC 24 V, red flashing, green steady
Enclosure / cover	Die-cast - painted yellow, stainless steel ZLMS / ZLSE
External parts	Corrosion resistance steel
IP rating	IP67 (ZLM / ZLS), IP69K (ZLMS / ZLSE)
Conduit entries	3 x M20
Ambient temperature	-25°C up to +80°C
Vibration resistance	10-500 Hz, 0.35 mm
Shock resistance	15 g, 11 ms
Mounting	4 x M5 screws / 4 Nm recommended, terminals 1.0 Nm
Mechanical life	1.5 x 10^6 operations
Mounting position	Any
Weight	675 g ZLM to 1640 g (ZLSE), 2850 g ZL2SE
Colour	Housing yellow, mushroom stop red, reset button blue

Dimension Drawing

ZLM & ZLMS



ZLS & ZLSE



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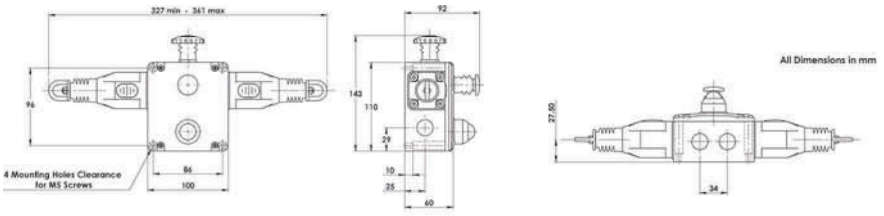
ZL2S & ZL2SE



Variants & Accessories

Order-No. 940020	ZLM, E-Stop, LED, die-cast, up to 50 m
Order-No. 940050	ZLMS, E-Stop, LED, stainless steel, up to 50 m
Order-No. 940010	ZLS, E-Stop, LED, die-cast, up to 80 m
Order-No. 940040	ZLSE, E-Stop, LED, stainless steel, up to 100 m
Order-No. 940025	ZL2S , E-Stop, LED, up to 100m
Order-No. 940055	ZL2SE, E-Stop, LED, stainless steel up to 100 m
Accessories:	
Order-No. 940090	Tensioner / gripper ZTK, galvanized
Order-No. 940091	Eyebolt M8, 84 mm, galvanized
Order-No. 940092	Universal pulley, 77 x 40 mm, galvanized
Order-No. 940093	Safety spring, stainless steel, 235 mm
Order-No. 900166	Rope per meter, red PP outer
Order-No. 940094	Eyebolt M8, 84 mm, stainless steel
Order-No. 940095	Tensioner / gripper ZTKE, stainless steel
Order-No. 940096	Universal pulley, 77 x 40 mm, stainless steel
Order-No. 940097	Thimble with 2 clamps
Order-No. 940098	Thimble with 2 clamps (stainless steel)
Order-No. 940060	Ceiling hook, galvanized, incl. 2x nut, 2x washer, M8 x 125 mm
Order-No. 940061	Ceiling hook, stainless steel, incl. 2x nut, 2x washer, M8 x 125 mm
Order-No. 940099	Ceiling hook, galvanized, incl. 2x nut, 2x washer, M10 x 120 mm
Order-No. 940063	Ceiling hook, stainless steel, incl. 2x nut, 2x washer, M10 x 120 mm



Stainless Steel type ZLSE
Up to 100 m rope length

CE **Konformitätserklärung**
EC Declaration of Conformity
Déclaration de conformité

Hersteller: / Producer: / Fabricant:
H. ZANDER GmbH & Co. KG
Am Gut Wolf 15 • 52070 Aachen • Deutschland

Produktgruppe: / Product Group: / Groupe de produits:
Seilzugschalter
Safety Rope Switches
Interrupteur de traction de cable

Produkt Name / Product Name / Nom du produit	Zertifikats-Nr. / No of Certificate / N° du certificat
ZLS	968/FSP 1283.02/24
ZLM	968/FSP 1283.02/24
ZLSE	968/FSP 1283.02/24
ZLMS	968/FSP 1283.02/24
ZL2S	968/FSP 1283.02/24
ZL2SE	968/FSP 1283.02/24

Die Produkte stimmen mit den Vorschriften folgender Europäischer Richtlinien überein:
The products conform with the essential protection requirements of the following European directives:
Les produits sont conformes aux dispositions des directives européennes suivantes:

2006/42/EG : Maschinenrichtlinie
2006/42/EG : Machinery Directive
2006/42/EG : Directive <<Machines>>

2011/65/EU: RoHS Richtlinie
2011/65/EU: RoHS Directive
2011/65/EU: Directive <<RoHS>>

Die Übereinstimmung der bezeichneten Produkte mit den Vorschriften der o.a. Richtlinie wird, falls anwendbar, nachgewiesen durch die vollständige Einhaltung folgender Normen:
If applicable, the conformity of the designated products is proved by full compliance with the following standards:
Le strict respect des norms suivantes confirme, s´il y a lieu, que les produits désignés sont conformes aux dispositions de la directive susmentionnée:

EN ISO 14419:2013
IEC 63000:2018

EN 60204-1: 2018

Gemäß Zertifikat TÜV-Rheinland:
According to the certificate of TÜV-Rheinland:
Selon de organisme TÜV-Rheinland:

EN 60947-5-1:2017
IEC 60947-5-1:2016 + COR1:2016
EN ISO 13850:2015

EN 60947-5-5:1997 + A1:2005 + A11:2013 + A2:2017
IEC 60947-5-5:1997 + A1:2005 + A2:2016

Dokumentationsbeauftragte/-r: Christiane Nittschalk
Documentation manager
Autorisé à constituer le dossier technique

Aachen, 04.04.2024

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Leiter CE-Konformitätsbewertung
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Responsable évaluation de conformité CE

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