



- Safety relays and RFID safety sensors with performance level up to Cat. 4, PLe compliant to EN/BS 13849-1
- Multifunction version with frontal trimmer for function selection
- Programmable version through software
- Dedicated versions for emergency stop, light curtains and two-hand control devices
- Expansion module
- Compact design with 35mm DIN rail mounting
- RFID safety sensors with two different coding levels and two different connectors
- Safety limit switches with dimensions compatible to EN/BS 50047
- Safety limit switches with direct opening action of NC contacts
- Safety limit switches with interchangeable and rotatable heads.

Safety relays

Safety relays SRC... series	11 - 2
Safety relays SRB... series	11 - 2
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Programmable safety relay SRP...	11 - 4

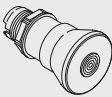
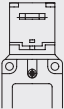
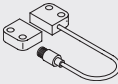
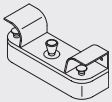
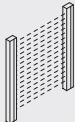
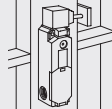
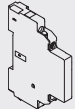
Safety sensors

RFID... safety sensors	11 - 5
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Metal and plastic safety limit switches (dimensions to/compatible to EN/BS 50047)

Hinge operating	11 - 6
Slotted lever	11 - 7
Key operated	11 - 8

Safety switches with solenoid and separate actuator **11 - 9****Rope-pull lever limit switches for emergency stopping (ISO 13850 compliant)** **11 - 11****Dimensions** **11 - 12****Wiring diagrams** **11 - 14****Technical characteristics** **11 - 18**

	Emergency stop	Safety switch	Magnetic sensors	Two-hand control devices	Safety devices with OSSD outputs (light curtains, laser scanner, RFID,...)	Mechanical safety interlock	Expansion module of safe outputs
							
SRC...	●	●	●			●	
SRBES...	●	●	●			●	
SRBEM41							●
SRATH21				●			
SRALC21					●		
SRASM20					●		
SRAMF21	●	●	●	●	●	●	
SRPMFA164	●	●	●	●	●	●	



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SAFETY RELAYS SRC... SERIES

- 24VAC/DC auxiliary supply
- For safety control of emergency stop, safety switch and magnetic sensors
- Screw and spring-clamp with Push-in technology terminal versions
- 35mm DIN rail mounting
- 22.5mm width.



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SAFETY RELAYS SRB... SERIES

- 24VAC/DC auxiliary supply
- For safety control of emergency stop, safety switch and magnetic sensors
- Expansion module of safe outputs
- 35mm DIN rail mounting
- 17.8mm width.



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SAFETY RELAYS SRA... SERIES

- 24VDC auxiliary supply
- Multifunction version with frontal trimmer for function selection
- For safety control of light curtains, two-hand control devices, laser scanner and RFID
- 35mm DIN rail mounting
- 22.5mm width.



Page 11-4

PROGRAMMABLE SAFETY RELAY SRP... SERIES

- 24VDC auxiliary supply
- Completely programmable version through software
- For light curtains, photocells, laser scanner, emergency stop buttons, electromechanical switches, interlocked locks, magnetic switches, RFID sensors, sensitive mats and edges, two-hand devices and maintained action enabling pushbuttons
- 35mm DIN rail mounting
- 16 digital inputs and 4 pairs of OSSD safety outputs.



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RFID SAFETY SENSORS

- 24VDC auxiliary supply
- M12 or Pigtail connector
- Generic or Teach-in coding
- 5 and 8-pin versions
- 22mm fixing interaxis
- Signalling LED visible from all directions.



Page 11-6

PLASTIC AND METAL SAFETY LIMIT SWITCHES

- Dimensions to EN/BS 50047 standards for KB and KM types
- Dimensions compatible to EN/BS 50047 for KC and KN types
- Self-extinguishing polymer thermoplastic housing (KB-KC types)
- Aluminium-zinc alloy housing (KM-KN types)
- Unique fixing mechanism of operating head
- IEC degree of protection IP65
- M20 cable entry; PG13.5 or 1/2 NPT entry available.



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ROPE-PULL LEVER LIMIT SWITCHES FOR EMERGENCY STOPPING

- Compliant to ISO 13850 standards
- IEC degree of protection IP65 and IP66
- PG11 and PG13.5 cable entry.



Page 11-9

SAFETY SWITCHES WITH SOLENOID AND SEPARATE ACTUATOR

- Actuator locked by solenoid
- For safety applications up to:
 - Safety integrity level (SIL), category 3: according to EN/BS 62061
 - PLe according to EN/BS ISO 13849-1
- Interlock with mechanical lock Type 2 according to EN/BS ISO 14119
- Self-extinguishing polymer thermoplastic housing and actuator head
- IEC degree of protection IP65
- Three threaded conduit entries M20.

SRC... series



SRCES...



SRCES...S

new

Order code	Auxiliary supply voltage	Type of output contact	Function	Qty per pkg	Wt
	[V]			n°	[kg]
Single function. Screw terminals.					
SRCES20	24V AC/DC	2NO	Emergency stop	1	0.164
SRCES31		3NO+1NC	Emergency stop	1	0.164
Single function. Spring-clamp terminals (Push-in).					
SRCES20S	24V AC/DC	2NO	Emergency stop	1	0.164
SRCES31S		3NO+1NC	Emergency stop	1	0.164

General characteristics

LOVATO Electric safety relays are designed for applications up to Cat. 4 and performance level PL up to PLe according to EN/ISO/BS 13849-1.

The SRC... safety relays are designed in order to monitor and control safety circuits in applications with:

- Emergency stops
- Safety accesses
- Magnetic safety switches
- Safety limit switches
- Electromechanical interlocks

Operational characteristics

- Auxiliary supply voltage: 24VAC/DC
- 35mm DIN rail mounting (IEC/EN/BS 60715)
- Dimensions: 22.5mm wide
- Double or single channel operation
- Control up to 3 NO safety outputs with electromechanical relay with forced guidance
- Start / Reset operating mode (manual, automatic or monitored manual)
- Diagnostics of the safety circuit through indications of LEDs for power supply, safety input status and status of the safety outputs
- The short circuit between the two input channels is detected
- In the event of a fault, the safe outputs are deactivated (contacts opened)
- 1 NC auxiliary output (SRBES31...) that can be used for remote status indication
- Removable screw or spring-clamp (Push-in) terminal connection
- Front protection degree: IP40
- Terminal protection degree: IP20.

Certifications and compliance

Certifications obtained: cULus, TÜV (pending).
Compliant with standards: Cat. 4, PLe according to EN/BS 13849-1, EN/BS 81-20, EN/BS 81-50.

SRB... series



SRBES...



SRBEM41

Order code	Auxiliary supply voltage	Type of output contact	Function	Qty per pkg	Wt
	[V]			n°	[kg]
Single function. Screw terminals.					
SRBES20	24V AC/DC	2NO	Emergency stop	1	0.209
SRBES31		3NO+1NC	Emergency stop	1	0.230
Safe outputs expansion module. Screw terminals.					
SRBEM41	24V AC/DC	4NO+1NC	Expansion module	1	0.239

General characteristics

LOVATO Electric safety relays are designed for applications up to Category 4 and performance level up to PLe according to EN/ISO/BS 13849-1.

The SRB ... safety relays are designed in order to monitor and control safety circuits in applications with:

- Emergency stops
- Safety accesses
- Magnetic safety switches
- Safety limit switches
- Electromechanical interlocks.

They are also used to safely control the circuits for lift cabin leveling and inspection of the lifting pit, according to EN/BS 81-20 and EN/BS 81-50 lift standards.

SRBEM41 is an expansion module to extend the number of safe outputs.

Operational characteristics

- Auxiliary supply voltage: 24VAC/DC
- 35mm DIN rail mounting (IEC/EN/BS 60715)
- Compact size: 17.8mm wide
- Double or single channel operation
- Control up to 3 NO safety outputs with electromechanical relay with forced guidance
- Start / Reset operating mode (manual, automatic or monitored manual)
- Diagnostics of the safety circuit through indications of LEDs for power supply, safety input status and status of the safety outputs
- The short circuit between the two input channels is detected
- In the event of a fault, the safe outputs are deactivated (contacts opened)
- 1 NC auxiliary output (SRBES31) that can be used for remote status indication
- Removable screw terminal connection
- Front protection degree: IP40
- Terminal protection degree: IP20.

Certifications and compliance

Certifications obtained: cULus, TÜV.
Compliant with standards: Cat. 4, PLe according to EN/BS 13849-1, EN/BS 81-20, EN/BS 81-50 (SRBES20 and SRBES31 only).

SRA... series



SRATH21



SRAMF21

Order code	Auxiliary supply voltage	Type of output contact	Function	Qty per pkg	Wt
	[V]			n°	[kg]
Single function. Screw terminals.					
SRATH21	24VDC	2NO+1PNP	Two-hand control devices	1	0.150
SRALC21	24VDC	2NO+1PNP	Devices OSSD	1	0.150
SRASM20	24VDC	2NO	Devices OSSD	1	0.150
Multifunction. Screw terminals.					
SRAMF21	24VDC	2NO+1PNP	Multi-function	1	0.150

General characteristics

LOVATO Electric safety relays are designed for applications up to Cat. 4 and performance level PL up to PLe according to EN/ISO/BS 13849-1 and up to SIL CL.3 according to IEC/EN/BS 62061.

The single function SRA... safety relays are designed in order to monitor and control safety circuits in applications with:

- SRATH21: monitoring of two-hand control devices
- SRALC21: monitoring of safety devices equipped with OSSD (light curtains, laser scanner, RFID)
- SRASM20: monitoring of devices equipped with OSSD and integrated safety functions.

The SRAMF21 multifunction safety relay offers the possibility of having all the safety functions of SRB series and the three SRA codes above in one device. This is achieved by simply selecting the desired function using the dedicated frontal trimmer.

The SRAMF21 multifunction safety relay monitors and controls safety circuits in applications with:

- Emergency stops
- Safety accesses
- Magnetic safety switches
- Safety limit switches
- Electromechanical interlocks
- Input from OSSD (for ESPE and RFID), automatic restart or monitored manual restart
- Command of two-hand control devices
- Control for type 2 photocells, manual or automatic restart.

Operational characteristics

- Auxiliary supply voltage: 24VDC
- 35mm DIN rail mounting (IEC / EN / BS 60715)
- Dimensions: 22.5mm wide
- 1 PNP output for system monitoring
- 1 feedback input from external contactors
- 1 test input (for light curtains)
- Alarm diagnostics through LED flashing
- Front protection degree: IP20
- Terminal protection degree: IP20.

Certifications and compliance

Certifications (pending): cULus, TÜV.

Compliant with standards: EN/BS/ISO 13849-1 (Cat 4, PLe), EN/BS/IEC 61496-1 (Type 4), EN/BS 61508-1, EN/BS 61508-2, EN/BS 61508-3 (SIL3), IEC/BS 62061 (max. SIL 3).

Programmable SRP... series



SRPMFA164

new

Order code	Inputs	Outputs	Function	Qty per pkg	Wt
				n°	[kg]

Programmable multi-function.

Auxiliary supply voltage: 24VDC. Screw terminals.

SRPMFA164	16 digital inputs and 4 Restart/EDM inputs	4 OSSD outputs, 4 output status and 4 output test	Multi-function	1	0.248
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General characteristics

The SRPMFA164 programmable safety relay is a stand alone safety device able to manage the main safety functions of a machinery or plant. Fully configurable, it allows you to simplify wiring and reduce costs. It can in fact monitor and control safety circuits in applications with: light curtains, photocells, laser scanners, emergency stops, electromechanical interlocks, interlocked locks, magnetic safety switches, RFID sensors, sensitive mats and edges, two-hand devices and maintained action enabling pushbuttons.

The SRPMFA164 programmable safety relay offers several advantages, including:

- The reduction in the number of components, therefore the size and quantity of wiring
- Speeding up the construction times of the electrical panel
- The creation of safety systems resistant to tampering attempts
- Less wiring time: all the logic is created using the SRPSW01 configuration software, which can be downloaded free of charge from the website www.LovatoElectric.com, and not with a less safe and more complicated traditional electromechanical solution.
- Fewer components means better performance level and therefore greater safety.

SRPSW01 configuration software.

The configuration software is available in 10 languages, is easy to use and can be downloaded free of charge from www.LovatoElectric.com. The drag & drop function allows the creation of logical scenarios in a machine directive-compliant environment. Programming and design is thus simplified thanks to the user-friendly interface and a number of integrated functions including the monitoring function, automatic project validation, simulation function and the issuing of reports and log files, as well as the possibility of protecting the program using passwords.

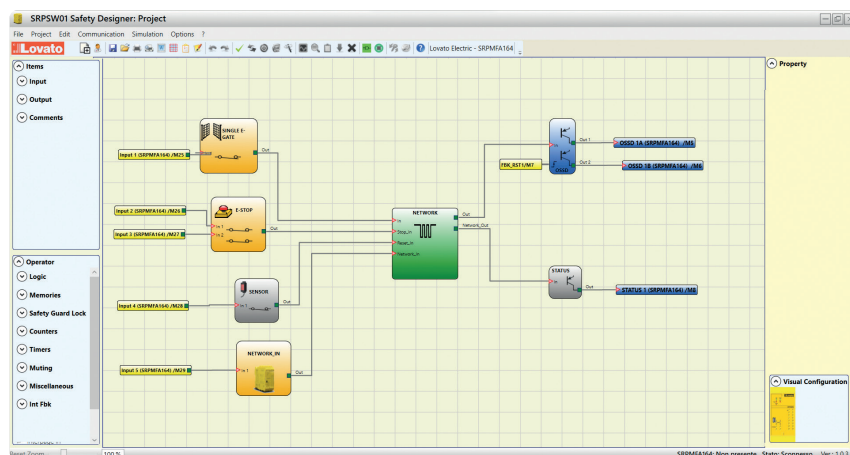
Operational characteristics

- Auxiliary supply voltage: 24VDC
- 35mm DIN rail mounting (IEC/EN/BS 60715)
- Compact size: 45mm wide
- Fully programmable via USB serial port on the front
- 16 digital inputs (configurable individually as a single channel or in pairs as a double channel)
- 4 individual inputs for restart interlock, EDM or single input devices
- 4 pairs of OSSD safety outputs (PNP 400mA)
- 4 SIL 1/PL c status outputs (PNP 100mA)
- 4 test outputs
- 64 logical operators
- Possibility of timing each output
- Safety circuit diagnostics via LED indications for power supply, safety input status and safety output status
- The short circuit between the two input channels is detected
- OSSD safety outputs are periodically tested for possible lockouts at 0V or +24VDC or for faulty connections (e.g. two OSSD outputs shorted). If the test results are not consistent, the system fails and goes into a safe state.
- Removable screw terminal connection
- Front protection degree: IP40
- Terminal protection degree: IP20.

Certifications and compliance

Certifications obtained: cULus, TÜV.

Compliant with standards: EN/BS/ISO 13849-1 (Cat 4, PL_e), EN/BS/IEC 61496-1 (Type 4), EN/BS 61508-1, EN/BS 61508-2, EN/BS 61508-3 (SIL3), IEC/BS 62061 (max. SIL 3), EN/BS 81-20, EN/BS 81-50.



SRPSW01

Programming software freely downloadable from www.LovatoElectric.com

SSF... series



SSF8TM



SSF8TP

new

Accessories



SSFXC55



SSFXC58



SSFXX01

Order code	Auxiliary supply voltage	Connector type	Coding type	Qty per pkg	Wt
	[V]			n°	[kg]
5-pin version.					
SSF5GM	24VDC	M12 connector	Generic	1	0.044
SSF5GP	24VDC	M12 Pigtail connector 15cm	Generic	1	0.056
8-pin version.					
SSF8GM	24VDC	M12 connector	Generic	1	0.044
SSF8GP	24VDC	M12 Pigtail connector 15cm	Generic	1	0.056
SSF8TM	24VDC	M12 connector	Teach-in	1	0.044
SSF8TP	24VDC	M12 Pigtail connector 15cm	Teach-in	1	0.056

Order code	Description	Qty per pkg	Wt
		n°	[kg]
SSFXC55	5-5 pin RFID sensor connector	1	0.026
SSFXC58	5-8 pin RFID sensor connector	1	0.026
SSFXX01	Fixing bracket to adapt to 78mm interaxis	1	0.013

new

General characteristics

The applications of the SSF... series RFID safety sensors are extremely various thanks to the compact design and versatility of the product.

The SSR... RFID safety sensors series is available in 2 different versions based on needs:

- With M12 connector
- With Pigtail, which consists of a 15cm cable with a pre-wired M12 connector.

They also differ in 2 further variants:

- 5-pin version, which allows operation only with automatic reset
- 8-pin version, which also allows manual reset, contactor feedback control (EDM) and to connect up to 16 SSF... RFID safety sensors in series...

RFID technology allows you to choose sensors coded in two different levels, allowing the user to adopt the technology that best suits the level of protection required by the application. The safest configuration is those where the sensor can only be coupled with the actuator assigned in production (Teach-in). Instead, a sensor with generic coding can be coupled with any actuator of the same coding.

The RFID technology used allows the PL e/SIL 3 safety level to be reached even when the sensors are connected in series.

Operational characteristics

- Auxiliary supply voltage: 24VDC
- 22mm interaxis (with anti-tampering protection caps)
- 2 OSSD outputs (300mA at 24VDC) with short circuit protection
- 2 different types of connector: M12 or Pigtail with M12 connector
- 2 different types of coded levels: generic coding or Teach-in coding
- 2 different configurations: 5 or 8 pins
- 5-pin version allows operation only with automatic reset
- 8-pin version allows operation with automatic or manual reset, automatic without EDM and series connection (with status information) of up to 16 SSF safety RFID sensors...
- Very high visibility status LED
- Possibility of mounting sensor and actuator in both directions
- Degree of protection (sensor and actuator) IP67 and IP69K.

Certifications and compliance

Certifications obtained: cULus, TÜV.

Compliant with standards: Cat. 4, PLc according to EN/BS 13849-1, EN/BS 61508-1 (SIL 3), EN/BS 61508-2 (SIL 3), EN/BS 61508-3 (SIL3), IEC/BS 62061 (max. SIL 3).



LED SIGNALS

The sensor is equipped with a multicolor LED that signals its status in real time.

Colour	Sensor status	Meaning	Output status
RED	Break	OSSD outputs deactivated	Low level
GREEN	Guard	OSSD outputs active	High level
YELLOW	Restart	waiting for Restart	-
Flashing GREEN/RED	Guard input OFF	One or more sensors are in break condition	-
Flashing GREEN	Programming	Programming (Teach-in)	-
Flashing YELLOW	Configuration	Type of configuration	-
Flashing RED	FAIL	Error condition	See manual

Safety limit switches, K series. One bottom cable entry. Dimensions to EN/BS 50047
Two side cable entries. Dimensions compatible to EN/BS 50047

Hinge operating



KBP... - KMP...



Order code Plastic body	Metal body	Contacts	Shaft features	Qty per pkg	Wt n° [kg]
One bottom cable entry. Dimensions to EN/BS 50047.					
KBP1L11	KMP1L11	1NO+1NC Slow action ①	Short cylinder	5	②
KBP2L11	KMP2L11	1NO+1NC Slow action ①	Long solid	5	②
KBP3L11	KMP3L11	1NO+1NC Slow action ①	Long solid w/ reduction	5	②
KBP1L02	KMP1L02	2NC Slow action ①	Short cylinder	5	②
KBP2L02	KMP2L02	2NC Slow action ①	Long solid	5	②
KBP3L02	KMP3L02	2NC Slow action ①	Long solid w/ reduction	5	②
KBP1L12	KMP1L12	1NO+2NC Slow action ①	Short cylinder	5	②
KBP2L12	KMP2L12	1NO+2NC Slow action ①	Long solid	5	②
KBP3L12	KMP3L12	1NO+2NC Slow action ①	Long solid w/ reduction	5	②
KBP1L21	KMP1L21	2NO+1NC Slow action ①	Short cylinder	5	②
KBP2L21	KMP2L21	2NO+1NC Slow action ①	Long solid	5	②
KBP3L21	KMP3L21	2NO+1NC Slow action ①	Long solid w/ reduction	5	②
KBP1L03	KMP1L03	3NC Slow action ①	Short cylinder	5	②
KBP2L03	KMP2L03	3NC Slow action ①	Long solid	5	②
KBP3L03	KMP3L03	3NC Slow action ①	Long solid w/ reduction	5	②

Two side cable entries. Dimensions compatible to EN/BS 50047.

KCP1L11	KNP1L11	1NO+1NC Slow action ①	Short cylinder	5	②
KCP2L11	KNP2L11	1NO+1NC Slow action ①	Long solid	5	②
KCP3L11	KNP3L11	1NO+1NC Slow action ①	Long solid w/ reduction	5	②
KCP1L02	KNP1L02	2NC Slow action ①	Short cylinder	5	②
KCP2L02	KNP2L02	2NC Slow action ①	Long solid	5	②
KCP3L02	KNP3L02	2NC Slow action ①	Long solid w/ reduction	5	②

① Direct (positive) opening action \ominus ; safety function according to IEC/EN/BS 60947-5-1.

② Consult Technical support for information; see contact details on inside cover.

General characteristics

The LOVATO Electric safety limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.

The body cover is hinged at the bottom and removable. The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools.

The auxiliary contact blocks are removable assuring remarkable wiring ease.

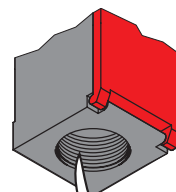
Operational characteristics

- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: 100,000 cycles
- B10d: 100,000 cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
 - A600 Q300 for KB...-KC... types
 - A300 Q300 for KM...-KN... types
- IEC rated insulation voltage Ui:
 - 690VAC for KB...-KC... types
 - 440VAC for KM...-KN... types
- IEC rated impulse withstand voltage Uimp:
 - 6kV for KB...-KC... types
 - 4kV for KM...-KN... types
- Class II insulation for KB...-KC... only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
 - KB...-KC... types: self-extinguishing double-insulation polymer thermoplastic
 - KM...-KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the below note for details)
- Operating head fixing: locking bayonet insert
- Operating torque: 15Ncm/21.2ozin
- Cable connection: self-releasing screw terminal
- Tightening torque:
 - Switch fixing: 2.5Nm / 22.1lb.in
 - Contact terminals: 0.8Nm / 7lb.in
 - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
 - Operating temperature: -25...+70°C
 - Storage temperature: -40...+70°C
 - Pollution degree: 3
 - IEC degree of protection: IP20 for terminals
 - IEC degree of protection: IP65 for body housing.

Certifications and compliance

Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.

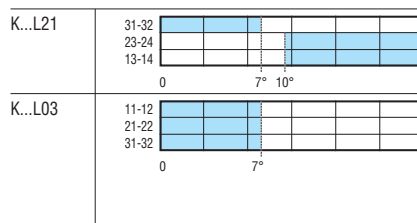
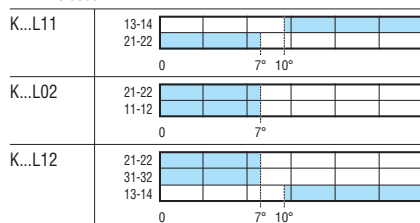
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



M20 CABLE ENTRY

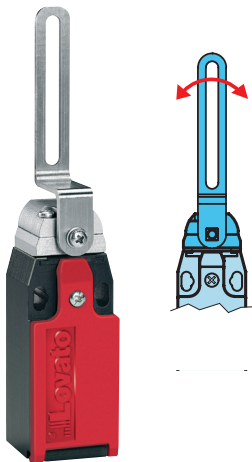
For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KBP1L11P - KBP1L11N

□ open
■ closed

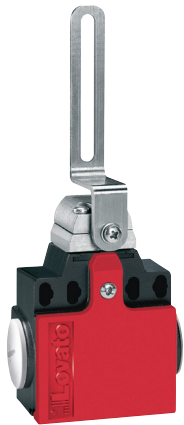


Safety limit switches, K series. One bottom cable entry. Dimensions to EN/BS 50047
Two side cable entries. Dimensions compatible to EN/BS 50047

Slotted lever



KBQ... - KMQ...



KCQ... - KNQ...

Order code	Plastic body	Metal body	Contacts	Qty per pkg	Wt
				n°	[kg]

One bottom cable entry. Dimensions to EN/BS 50047.

KBQ1L11	KMQ1L11	1NO+1NC Slow action ①	5	②
KBQ1L02	KMQ1L02	2NC Slow action ①	5	②
KBQ1L12	KMQ1L12	1NO+2NC Slow action ①	5	②
KBQ1L21	KMQ1L21	2NO+1NC Slow action ①	5	②
KBQ1L03	KMQ1L03	3NC Slow action ①	5	②

Two side cable entries. Dimensions compatible to EN/BS 50047.

KCQ1L11	KNQ1L11	1NO+1NC Slow action ①	5	②
KCQ1L02	KNQ1L02	2NC Slow action ①	5	②

① Direct (positive) opening action \ominus ; safety function according to IEC/EN/BS 60947-5-1.

② Consult Technical support for information; see contact details on inside cover.

General characteristics

The LOVATO Electric safety limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.

The body cover is hinged at the bottom and removable. The innovative locking bayonet mechanism permits to remove and reposition the operating head in the required configuration with no tools.

The auxiliary contact blocks are removable assuring remarkable wiring ease.

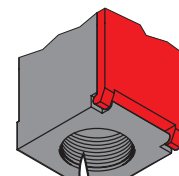
Operational characteristics

- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: 100,000 cycles
- B10d: 100,000 cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
 - A600 Q300 for KB...-KC... types
 - A300 Q300 for KM...-KN... types
- IEC rated insulation voltage Ui:
 - 690VAC for KB...-KC... types
 - 440VAC for KM...-KN... types
- IEC rated impulse withstand voltage Uimp:
 - 6kV for KB...-KC... types
 - 4kV for KM...-KN... types
- Class II insulation for KB...-KC... only
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Operators of aluminium-zinc alloy
- Housing:
 - KB...-KC... types: self-extinguishing double-insulation polymer thermoplastic
 - KM...-KN... types: aluminium-zinc alloy
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the below note for details)
- Operating head fixing: locking bayonet insert
- Operating torque: 15Ncm/21.2ozin
- Cable connection: self-releasing screw terminal
- Tightening torque:
 - Switch fixing: 2.5Nm / 22.1lb.in
 - Contact terminals: 0.8Nm / 7lb.in
 - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
 - Operating temperature: -25...+70°C
 - Storage temperature: -40...+70°C
 - Pollution degree: 3
 - IEC degree of protection: IP20 for terminals
 - IEC degree of protection: IP65 for body housing.

Certifications and compliance

Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.

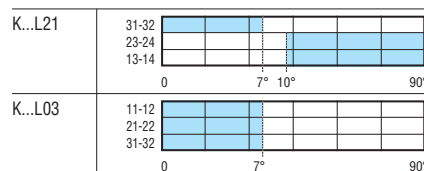
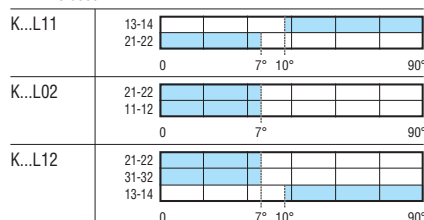
Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.



M20 CABLE ENTRY

For types with PG13.5 cable entry, add the letter P at the end of the order code while for 1/2 NPT, add N.
E.g. KBQ1L11P - KBQ1L11N

□ open
■ closed



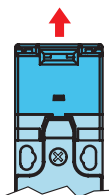
11 Safety devices

Safety limit switches, K series. One bottom cable entry. Dimensions to EN/BS 50047
Two side cable entries. Dimensions compatible to EN/BS 50047

Key operated



KBN...



KCN...

Order code Plastic body	Contacts	Key shape②	Qty per pkg	Wt n° [kg]
One bottom cable entry. Dimensions to EN/BS 50047.				
KBN1L11	1NO+1NC Slow action①	Straight	5	0.092
KBN2L11		Angled	5	0.092
KBN3L11		Straight "T"	5	0.092
KBN4L11		Angled "T"	5	0.092
KBN1L02	2NC Slow action①	Straight	5	0.092
KBN2L02		Angled	5	0.092
KBN3L02		Straight "T"	5	0.092
KBN4L02		Angled "T"	5	0.092
KBN1L12	1NO+2NC Slow action①	Straight	5	0.096
KBN2L12		Angled	5	0.096
KBN3L12		Straight "T"	5	0.096
KBN4L12		Angled "T"	5	0.096
KBN1L21	2NO+1NC Slow action①	Straight	5	0.096
KBN2L21		Angled	5	0.096
KBN3L21		Straight "T"	5	0.096
KBN4L21		Angled "T"	5	0.096
KBN1L03	3NC Slow action①	Straight	5	0.096
KBN2L03		Angled	5	0.096
KBN3L03		Straight "T"	5	0.096
KBN4L03		Angled "T"	5	0.096

Two side cable entries. Dimensions compatible to EN/BS 50047.

KCN1L11	1NO+1NC Slow action①	Straight	5	0.107
KCN2L11		Angled	5	0.107
KCN3L11		Straight "T"	5	0.107
KCN4L11		Angled "T"	5	0.107
KCN1L02	2NC Slow action①	Straight	5	0.107
KCN2L02		Angled	5	0.107
KCN3L02		Straight "T"	5	0.107
KCN4L02		Angled "T"	5	0.107

① Direct (positive) opening action \ominus ; safety function according to IEC/EN/BS 60947-5-1.

② The key is standard supplied.

General characteristics

The LOVATO Electric safety limit switches have been designed to satisfy requirements comprising quick installation, easy wiring, simple setup, modularity, sturdiness and constant reliability.

The body cover is hinged at the bottom and removable. The heads have axial rotation in any of 4 positions at 90° angles.

The auxiliary contact blocks are removable assuring remarkable wiring ease.

Operational characteristics

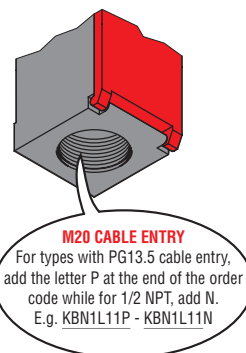
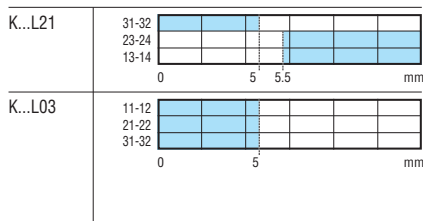
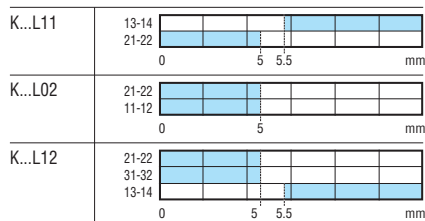
- Maximum operating rate: 3600 cycles/h
- Switching speed: 0.5...1.5m/s
- Mechanical life: 100,000 cycles
- B10d: 100,000 cycles
- IEC conventional thermal current Ith: 10A
- UL/CSA and IEC/EN/BS 60947-5-1 designation:
 - A600 Q600
- IEC rated insulation voltage Ui: 690V
- IEC rated impulse withstand voltage Uimp: 6kV
- Class II insulation
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Housing and operators in self-extinguishing double-insulation polymer thermoplastic
- Cable entry: M20 standard supplied; PG13.5 and 1/2 NPT available (see the below note for details)
- Operating head fixing: locking bayonet insert
- Operating force: 8N/1.8lb
- Cable connection: self-releasing screw terminal
- Tightening torque:
 - Switch fixing: 2.5Nm / 22.1lb.in
 - Contact terminals: 0.8Nm / 7lb.in
 - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14AWG
- Ambient conditions:
 - Operating temperature: -25...+70°C
 - Storage temperature: -40...+70°C
 - Pollution degree: 3
 - IEC degree of protection: IP20 for terminals
 - IEC degree of protection: IP65 for body housing.

Certifications and compliance

Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches; EAC, CCC.

Compliant with standards: EN/BS 50047, IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, UL508, CSA C22.2 n° 14.

□ open
■ closed



Accessories and spare parts



KXN1



KXN2



KXN3



KXN4



KXN5

Order code	Description	Qty per pkg	Wt n° [kg]
KXN1	Straight key	5	0.013
KXN2	Angled key	5	0.013
KXN3	Straight "T" key	5	0.012
KXN4	Angled "T" key	5	0.012
KXN5	Toggle key	5	0.019

Safety switches with solenoid



KEN1...

Keys



KEXN1



KEXN2



KEXN5

Order code	Key actuated contacts ①	Solenoid actuated contacts ①	Solenoid rated voltage	Qty per pkg	Wt
			[V]	n°	[kg]

Locked actuator with energised solenoid ②.

KEN1E1024F	1NC	2NC+1NO	24V AC/DC	1	0.440
KEN1E2024F	1NO	2NC+1NO		1	0.440
KEN1E3024F	1NO+1NC	2NC		1	0.440
KEN1E1120F	1NC	2NC+1NO	120V AC/DC	1	0.440
KEN1E2120F	1NO	2NC+1NO		1	0.440
KEN1E3120F	1NO+1NC	2NC		1	0.440
KEN1E1230F	1NC	2NC+1NO	230V AC/DC	1	0.440
KEN1E2230F	1NO	2NC+1NO		1	0.440
KEN1E3230F	1NO+1NC	2NC		1	0.440

Locked actuator with de-energised solenoid ②.

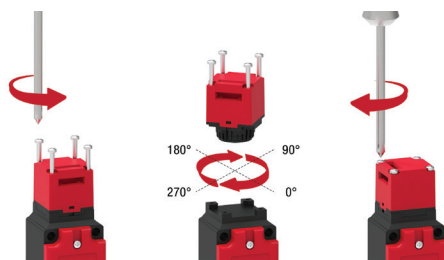
KEN1M1024F	1NC	2NC+1NO	24V AC/DC	1	0.440
KEN1M2024F	1NO	2NC+1NO		1	0.440
KEN1M3024F	1NO+1NC	2NC		1	0.440
KEN1M1120F	1NC	2NC+1NO	120V AC/DC	1	0.440
KEN1M2120F	1NO	2NC+1NO		1	0.440
KEN1M3120F	1NO+1NC	2NC		1	0.440
KEN1M1230F	1NC	2NC+1NO	230V AC/DC	1	0.440
KEN1M2230F	1NO	2NC+1NO		1	0.440
KEN1M3230F	1NO+1NC	2NC		1	0.440

① Contacts status are referred to the operating condition (KEN1E...: energised solenoid and inserted key actuator / KEN1M...: de-energised solenoid and inserted key actuator).

② Key actuator has to be ordered separately

Order code	Description	Qty per pkg	Wt
		n°	[kg]
KEXN1	Straight key	1	0.013
KEXN2	Angled key	1	0.013
KEXN5	Toggle key	1	0.019

ACTUATOR HEAD ORIENTATION



Follow these steps in order to properly direct the actuator head of KEN... safety switches:

- Unscrew the 4 Ø2 Pozidriv 1 screws
- Remove the actuator
- Check the gasket is properly placed
- Put the actuator head in the desired position and press for fixing it into the case
- Screw the 4 Ø2 Pozidriv 1 screws (tightening torque 0.8Nm / 7lb.in)
- Before start using the new configuration, repeat the functional tests of the system.

General characteristics

The safety switches with solenoid avoid access in hazardous areas until the receiving of an appropriate signal: the actuator key could be locked or released through a solenoid dependent upon its powered state (locked actuator with energised solenoid for KEN1E... / locked actuator with de-energised solenoid for KEN1M...).

A manual emergency release is available.

Three different electric contact combinations are available.

Contacts are actuated separately by key actuator or by solenoid and allow to cover the installations' main common needs.

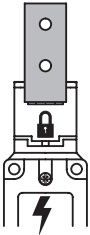
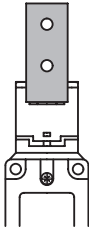
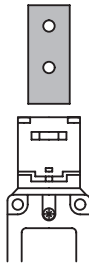
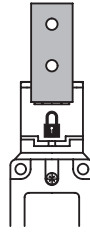
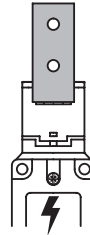
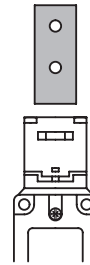
Operational characteristics

- For safety applications up to:
 - Safety integrity level (SIL), category 3 according to EN/BS 62061
 - PLe according to EN/BS ISO 13849-1
- Interlock with mechanical lock Type 2 according to EN/BS ISO 14119.
- Actuator insertion force: 15N
- Release actuator extraction force: 30N
- Locked actuator holding force: 1200N
- Maximum operating rate: 600 cycles/h
- Mechanical life: 1.000.000 cycles
- B10d: 4.000.000 cycles
- IEC conventional thermal current: 10A
- IEC/EN/BS 60947-5-1 designation: A300 Q300
- AC15 duty:
 - 24V - 10A
 - 230V - 4A
- DC13 duty:
 - 24V - 4A
- IEC rated insulation voltage U_i : 250V
- Rated impulse withstand voltage: 2.5kV
- Short-circuit backup protection: 10A Gg
- Max solenoid consumption:
 - 24V: 8.3W
 - 120V: 8.1W
 - 230V: 6.8W
- IEC terminals degree of protection: IP20
- IEC body housing degree of protection: IP65
- Self-extinguishing polymer thermoplastic housing and actuator head
- Actuator head orientation can be modified by the user in 4 axial positions (90° step)
- Cables entries: 3 x M20
- Cable connection: self-releasing screw terminal
- Tightening torque:
 - Case cover: 0.8Nm / 7lb.in
 - Manual release: 0.5Nm / 4.3lb.in
 - Head actuator fixing: 0.8Nm / 7lb.in
 - Contact terminals: 0.5Nm / 4.3lb.in
 - Supply terminals: 0.5Nm / 4.3lb.in
- Conductor section: 1 or 2 conductors 1.5mm² max
- Ambient conditions:
 - Operating temperature: -25...+55°C
 - Storage temperature: -40...+70°C
 - Pollution degree: 3.

Certifications and compliance

Certifications obtained: cULus, EAC.

Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204, UNI EN/BS ISO 14119, UL508, CSA C22.2 n°14.

		KEN1E...: locked actuator with energised solenoid			KEN1M...: locked actuator with de-energised solenoid		
Key actuator status		inserted and locked	inserted and unlocked	not inserted	inserted and locked	inserted and unlocked	not inserted
Solenoid status		energised	de-energised	-	de-energised	energised	-
							
Contact activation							
KEN1...1...	Key actuator	11 — 12	11 — 12	11 — 12	11 — 12	11 — 12	11 — 12
	Solenoid	21 — 22	21 — 22	21 — 22	21 — 22	21 — 22	21 — 22
	Solenoid	33 — 34	33 — 34	33 — 34	33 — 34	33 — 34	33 — 34
	Solenoid	41 — 42	41 — 42	41 — 42	41 — 42	41 — 42	41 — 42
KEN1...2...	Key actuator	13 — 14	13 — 14	13 — 14	13 — 14	13 — 14	13 — 14
	Solenoid	21 — 22	21 — 22	21 — 22	21 — 22	21 — 22	21 — 22
	Solenoid	33 — 34	33 — 34	33 — 34	33 — 34	33 — 34	33 — 34
	Solenoid	41 — 42	41 — 42	41 — 42	41 — 42	41 — 42	41 — 42
KEN1...3...	Key actuator	13 — 14	13 — 14	13 — 14	13 — 14	13 — 14	13 — 14
	Solenoid	21 — 22	21 — 22	21 — 22	21 — 22	21 — 22	21 — 22
	Key actuator	31 — 32	31 — 32	31 — 32	31 — 32	31 — 32	31 — 32
	Solenoid	41 — 42	41 — 42	41 — 42	41 — 42	41 — 42	41 — 42



RS131310



PLN131311



P2L...

Accessories and spare parts



P33032



P33033



P33034



P33035



P33036

Order code	Contacts	Force	Qty per pkg	Wt
		[N]	n°	[kg]

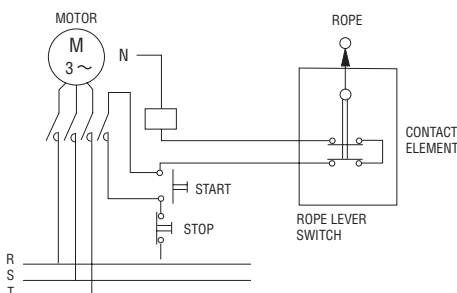
With reset button.

RS131310	1NO + 1NC	25	1	0.092
PLN131311	1NO + 1NC	60	1	0.248
P2L131311	1NO + 1NC	40	1	0.459
P2L131312	1NO + 1NC	120	1	0.459
P2L151311	2NO + 2NC	40	1	0.459
P2L151312	2NO + 2NC	120	1	0.459

① Direct (positive) opening action \ominus ; safety function according to IEC/EN/BS 60947-5-1.

② Dimensions according with EN/BS 50047.

Example of wiring diagram



Type		open	closed
RS...	13-14 21-22		
PLN...	11-12 21-22		
P2L13...	31-32 41-42		
P2L15...	31-32 41-42 13-14 23-24		

General characteristics

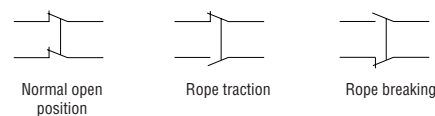
The rope-operated switches for emergency stop are mainly suitable for emergency stop or alarm systems for machinery which occupies a large space. This emergency stop can be achieved from any point when the rope is manually pulled each time.

The choice of the body, between plastic and metal, can satisfy the most diversified requirements for sturdiness and size.

Operational characteristics

- Maximum operating rate: 1800 cycles/h
- Mechanical life: 100,000 cycles
- IEC utilisation category:
 - DC13 duty: 1.5A 24V (10A 24V only for PLN-P2L)
 - AC15 duty: 6A 250V (3A 400V only for PLN-P2L)
- IEC conventional thermal current Ith:
 - 10A for RS and PLN; 6A for P2L
- IEC rated insulation voltage Ui:
 - 250VAC (400V for PLN-P2L)
- Contact resistance: <10mΩ
- Short-circuit backup protection: 10A gG/SC quick fuse
- Cable entry: PG11 for RS, PLN and P2L types (PLN and P2L complete with cable gland)
- Cable connection: self-releasing screw terminal
- Tightening torque:
 - Switch fixing: 2.5Nm / 22.1lb.in
 - Contact terminals: 0.8Nm / 7lb.in (for RS), 1.8Nm / 15.9lb.in (for PL and P2L)
 - Body lid screw fixing: 0.8Nm / 7lb.in
- Conductor section: 1 or 2 2.5mm² max / 16-14 AWG
- Ambient conditions:
 - Operating temperature: -25...+70°C
 - Storage temperature: -40...+70°C
 - Pollution degree: 3
 - IEC degree of protection: IP65 (T type: IP66).

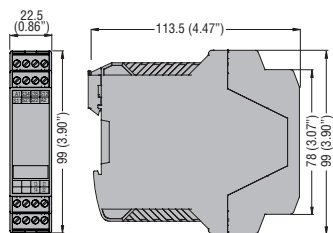
Operation



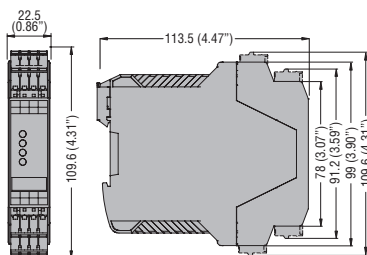
Certification and compliance

Certifications obtained: UL Listed for USA and Canada (cULus - File E93601), as Auxiliary Devices - Limit switches for RS13... and TL13... types only; EAC for all. Compliant with standards: IEC/EN/BS 60947-1, IEC/EN/BS 60947-5-1, IEC/EN/BS 60204-1, ISO 13850; also UL508, CSA-C22.2 n° 14 for RS types.

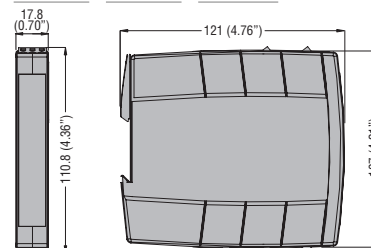
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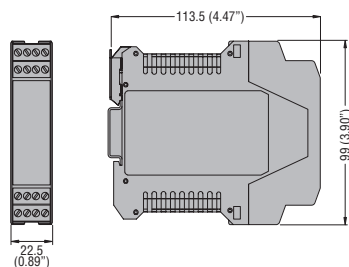
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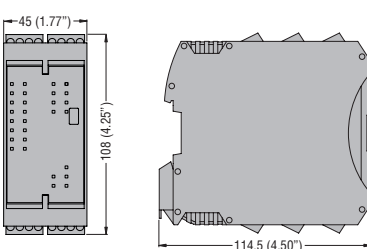
SRBES20 - SRBES31 - SRBEM41



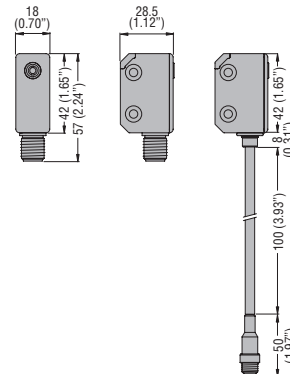
SRATH21 - SRALC21 - SRASM20 - SRAMF21



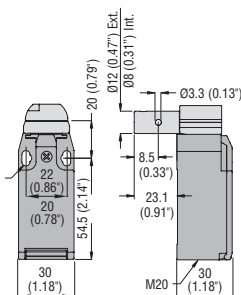
SRPMFA164



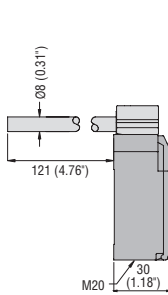
SSF...



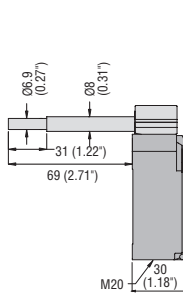
KBP1... KMP1...



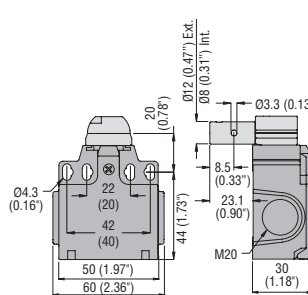
KBP2... KMP2...



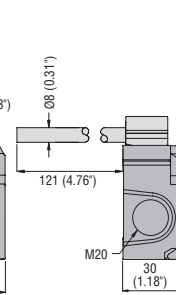
KBP3... KMP3...



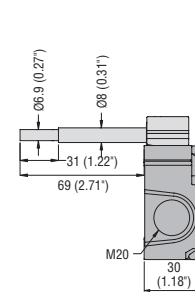
KCP1... KNP1...



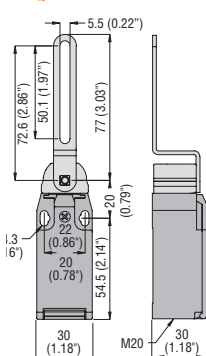
KCP2... KNP2...



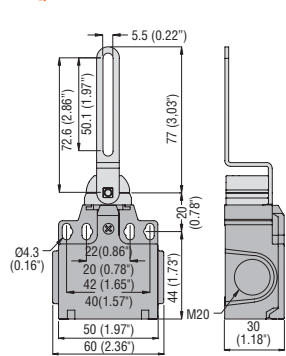
KCP3... KNP3...



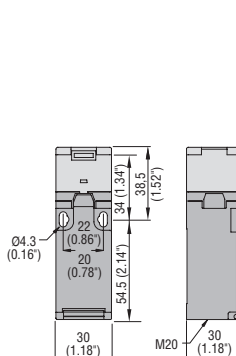
KBQ1L... KMQ1L...



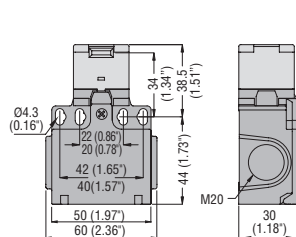
KCQ1L... KNQ1L...



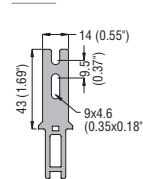
KBN1... - KBN2... KMN1... - KMN2...



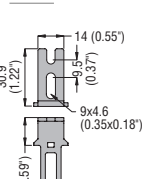
KCN...



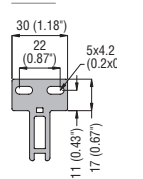
Keys KXN1



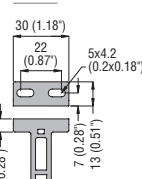
KXN2



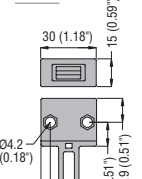
KXN3



KXN4

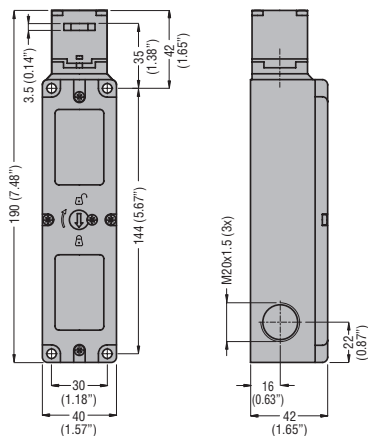


KXN5

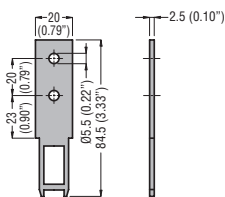


SAFETY SWITCHES WITH SOLENOID

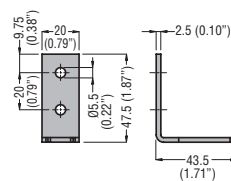
KEN1...



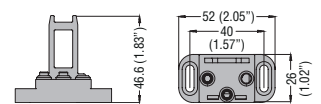
KEXN1



KEXN2

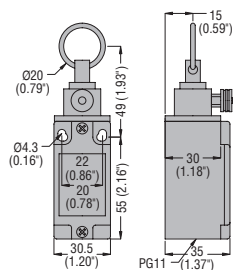


KEXN5

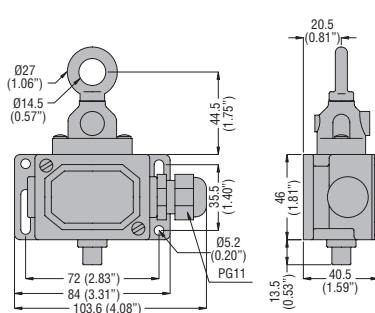


ROPE-PULL SAFETY LIMIT SWITCHES, ISO 13850 COMPLIANT

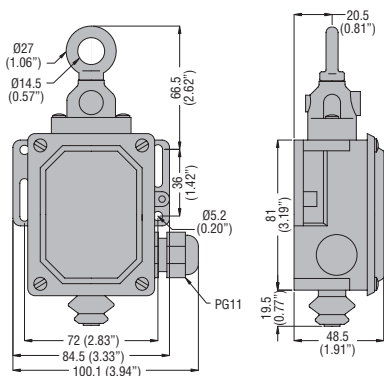
RS131310



PLN131311

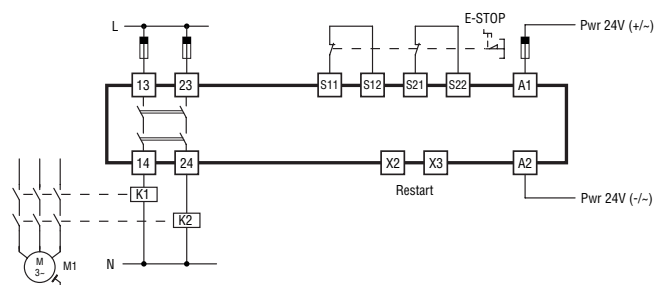


P2L13... - P2L15...



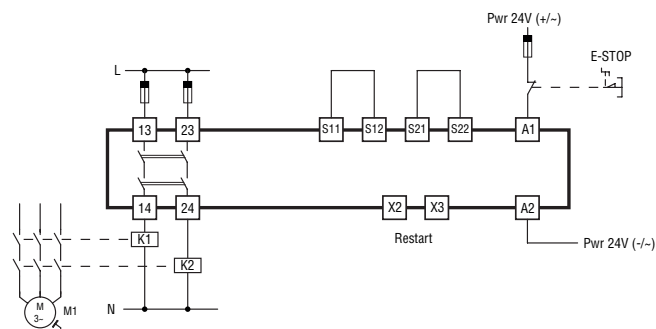
SRCES20

Double channel mode, manual start



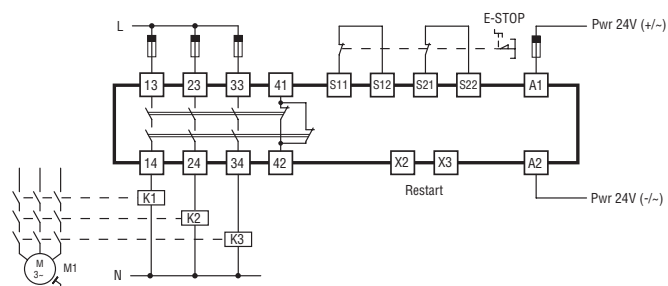
SRCES20

Single channel mode, manual start



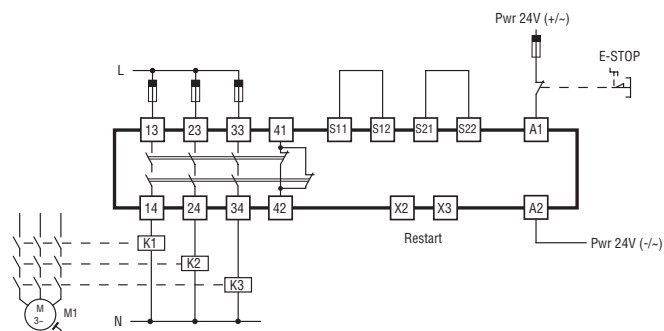
SRCES31

Double channel mode, manual start



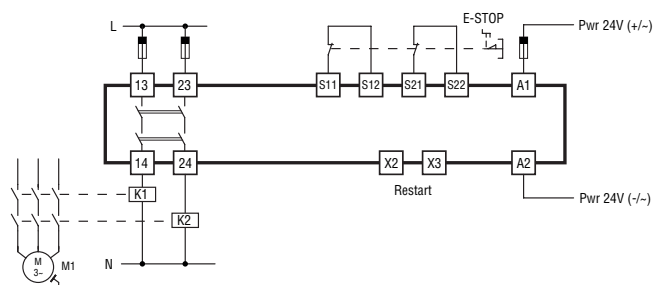
SRCES31

Single channel mode, manual start



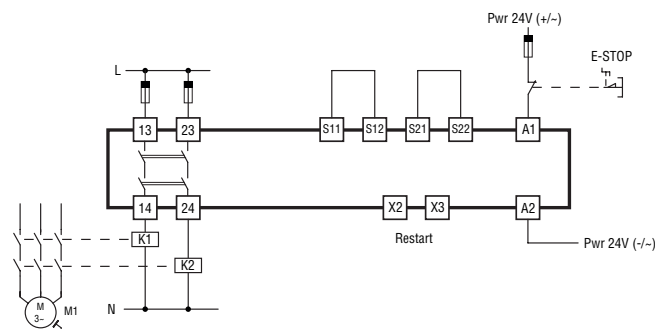
SRBES20

Double channel mode, manual start



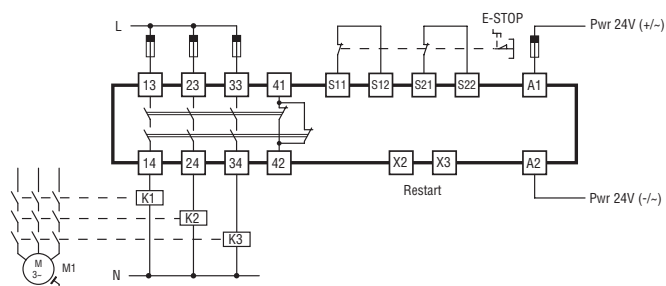
SRBES20

Single channel mode, manual start



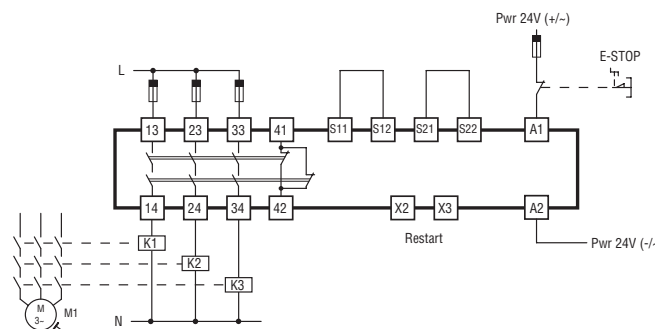
SRBES31

Double channel mode, manual start



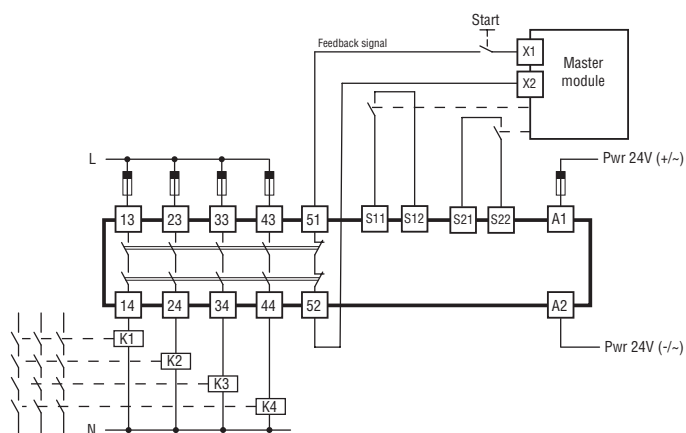
SRBES31

Single channel mode, manual start



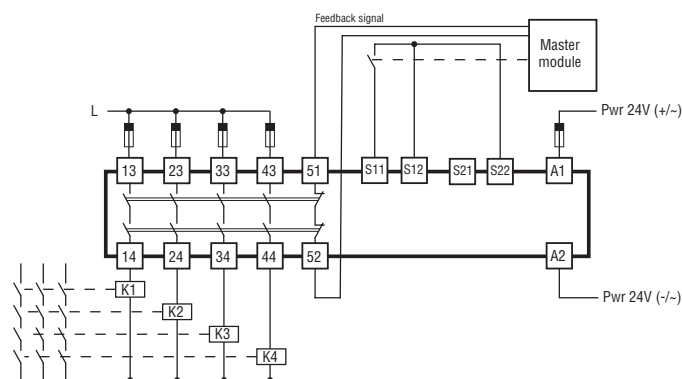
SRBEM41

Double channel mode



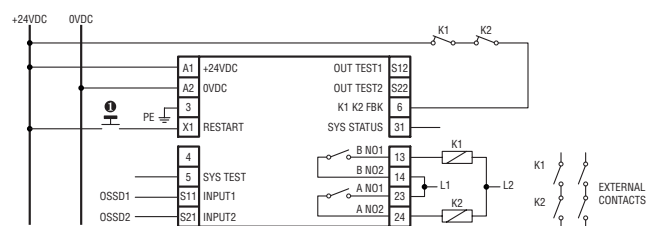
SRBEM41

Single channel mode

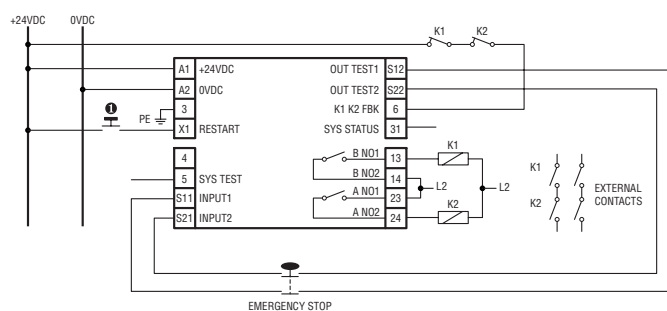
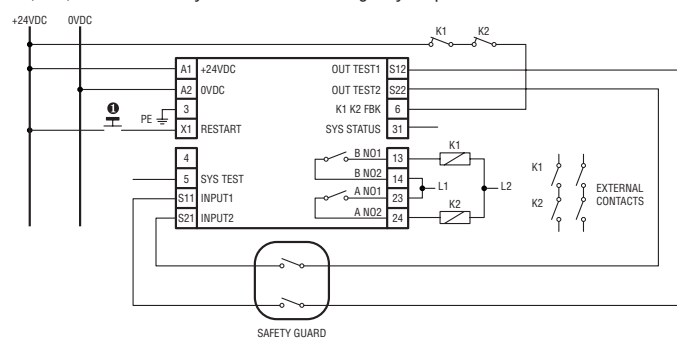


SRAMF21

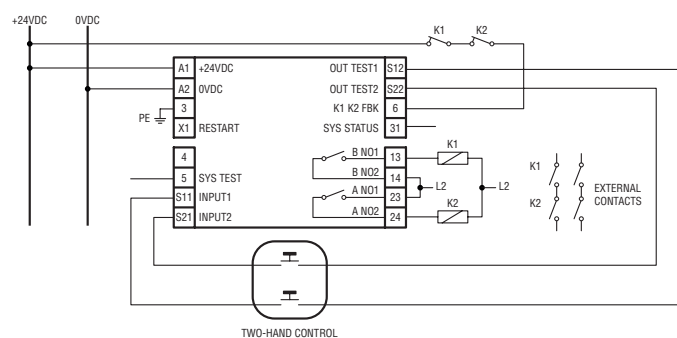
1A, 1C mode: OSSD inputs



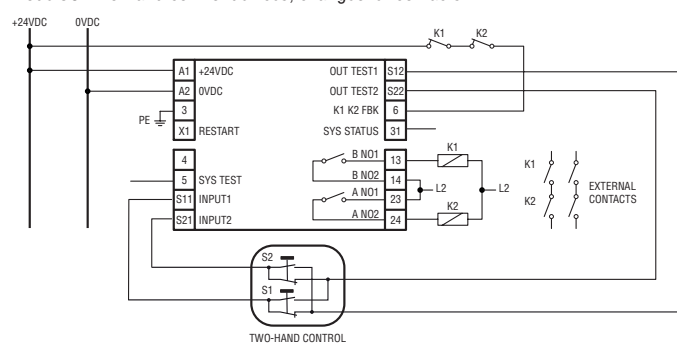
2A, 2M, 2C mode: safety accesses and emergency stops



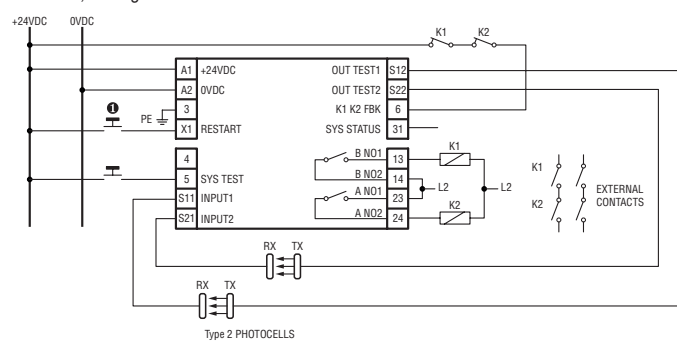
Mode 3A: two-hand control devices



Mode 3C: two-hand control devices, changeover contacts

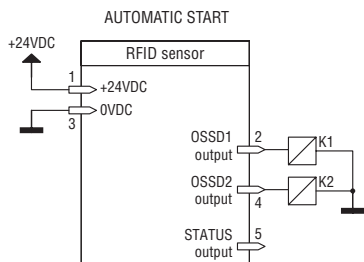


Mode 4A, 4C: light curtains

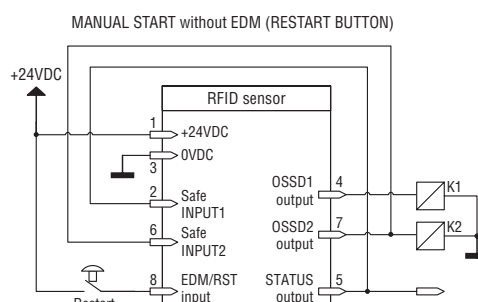
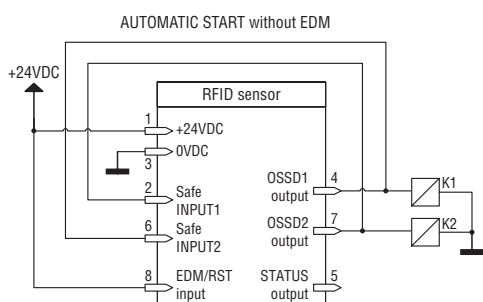
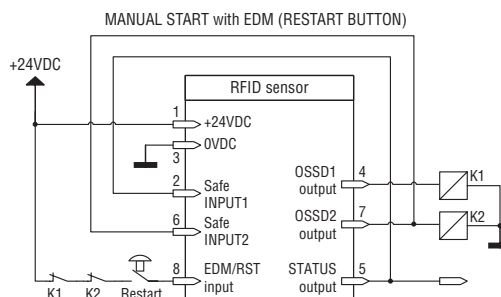
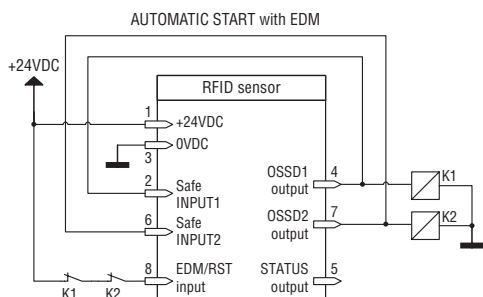


ⓘ Not necessary when used in automatic mode.

SSF5...



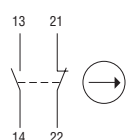
SSF8...



LIMIT SWITCHES, KB - KM - KC - KN TYPES

K...L11

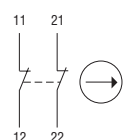
Slow action



1NO + 1NC

K...L02

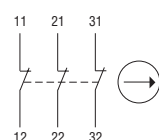
Slow action



2NC

K...L03

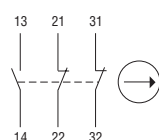
Slow action



3NC

K...L12

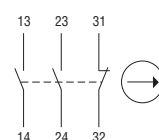
Slow action



1NO + 2NC

K...L21

Slow action

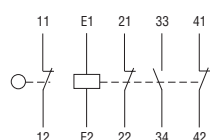


2NO + 1NC

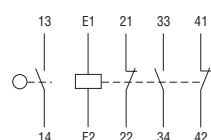
SAFETY SWITCHES WITH SOLENOID

Actuator inserted and unlocked

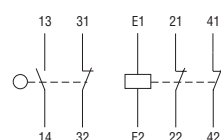
KEN1E1...KEN1M1....



KEN1E2...KEN1M2....

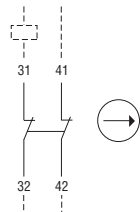


KEN1E3...KEN1M3....

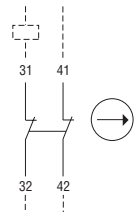


LIMIT SWITCHES FOR EMERGENCY STOPPING

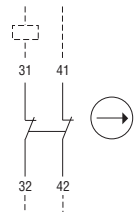
RS13...



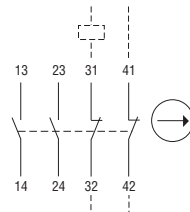
PLN13...



P2L13...



P2L15...



Type	SRCES20 - SRCES20S	SRCES31 - SRCES31S	SRBES20	SRBES31	SRBEM41	
AUXILIARY SUPPLY						
Nominal auxiliary voltage supply	24VAC/DC		24VAC/DC			
Operating range	22...26VAC/DC		22...26VDC, 20.4...27.6VAC			
Frequency range	60-50Hz		60-50Hz			
Overvoltage category	III		III			
Insulation voltage	4kV		4kV			
Protection	Short circuit with PTC		Short circuit with PTC			
INPUTS						
Number	2		2			
Input current	Typical 50mA		Typical 5mA			
Input voltage	–		–	0-35VDC		
Number of feedback/RESTART inputs	–		–			
OUTPUTS						
Number of safe outputs NO	2	3	2	3	4	
Number of safe outputs OSSD	–		–			
Number of auxiliary outputs NC	–	1	–	1	–	
Number of feedback outputs	–	–	–	–	1NC	
Number of test outputs	–		–			
Safe output type	Voltage free contacts, relays with forced guided contacts		Voltage free contacts, relays with forced guided contacts			
Ratings	AC1 250V: 6A - 1500VA AC15 250V: 5A - DC1 24V: 6A DC13 24V: 6A		AC1 250V: 6A - 2000VA AC15 230V: 3A - DC1 24V: 6A DC13 24V: 2.5A			
UL 508 ratings	Pilot duty: B300 - R300		Pilot duty: B300 - R300			
Mechanical life	>10 ⁷ operations		>10 ⁷ operations			
Electrical life AC1 at 360 commutations/h	10 ⁵ operations		10 ⁵ operations			
SAFETY PARAMETERS						
ISO 13849-1 safety category	Cat. 4		Cat. 4			
ISO 13849-1 performance level	PL _e		PL _e			
AMBIENT CONDITIONS						
Degree of protection	IP40 on front, IP20 on terminals		IP40 on front, IP20 on terminals			
Degree of pollution	2		2			
Operating temperature	-20...+55°C		-25...+60°C			
Storage temperature	-20...+85°C		-30...+70°C			
Relative humidity	R.H. ≤93%		R.H. ≤95%			
CERTIFICATIONS AND COMPLIANCE						
Certifications	cULus, TÜV (pending)		cULus, TÜV			
Compliance	Cat. 4, PLe according to EN/BS 13849-1, EN/BS 81-20, EN/BS 81-50		Cat. 4, PLe according to EN/BS 13849-1, EN/BS 81-20, EN/BS 81-50		Cat. 4, PLe according to EN/BS 13849-1	

	SRATH21	SRALC21	SRASM20	SRAMF21	SRPMFA164
	24VDC				24VDC
	19...29VDC				19...29VDC
	–				–
	III				III
	4kV				4kV
	Signaling output protected from overload		–	Signaling output protected from overload	Signaling output protected from overload
	2				16
	Typical 4.3mA				–
	0-30VDC				–
	–				4
	2				–
	–				4 pairs
	–				–
	1PNP	1PNP	–	1PNP	–
	–				4
	Relays with forced guided contacts				OSSD safe outputs
	AC1 250V: 6A - 2000VA AC15 230V: 5A DC13 24V: 2A				400mA - 24VDC
	Pilot duty: B300 - Q300				–
	>10 ⁷ operations				–
	>10 ⁷ operations				–
	Cat. 4				Cat. 4
	PLe				PLe
	IP20 on front, IP20 on terminals				IP20 on front, IP20 on terminals
	2				2
	-25...+55°C				-25...+55°C
	-30...+70°C				-30...+70°C
	R.H. ≤95%				R.H. ≤95%
	cULus, TÜV				cULus, TÜV
	Type 4 according to EN/BS 61496 Cat. 4, Ple according to EN/BS 13849-1	–	Cat. 4, Ple according to EN/BS 13849-1, EN/BS/IEC 61496-1 (Type 4), EN/BS 61508-1, EN/BS 61508-2, EN/BS 61508-3 (SIL3), IEC/BS 62061 (max. SIL 3)	Cat. 4, Ple according to EN/BS 13849-1, EN/BS 61508-1(SIL 3), EN/BS 61508-2 (SIL 3), EN/BS 61508-3 (SIL3), IEC/BS 62061 (max. SIL 3)	