

XCS SAFETY INTERLOCK SWITCHES

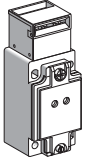
GENERAL INFORMATION	40
BASIC PRINCIPLES	41
Type XCSA, XCSB, XCSC, XCSE, XCSL	42 - 47
Type XCSPA, XCSTA, XCSTE, XCOMP	48 - 51
Type XCSPL, XCSTL	52
Type XCSPR, XCSTR	53
Type XCSDM	54
SPECIFICATIONS	55
SELECTION	56
Type XCSA	56
Type XCSB and XCSC	57
Type XCSE	58 - 59
Type XCSL	60 - 62
ACCESSORIES AND SPARE PARTS	63 - 64
PRE-WIRED CONNECTORS	65
DIMENSIONS	66 - 69
Type XCSA, XCSB, XCSC, and XCSE	66 - 68
Type XCSL	69 - 70
WIRING DIAGRAMS TYPE XCSA, XCSB, XCSC, XCSE, XCSL	71 - 76
SELECTION	77
Type XCSPA, and XCSTA	77
Type XCSTE	78 - 79
ACCESSORIES AND SPARE PARTS	80
DIMENSIONS	81 - 82
WIRING DIAGRAMS	83 - 85
SELECTION	86
Type XCSPL, XCSPR, XCSTL, and XCSTR	86
DIMENSIONS	87
WIRING DIAGRAM	88
SELECTION	89
Type XCSMP	89
DIMENSIONS	90 - 91
WIRING DIAGRAMS	91 - 92

XCS NON-CONTACT SAFETY INTERLOCK SWITCHES

SPECIFICATIONS TYPE XCSDM	93
SELECTION TYPE XCSDM	94 - 95
WIRING DIAGRAMS	95 - 98
MOUNTING	99
SELECTION CLASS 9007 TYPE SG GATE GARD®	100
APPLICATION DATA, DIMENSIONS	101

XCS Safety Interlock Switches

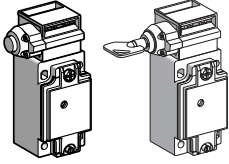
General Information



Metal Body Safety Interlock Switches

Without Locking of the Actuating Key:

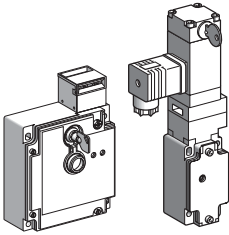
Metal body safety interlock switches for use on machines **without inertia** and operating in **normal stable conditions** (no vibration or shock and guard mounted vertically, without risk of rebound on closing) where the guard remains in its closed position, thus eliminating unintentional opening of the guard. Does not have forces trying to open the door.



With Locking of the Actuating Key and Manual Unlocking by Tubular High Security Key Operated Lock or by Push Button:

Metal body safety interlock switches for use on heavy machines **without inertia** and operating in **less stable conditions** (shock or vibration exist), whereby the guard could open unintentionally.

The tubular high security key operated lock enables the positive locking of the guard and its subsequent unlocking. The push button lock will lock the guard until the push button is pressed.

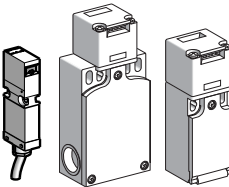


With Interlocking of the Actuating Key by Electromagnet:

Metal body safety interlock switches for use on machines **with inertia** or controlled opening of the protective guard is required.

The locking of the moving guard can either be on de-energization or energization of the electromagnet.

A tubular high security key operated lock enables manual unlocking of the guard in the event of an interlocking circuit malfunction, and also enhances safety for maintenance personnel working on the machine.

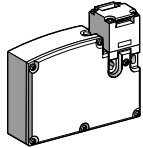


One type of these switches incorporate two LEDs: one indicating guard "open/closed" and the other indicating guard "locked/unlocked." Another type of these switches incorporates one LED, indicating guard "closed and locked".

Plastic Body Safety Interlock Switches

Without Locking of the Actuating Key:

Plastic body safety interlock switches for use on light machines **without inertia**. For use in **less stable conditions** (shock or vibration exist, guard not vertical or potential of rebound on closing) where the guard could open unintentionally. A **guard retaining device** is available as an accessory.

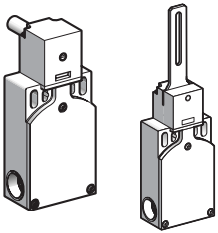


With Interlocking of the Actuating Key by Electromagnet:

Plastic body safety interlock switches for use on machines **with inertia** or controlled opening of the protective guard is required.

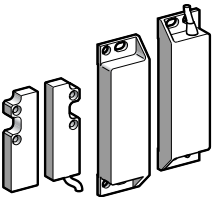
The locking of the moving guard can either be on de-energization or energization of the electromagnet.

A special tool enables manual unlocking of the guard in the event of an interlocking circuit malfunction, and also enhances safety for maintenance personnel working on the machine.



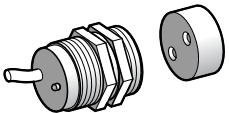
With Rotary Operator:

Plastic body safety interlock switches with straight or elbowed operating lever or rotary shaft operator. Specifically designed for small industrial machines fitted with small-sized **hinged doors, covers, or protective guards**.



Non-Contact Safety Interlock Switches

Plastic body non-contact safety interlock switches for use on machines **without inertia**. Consists of a switch and magnetic actuating key. Designed for use where guards are not precisely adjusted, where no contact is desired between switch and actuating key, and for frequent wash down applications.



Extract from Standards EN 292-2 and EN 1088

Removable protective guards associated with moving parts (therefore potentially hazardous) must be used in conjunction with locking or interlocking devices.

Applications where an interlocking device is necessary: high inertia machines.

An interlocking device must be used when the rundown or stop time is greater than the time it takes for a person to access the hazardous zone.

This device provides that the unlocking of the guard is delayed until the hazardous movement has effectively stopped.

Safety Interlock Switches

The key operated safety interlock switches, specifically designed for machine guarding applications, provide an ideal solution for the locking or interlocking of movable guards associated with industrial machinery. They meet all the requirements of the standards EN 292-2, EN 294, EN 1088, and IEC/EN 60204.

The switches enhance protection for machine operators when a guard is removed or opened, the start control circuit of the machine is opened (switched-off), using positive opening operation contacts, and movements stop.

The removal/opening of the guard (after hazardous movements have stopped) can either be:

- at the time the machine is switched-off for low inertia machines (machines whose rundown or stop time is less than the time it takes for the operator to access the hazardous zone), or
- delayed for high inertia machines (machines whose rundown or stop time is greater than the time it takes for the operator to access the hazardous zone).

Operation

The starting circuit of the machine can only be closed by the insertion of the actuating key (mounted to the guard) fully into the head of the safety interlock switch. When the actuating key is withdrawn, the N.C. safety contacts are opened by positive opening action.

The safety interlock switch incorporates slow break contact blocks with positive opening operation. As the guard is closed, the actuating key fitted to it enters the head of the safety interlock switch and actuates a multiple interlock device which, in turn, closes the N.C. contact(s).

The key insertion slot in the head of the safety interlock switch is designed to accept small movements of the actuating key (a few millimeters) to compensate for mechanical play, or vibration.

Tamper Proofing

The safety interlock switch can only be operated by an actuating key specifically designed for this purpose and cannot be actuated by any other means (common tools, rods or metal plates).

When loosening the cover screws for re-orientation of the turret head, the head itself remains attached to the switch body and the contact states remain unchanged. (The heads of the XCSL devices cannot be rotated or re-oriented).

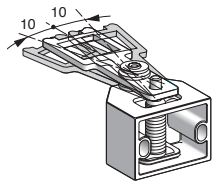
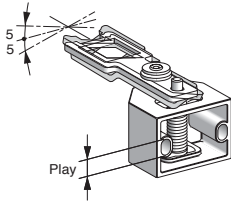
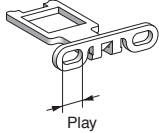
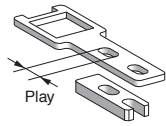
There are various methods for obtaining a higher level of tamper proofing, for example:

- using a cage device to prevent the insertion of a spare actuating key into the head of the switch,
- mounting the actuating key to the guard by means that make it very difficult to remove (welding, riveting).

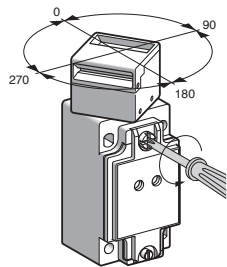
XCS Safety Interlock Switches

XCSEA, XCSB, XCS, XCSE, XCSL

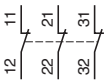
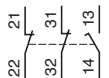
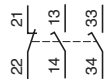
Actuating Keys



Turret Head



Contact Configurations



Metal Body Safety Interlock Switches

Actuating Keys

The actuating keys are common to all XCS metal body safety interlock switch models (except XCSL). Their oblong mounting holes enable simple adjustment when mounting on moving guards.

A pivoting actuating key (both horizontally and vertically) is available when using the switches in conjunction with hinged guards or guards with imprecise guidance.

Straight actuating keys are supplied with an adaptor for simple replacement of an XCKJ interlock switch by an XCS switch, without the need to drill additional mounting holes.

Turret Head

All metal body safety interlock switches have a square turret head which can be rotated through 360° in 90° steps (except XCSL).

Eight directions of actuation are possible for the actuating key:

- 4 in the horizontal plane,
- 4 from above the switch (4 alternative positions of the key slot, depending on the orientation of the head).

When loosening the mounting screw for re-orientation of the operating head, the head itself remains attached to the body and the contact states remain unchanged. (The heads of the XCSL devices cannot be rotated or re-oriented).

Contact Configurations

Metal body safety interlock switches incorporate a 3-pole contact block, with direct (positive) opening operation, which is actuated by insertion or withdrawal of the actuating key.

The withdrawal of the actuating key opens the N.C. safety contact(s), even in the event of the contact sticking or welding.

The contact block enables redundant safety circuits to be established and also, to provide signalling (for example: PLC or illuminated beacon).

NOTE: Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signalling – NOT for safety functions.

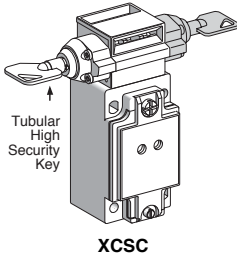
LED Indicators

An orange LED (optional for safety interlock switch types XCSEA and XCS, standard for safety interlock switch type XCSE) indicates the position of the machine guard:

- ☀ LED illuminated: actuating key not inserted in head of switch, N.C. contact(s) open, guard open.
 - ⊗ LED not illuminated: actuating key inserted in head of switch, N.C. contact(s) closed, guard closed.
- A green LED (incorporated on safety interlock switch type XCSE) indicates the locking of the machine guard.
- ⊗ LED not illuminated: actuating key not locked in head of switch: the machine cannot be operated.
 - ☀ LED illuminated: actuating key inserted in head of switch and key locked. The machine is either ready for starting, running or decelerating to a standstill.

XCS Safety Interlock Switches

XCSEA, XCSB, XCSC, XCSE, XCSL



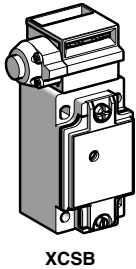
Manual Locking / Unlocking, XCSB and XCSC

On the XCSB safety interlock, the actuating key is locked into the switch until the push button on the device is pushed, unlocking the actuating key and allowing it to be removed.

The XCSC safety interlock allows manual locking and unlocking of the actuating key with a tubular high security key operated lock. It is not necessary to use this lock for normal operation of the safety interlock switch. The tubular high security key is removable from the locking device when it is in the "UNLOCK" position. To lock the actuating key in the safety interlock switch, the tubular high security key must be in "LOCK" position.

Both the XCSB and XCSC safety interlocks allow the locking mechanism to be mounted on the right or left side for ease of access. The locking mechanism mounting can be modified in the field.

When the actuating key and guard are locked (i.e., the high security key is in the "LOCK" position on the XCSC, and the push button is not depressed on the XCSB) the resistance to forcible withdrawal of the actuating key is 337 lbf (150 daN).

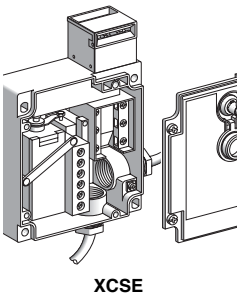


Locking / Unlocking by Electromagnet on XCSE and XCSL

Type XCSE and XCSL safety interlock switches incorporate an electromagnet for locking or unlocking the machine guard.

With the machine guard closed and locked, the resistance to forcible withdrawal of the actuating key is 450 lbf (200 daN) for XCSE and 337 lbf (150 daN) for XCSL.

In addition to the 3-pole contact block actuated by the key mounted to the guard, XCSE safety interlock switches incorporate a N.C. and N.O. contact block with direct (positive) opening operation actuated by the electromagnet. The N.C. contact is for use in the safety circuit of the machine and the N.O. contact is for signalling the status of the electromagnet.



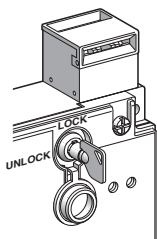
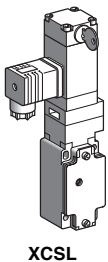
Tubular High Security Key Operated Lock on XCSE / Ronis Key Operated Lock on XCSL

The XCSE and XCSL safety interlock switches are supplied with an additional key operated lock (XCSE: tubular high security, XCSL: Ronis), which allows the forced opening of the guard in an emergency situation, and can be useful in the following situations:

- While the machine is undergoing maintenance. When the high security key is turned to the "UNLOCK" position then removed, the degree of safety is higher in preventing an accidental machine restart. Safety for maintenance personnel is thus improved.
- In the event of a power failure.
- In the event of an interlocking circuit malfunction (interlocked condition maintained). The electrical supply which unlocks the switch via the electromagnet always takes priority over manual unlocking with the high security key.

Note on the operation of the tubular high security key and the Ronis key:

- When the tubular high security key is turned to the unlock position on the XCSE, the actuating key is unlocked and is free to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed from the switch.
- When the Ronis key is turned to the unlock position on the XCSL, the actuating key is unlocked and is free to be removed from the switch. The N.C. safety contacts will open when the Ronis key is turned to the unlock position as well.



Electromagnet Supply for XCSE

The electromagnet incorporated in Type XCSE safety interlock switches is DC operated for increased reliability. It is protected by a bridge rectifier and therefore can be supplied from both AC or DC sources (24 V, 48 V, 120 V, or 230 V). Overload protection is also provided.

XCS Safety Interlock Switches

XCSA, XCSB, XCSC, XCSE, XCSL

Example of Operation for an XCSE Safety Interlock Switch: Locking Without Power

Actuating key locks into the switch when inserted. This is typically preferred as the door is secured, regardless of electrical power availability or power failure. Applying power to the electromagnet will unlock the actuating key and allow it to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed.

Machine Status	Power Off, Machine Off	Power On, Machine Off	Machine Stopped, Ready to Start	Machine in Use	Stopping Sequence	Machine Stopped, Power On
Guard Position	Open	Open	Closed	Closed	Closed	Closed
Guard Status	Free movement	Free movement	Free movement	Locked	Locked	Free movement
Electromagnet State	"0" (de-energized)	"1" (energized)	"1" (energized)	"0" (de-energized)	"0" (de-energized)	"1" (energized)
3-Pole Contact State For XCSE5●●●						
3-Pole Contact State For XCSE7●●●						
Resulting Status	Machine is in non-operational state	Machine cannot be started.	Guard is closed, actuating key can be locked. It is locked by the start command.	Start command is given, the machine is in operational state.	Stop command is given, the machine slows down until complete stop.	When machine has stopped the guard may be opened.
Contact States of Electromagnet						
Orange LED						
Green LED						
Machine Safety Circuit	Open	Open	Open	Closed	Closed	Open

XCS Safety Interlock Switches XCSEA, XCSB, XCSC, XCSE, XCSL

Example of Operation for an XCSE Safety Interlock Switch: Locking With Power

Actuating key is locked into switch *only* when actuating key is inserted *and* power is applied to the electromagnet. Door or guard is not locked in the event of a power failure or when power is removed from the electromagnet. Removing power to the electromagnet will unlock the actuating key and allow it to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed.

NOTE: Locking with power devices does not meet European standards regarding the safety of machinery, especially EN 1088 regarding guard locking. European standards do not allow a "locking with power" function for gate or door guarding/locking. Locking without power devices meet European requirements, and should be used when machinery is to be shipped to Europe or where machinery must meet European standards.

Machine Status	Power Off, Machine Off	Power On, Machine Off	Machine Stopped, Ready to Start	Machine in Use	Stopping Sequence	Machine Stopped, Power On
Guard Position	Open	Open	Closed	Closed	Closed	Closed
Guard Status	Free movement	Free movement	Free movement	Locked	Locked	Free movement
Electromagnet State	"0" (de-energized)	"0" (de-energized)	"0" (de-energized)	"1" (energized)	"1" (energized)	"0" (de-energized)
3-Pole Contact State For XCSE5●●●						
3-Pole Contact State For XCSE7●●●						
Resulting Status	Machine is in non-operational state.	Machine cannot be started.	Guard is closed, actuating key can be locked. It is locked by the start command.	Start command is given, the machine is in operational state.	Stop command is given, the machine slows down until complete stop.	When machine has stopped the guard may be opened.
Contact States of Electromagnet						
Orange LED						
Green LED						
Machine Safety Circuit	Open	Open	Open	Closed	Closed	Open

XCS Safety Interlock Switches

XCSA, XCSB, XCSC, XCSE, XCSL

Example of Operation for an XCSL Safety Interlock Switch: Locking Without Power

Actuating key locks into the switch when inserted. This is typically preferred as the door is secured, regardless of electrical power availability or power failure. Applying power to the electromagnet will unlock the actuating key and allow it to be removed from the switch. Applying power to the electromagnet will open the N.C. safety contacts as well.

Machine Status	Power Off, Machine Off	Power On, Machine Off	Machine Stopped, Ready to Start	Machine in Use	Stopping Sequence	Machine Stopped, Power On
Guard Position	Open	Open	Closed	Closed	Closed	Closed
Guard Status	Free movement	Free movement	Free movement	Locked	Locked	Free movement
Electromagnet State	"0" (de-energized)	"1" (energized)	"1" (energized)	"0" (de-energized)	"0" (de-energized)	"1" (energized)
3-Pole Contact State For XCSL5●●●						
3-Pole Contact State For XCSL7●●●						
Resulting Status	Machine is in non-operational state	Machine cannot be started.	Guard is closed, actuating key can be locked. It is locked by the start command.	Start command is given, the machine is in operational state.	Stop command is given, the machine slows down until complete stop.	When machine has stopped the guard may be opened.
Orange LED						
Machine Safety Circuit	Open	Open	Open	Closed	Closed	Open

XCS Safety Interlock Switches XCSA, XCSB, XCSC, XCSE, XCSL

Example of Operation for an XCSL Safety Interlock Switch: Locking With Power

Actuating key is locked into switch *only* when actuating key is inserted *and* power is applied to the electromagnet. Door or guard is not locked in the event of a power failure or when power is removed from the electromagnet. Removing power to the electromagnet will unlock the actuating key and allow it to be removed from the switch. Removing power to the electromagnet will open the N.C. safety contacts as well.

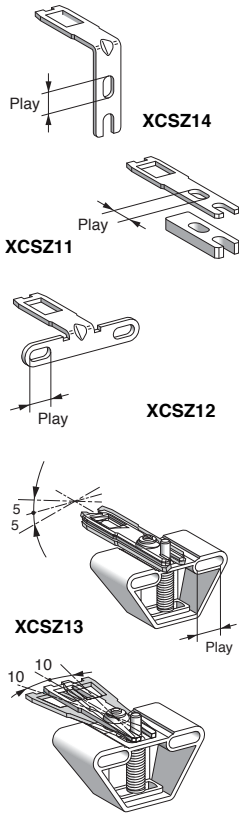
NOTE: Locking with power devices does not meet European standards regarding the safety of machinery, especially EN 1088 regarding guard locking. European standards do not allow a "locking with power" function for gate or door guarding/locking. Locking without power devices meet European requirements, and should be used when machinery is to be shipped to Europe or where machinery must meet European standards.

Machine Status	Power Off, Machine Off	Power On, Machine Off	Machine Stopped, Ready to Start	Machine in Use	Stopping Sequence	Machine Stopped, Power On
Guard Position	Open	Open	Closed	Closed	Closed	Closed
Guard Status	Free movement	Free movement	Free movement	Locked	Locked	Free movement
Electromagnet State	"0" (de-energized)	"0" (de-energized)	"0" (de-energized)	"1" (energized)	"1" (energized)	"0" (de-energized)
3-Pole Contact State For XCSL5●●●						
3-Pole Contact State For XCSL7●●●						
Resulting Status	Machine is in non-operational state.	Machine cannot be started.	Guard is closed, actuating key can be locked. It is locked by the start command.	Start command is given, the machine is in operational state.	Stop command is given, the machine slows down until complete stop.	When machine has stopped the guard may be opened.
Orange LED						
Machine Safety Circuit	Open	Open	Open	Closed	Closed	Open

XCS Safety Interlock Switches

XCSPA, XCSTA, XCSTE, XCSMP

Actuating Keys



Plastic body

Actuating Keys

The actuating keys are common to all XCSPA, XCSTA, and XCSTE plastic body safety interlock switch models. Their oblong mounting holes enable simple adjustment when mounting on moving guards.

A pivoting actuating key (both horizontally and vertically) is available when using the switches in conjunction with hinged guards or guards with imprecise guidance.

Straight actuating keys are supplied with an adapter for simple replacement of an XCKP safety interlock switch by an XCSPA switch or an XCKT safety interlock switch by an XCSTA switch, without the need to drill additional mounting holes.

The XCSMP safety interlock switches use actuating different actuating keys, due to the smaller size of the switch. Straight, 90°, and pivoting actuating keys are available for the XCSMP.

Turret Head

The XCSPA, XCSTA and XCSTE safety interlock switches are fitted with a square turret head which can be rotated through 360° in 90° steps.

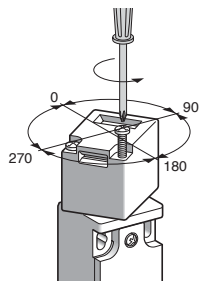
Eight directions of actuation are possible for the actuating key:

- 4 in the horizontal plane,
- 4 from above the switch (4 alternative positions of the key slot, depending on the orientation of the head).

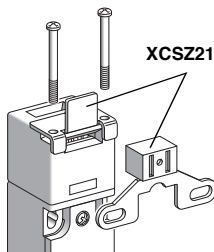
When loosening the head mounting screws for re-orientation of the operating head, the head itself remains attached to the body and the contact states remain unchanged. There are 2 head mounting screws for the XCSPA and XCSTA, and 4 head mounting screws for the XCSTE.

XCSMP safety interlock switches have a fixed head that is not rotatable. The actuating key can approach the switch from the top and side of the switch.

Turret Head



Guard Retaining Device

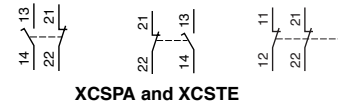


Contact Configurations.

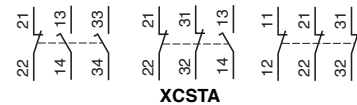
Safety interlock switches incorporate a 2-pole (XCSMP, XCSPA and XCSTE) or a 3-pole (XCSMP and XCSTA) contact block, with positive opening operation, which is actuated by insertion or withdrawal of the actuating key attached to the guard.

The withdrawal of the actuating key opens the N.C. safety contact(s), even in the event of the contact sticking or welding.

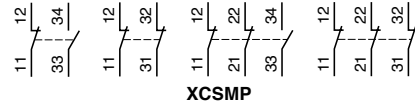
The contact block enables redundant safety circuits to be established and also, to provide signaling (for example: PLC, illuminated beacon, etc.).



XCSPA and XCSTE



XCSTA



XCSMP

NOTE: Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signaling – NOT for safety functions.

Guard Retaining Device

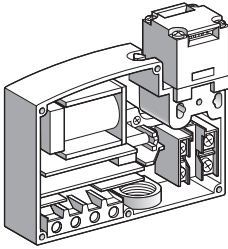
The guard retaining device XCSZ21 can be used with plastic body safety interlock switches XCSPA and XCSTA that are used in conjunction with either the wide (XCSZ12) or pivoting (XCSZ13) actuating key.

They assist in holding the guard closed by providing an extra magnetic retaining force, for a total of 11.3 lbf (5 daN).

It is specially suited for use with light machines operating in arduous conditions (vibration, mechanical shock, guard not vertical, risk of guard rebound on closing).

It can be used for horizontal actuating key actuating directions as well as those from above.

Locking/Unlocking by Electromagnet on XCSTE



Safety interlock switches type XCSTE incorporate an electromagnet for locking/unlocking of the machine guard.

With the machine guard closed and locked, the resistance to forcible withdrawal of the actuating key fitted to the guard is 112.5 lbf (500 N).

In addition to the 2-pole contact block actuated by the actuating key fitted to the guard, XCSTE safety interlock switches incorporate a N.C. contact block with positive opening operation that is actuated by the electromagnet.

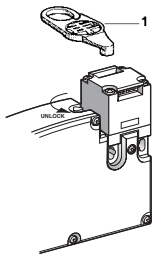
The N.C. contact is for use in the safety circuit of the machine.

Unlocking by Special Tool on XCSTE

Safety interlock switches type XCSTE are supplied with a special tool (1) that enables unlocking of the machine guard while being held in the locked position by the electromagnet.

The manual unlocking of the guard using the tool is useful in the following cases:

- while the machine is undergoing maintenance (with the tool turned to the “UNLOCK” position and then removed, the degree of safety is higher in preventing an accidental machine restart. The safety for maintenance personnel is thus improved),
- in the event of a power failure,
- in the event of an interlocking circuit malfunction (interlocked condition maintained). The electrical supply providing the unlocking via the electromagnet always takes priority over manual unlocking using the special tool.



Electromagnet Supply for XCSTE

The electromagnet incorporated in safety interlock switches type XCSTE is electronically supplied, giving it a very long service life. They are supplied with a bridge rectifier and, therefore, can be powered up from both AC or DC sources.

Overvoltage protection is also incorporated.

XCS Safety Interlock Switches

XCSTE

Example of Operation for an XCSTE Safety Interlock Switch: Locking Without Power

Actuating key locks into switch when inserted. This is typically preferred as the door is secured regardless of electrical power availability or failure. Applying power to the electromagnet will unlock actuating key and allow it to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed.



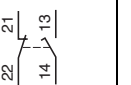
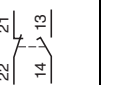
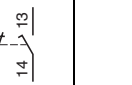

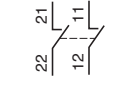
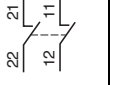
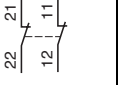
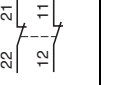
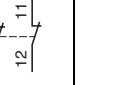




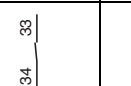
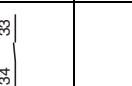

Machine Status	Power Off, Machine Off	Power On, Machine Off	Machine Stopped, Ready to Start	Machine in Use	Stopping Sequence	Machine Stopped, Power On
Guard Position	Open	Open	Closed	Closed	Closed	Closed
Guard Status	Free movement	Free movement	Free movement	Locked	Locked	Free movement
Electromagnet State	"0" (de-energized)	"1" (energized)	"1" (energized)	"0" (de-energized)	"0" (de-energized)	"1" (energized)
2-Pole Contact State For XCSTE5●●●						
2-Pole Contact State For XCSTE7●●●						
Resulting Status	Machine is in non-operational state	Machine cannot be started.	Guard is closed, actuating key can be locked. It is locked by the start command.	Start command is given, the machine is in operational state.	Stop command is given, the machine slows down until complete stop.	When machine has stopped, the guard may be opened.
Contact State of Electromagnet						
Machine Safety Circuit	Open	Open	Open	Closed	Closed	Open

XCS Safety Interlock Switches XCSTE

Example of Operation for an XCSTE Safety Interlock Switch: Locking with Power

The actuating key is locked into switch *only* when the actuating key is inserted *and* power is applied to the electromagnet. The door or guard is not locked in the event of a power failure or when power is removed from the electromagnet. Removing power to the electromagnet will unlock the actuating key and allow it to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed.

NOTE: Locking with power devices does not meet European standards regarding the safety of machinery, especially EN 1088 regarding guard locking. European standards do not allow a "locking with power" function for gate or door guarding/locking. Locking without power devices meets European requirements, and should be used when machinery is to be shipped to Europe or where machinery must meet European standards.

Machine Status	Power Off, Machine Off	Power On, Machine Off	Machine Stopped, Ready to Start	Machine in Use	Stopping Sequence	Machine Stopped, Power On
Guard Position	Open	Open	Closed	Closed	Closed	Closed
Guard Status	Free movement	Free movement	Free movement	Locked	Locked	Free movement
Electromagnet State	"0" (de-energized)	"0" (de-energized)	"0" (de-energized)	"1" (energized)	"1" (energized)	"0" (de-energized)
2-Pole Contact State For XCSTE5●●●						
2-Pole Contact State For XCSTE7●●●						
Resulting Status	Machine is in non-operational state.	Machine cannot be started.	Guard is closed, actuating key can be locked. It is locked by the start command.	Start command is given, the machine is in operational state.	Stop command is given, the machine slows down to a complete stop.	When machine has stopped, the guard may be opened.
Contact State of Electromagnet						
Machine Safety Circuit	Open	Open	Open	Closed	Closed	Open

XCS Safety Interlock Switches

XCSPL, XCSTL

Plastic Body with Rotary Lever

Turret Head

Safety interlock switches with a rotary lever incorporate a turret operating head that can be rotated through 360° in 90° steps.

Two supplementary self-locking tamper-proof screws are included with each switch for permanent mounting and direction of the head.

2 Body Versions

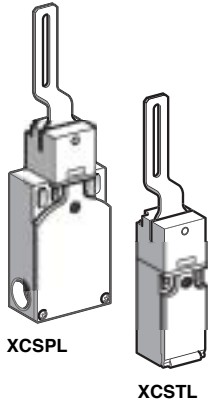
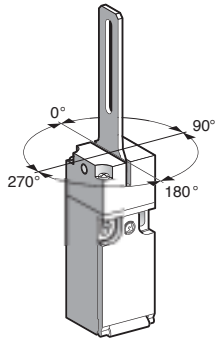
- plastic case, narrow, with 1 bottom conduit entry for XCSPL,
- plastic case, wide, with 2 side conduit entries for XCSTL.

2 Types of Operating Levers

Straight or elbowed (flush with rear of switch), making the safety interlock switches suitable for use with all types of hinged guards, whether:

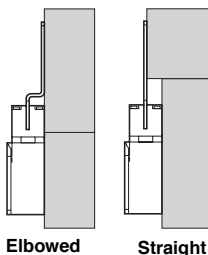
- flush with the machine framework (use a switch with an elbowed flush lever),
- overhanging the machine framework (use a switch with a straight lever).

3 orientation alternatives for the operating lever allow the safety interlock switches to be used with guards that open to the left, center, or right.



XCSPL

XCSTL



Elbowed

Straight

Contact Configurations

XCSPL rotary lever operating head safety interlock switches incorporate a 2-pole (N.C. + N.O. break before make or N.C. + N.C.) contact block with positive opening operation.

XCSTL rotary lever operating head safety interlock switches incorporate a 3-pole (N.C. + N.O. + N.O. or N.C. + N.C. + N.O., or N.C. + N.C. + N.C.) contact block with positive opening operation.

Opening of the N.C. safety contact(s) occurs when the operating lever is displaced by an angle equal to or greater than 5°.

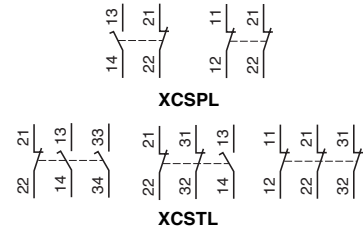
NOTE: Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signaling—NOT for safety functions.

Applications

These safety interlock switches provide a solution for monitoring hinged protective covers with small opening radius, used on machines with low inertia (no rundown time) where access time is less than stop time.

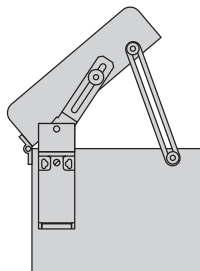
They are specially suited for existing machines which need to be brought in-line with the latest standards and directives since they can be used in conjunction with the existing covers, even if their mounting is somewhat imprecise.

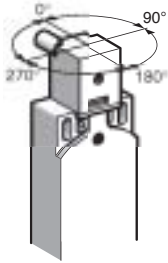
The mounting of the safety interlock switch improves the machine operator's level of safety by limiting the opening of the protective cover and reducing the risk of touching any moving parts before they have come to a stop.



XCSPL

XCSTL





Plastic Body with Rotary Shaft

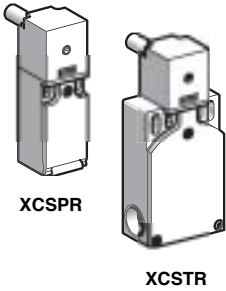
Turret Head

Safety interlock switches with rotary a shaft incorporate a turret operating head that can be rotated through 360° in 90° steps.

Two supplementary self-locking tamper-proof screws are included with each switch for permanent mounting and direction of the head.

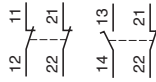
2 Body Versions

- plastic case, narrow, with 1 bottom conduit entry for XCSPR,
- plastic case, wide, with 2 side conduit entries for XCSTR.



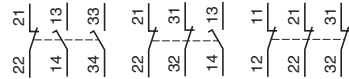
Contact Configurations

XCSPR rotary shaft operating head safety interlock switches incorporate a 2-pole (N.C. + N.O. break before make or N.C. + N.C.) contact block with positive opening operation.



XCSPR

XCSTR rotary shaft operating head safety interlock switches incorporate a 3-pole (N.C. + N.O. + N.O. or N.C. + N.C. + N.O., or N.C. + N.C. + N.C.) contact block with positive opening operation.

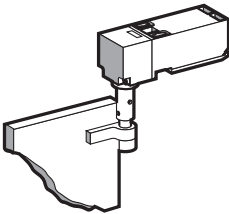


XCSTR

Opening of the N.C. safety contact(s) occurs when the operating lever or shaft is displaced by an angle equal to or greater than 5°.

NOTE: Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signaling—NOT for safety functions.

Applications



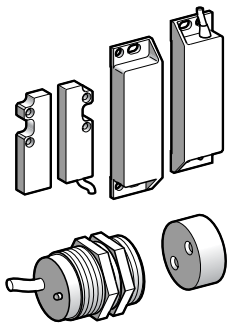
These safety interlock switches provide a solution for monitoring hinged protective covers, doors, or guards when used on machines with low inertia (no rundown time) where access time is less than stop time.

These safety interlock switches are used where it is not desired or possible to mount any hardware on the doors or guards themselves. The switch is mounted to the guard (door) frame with the shaft in the same axis as the guard's hinge pin. The pin from the guard hinge fits into the end of the shaft of the switch, and then this hinge pin is secured to the shaft by either a set screw or a roll pin. As the door is opened, the hinge pin and shaft of the switch turn, opening the contacts.

The standard shaft length of these switches is 1.18 in. (30 mm). A switch with an extended length shaft of 3.15 in. (80 mm) is also available. This is useful when the switch is mounted so that the shaft must go through a thick frame to reach the hinge pin. The extended shaft cannot be added as an accessory or replaced in the field. A complete switch must be ordered to get the extended shaft.

XCS Safety Interlock Switches

XCSDM



Non-Contact Magnetic Safety Interlocks

3 Body Versions

- XCSDMC small rectangular 2" x 0.63" x 0.27" (51 mm x 16 mm x 7 mm)
- XCSDMP large rectangular 3.46" x 98" x 0.51" (88 mm x 25 mm x 13 mm)
- XCSDMR cylindrical 1.18" x 1.52" (30 mm x 38.5 mm)

The body material is a PBT thermoplastic.

Contact Configurations

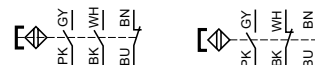
XCSDMC and XCSDMR are available with a 2-pole (1 N.O. + 1 N.C. or 2 N.C.) reed contact block.

XCSDMP is available with a 3-pole (2 N.O. + 1 N.C. or 1 N.O. + 2 N.C.) reed contact block.

Any of the above contact blocks are available with an LED that illuminates when the guard is closed.



XCSDMC and XCSDMR



XCSDMP

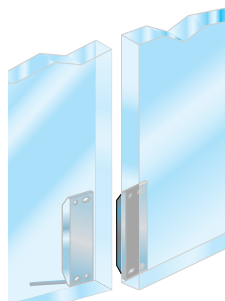
Wiring

To be used in safety circuits, the XCSDM devices must be wired in conjunction with an XPS safety relay.

Applications

These non-contact safety interlock switches are used for several different reasons:

- Multiple operating directions for actuating key allow for maximum flexibility of mounting options.
- Alignment between switch and actuating key is not critical, allows for door mis-alignment and vibration.
- Small size and profile allows freedom of installation location; can be mounted virtually anywhere.
- No inherent operating force eliminates damage to door or guard due to door interlocking issues reducing downtime.
- Magnetic actuating keys are lightweight (as little as 0.3 ounces) reducing stress and potential for damage to clear acrylic doors.
- Tolerates gate or guard alignment problems reducing downtime and damage to switch components.



XCS Safety Interlock Switches Specifications

General Characteristics (Metal, Turret Head, Types XCSA, XCSB, XCSC, XCSE, XCSL; Plastic, Double Insulated, Turret Head, Types XCSMP, XCSPA, XCSTA, XCSPL, XCSPPR, XCSTL, XCSTR, and XCSTE) Complies with international and domestic safety standards. OSHA 1910, IEC/EN 60204-1, VDE 0660, ANSI B11.19, INRS (France), EN 1088, EN 292

Environment		
Safety Interlock Type	XCSA, XCSB, XCSC, XCSE, XCSL (metal)	XCSMP, XCSPA, XCSTA, XCSPL, XCSPPR, XCSTL, XCSTR, XCSTE (plastic)
Conforming to standards	Products	EC/EN 60947-5-1, UL 508, CSA C22-2 N° 14
	Machine assemblies	IEC/EN 60204-1, EN 1088, EN 292
Product certifications	UL, CSA, BG, TUV	
Ambient air temperatures ▲	Operation: -13° F to 158° F (-25° C to 70° C), XCSE: -13 to 104 °F (-25 to 40 °C), XCSTE: -13 to 140 °F (-25 to 60 °C); Storage -40 to 158 °F (-40 to 70 °C), XCSMP: -13 to 176 °F (-25 to 80 °C)	
Vibration resistance	5 gn (10 to 500 Hz) conforming to IEC 60068-2-6, XCSMP: 6 gn (10 to 55 Hz)	
Shock resistance	10 gn (duration 11 ms) conforming to IEC 60068-2-27, XCSL: 20 gn conforming to IEC 600068-2-27, XCSMP: 50 gn (duration 11 ms)	
Electric shock protection	Class 1 conforming to IEC/EN 60536	Class 2 conforming to IEC/EN 60536
Degree of protection ■	IP 67 conforming to IEC/EN 60529 and IEC/EN 60947-5-1; Metal: Type 4, 4X, 12; Plastic: Type 4 and 4X Indoor, 12 XCSL: NEMA 1, 2, 3, 4, 12	
Conduit entry	1 entry with 1/2 in. NPT on XCSA, XCSB, XCSC, XCSL 2 entries with 1/2" NPT on XCSE	1 entry with 1/2 in. NPT on XCSPA, XCSPL, XCSPPR 1 entry for 1/2 in. conduit adapter on XCSTE 2 entries for 1/2 in. conduit adapter on XCSTA, XCSTL, XCSTR Pre-wired with cable: XCSMP

- The enclosure rating for these switches is for the protection of the live electrical components. During installation and operation, precautions must be taken to prevent any ingress of contaminants, particles, and corrosives, including liquids containing solids, from entering into the actuating key area. If precautions are not taken, switches may not perform to published specifications. Use in a salt atmosphere is not recommended.
- ▲ Minimum temperature: The minimum temperatures listed are based on the absence of freezing moisture or water. Care should be taken to avoid sub-freezing temperatures where dripping or splashing water is present and to avoid bringing a cold device into a humid atmosphere and then back into sub-freezing temperatures. The water or moisture may freeze around internal or external components and prevent it from performing as intended.

Electrical Characteristics Complete Switches

Electrical contact rating	XCSA, XCSB, XCSC, XCSL, XCSPA, XCSTA, XCSPL, XCSPPR, XCSTL, XCSTR: ~ AC-15, A300: Ue=240 V, Ie=3 A or Ue = 120 V, Ie = 6 A; XCSE, XCSTE: ~ AC-15, B300: Ue = 240 V, Ie = 1.5 A or Ue = 120 V, Ie = 3 A, XCSMP: ~ AC-15, C300: Ue = 240V, Ie = 0.75 A or Ue = 120 V, Ie = 1.5 A All models: = DC-13, Q300: Ue = 250 V, Ie = 0.27 A or Ue = 125 V, Ie = 0.55 A conforming to IEC/EN 60947-5-1
Rated thermal current in enclosure	XCSA, XCSB, XCSC, XCSL, XCSPA, XCSPL, XCSPPR, XCSTA, XCSTL, XCSTR: Ithe = 10 A. XCSE, XCSTE: Ithe: 6 A, XCSMP: Ithe = 2.5 A
Rated insulation voltage	Ui = 500 V conforming to IEC/EN 60947-5-1 Ui = 300 V conforming to UL 508, CSA C22-2 no. 14
Rated impulse withstand voltage	XCSA, XCSB, XCSC, XCSL, XCSPA, XCSTA, XCSPL, XCSPPR, XCSTL, XCSTR: U imp = 6 kV conforming to IEC 60947-5-1; XCSE, XCSMP, XCSTE: U imp = 4 kV conforming to IEC 60947-5-1
Positive opening contacts	Positive opening N.C. contacts meets the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (direct opening action).
Resistance across terminals	≤30 mΩ conforming to IEC/EN 60947-5-4
Short-circuit protection	10 A Class CC fuse. Outside U.S. use cartridge fuse type gG (gl)
Wiring	Screw clamp terminals. Terminal capacity, min.: 1 #20 AWG (1 x 1.05 mm ²), max.: 2 #16 AWG (2 x 1.5 mm ²), XCSMP: prewired with 4 #20 AWG (4 x 0.5 mm ²), or 6 #20 AWG (6 x 0.5 mm ²)

AC Voltage and Current Ratings 50-60 Hz

Contact Rating Designation	Thermal Continuous Test Current, Amperes	Maximum Current, Amperes								Voltamperes	
		120 Volts		240 Volts		480 Volts		600 Volts		Make	Break
		Make	Break	Make	Break	Make	Break	Make	Break		
A300	10	60	6.00	30	3.00	...	...	...	...	7200	720
B300	5	30	3.00	15	1.50	...	...	...	...	3600	360
C300	2.5	15	1.5	7.5	0.75	...	...	...	...	1800	180

DC Voltage and Current Ratings

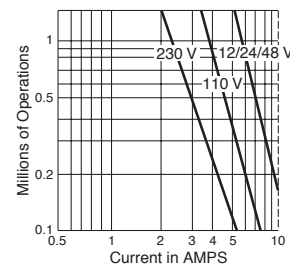
Contact Rating Designation	Thermal Continuous Test Current, Amperes	Maximum Make or Break Current, Amperes			Make or Break at 300 Volts or Less, Voltamperes
		125 Volts	250 Volts	301 to 600 Volts	
Q300	2.5	0.55	0.27	...	69

Electrical Life

Conforming to IEC 60947-5-1 Appendix C.Utilization categories AC-15 and DC-13.
Maximum operating rate: 3600 operating cycles per hour.Load factor: 0.5.

AC Supply	DC Supply			
50/60 Hz inductive circuit	Power broken in W for 1 million operating cycles			
	Voltage V	24	48	120
	Power W	13	9	7

The product life expressed is based on average usage and normal operating conditions. Actual operating life will vary with conditions. The above statements are not intended to nor shall they create any express or implied warranties as to product operation or life. For information on the limited warranty offered on this product please refer to the Square D terms and conditions of sale found in the Square D Digest.



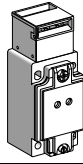



XCS Safety Interlock Switches

XCS Safety Interlock Switches Selection

Metal, Turret Head ■, Type XCSA, Non-Locking, Conduit Entry Tapped 1/2" NPT

Reference of switches without actuating key

Positive opening N.C. contacts meets the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (direct opening action).

Type of Switch		Without Locking of Actuating Key		
				
LED indication on opening of N.C. contacts		Without LED	1 orange LED 24/48 Vac or Vdc	1 orange LED 110/240 Vac
N.C. + N.O. + N.O. slow break † ★		XCSA503 (↻)	XCSA513 (↻)	XCSA523 (↻)
N.C. + N.C. + N.O. slow break † ★		XCSA703 (↻)	XCSA713 (↻)	XCSA723 (↻)
N.C. + N.C. + N.C. slow break †		XCSA803 (↻)	—	—
Weight (oz.)		15.5 (0.440 kg)		

■ 90° increments throughout 360°

† Schematic diagrams shown represent the contact state while the actuating key is fully inserted and engaged in the head of the switch.

★ The N.O. contacts will close after the N.C. contacts open. They do not change state simultaneously.

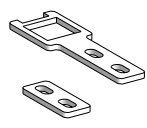
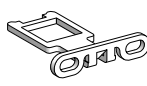
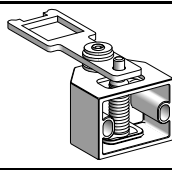
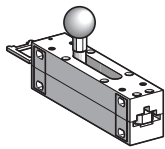
Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signalling – NOT for safety functions.

The only replacement parts or components available are covers and LED indicator modules. These devices are not to be repaired or adjusted. The complete switch should be replaced.

Complementary Characteristics (not shown under general characteristics)

Actuation Speed	Maximum: 19.7 in/s (0.5 m/s), Minimum: 0.39 in/s (0.01 m/s)
Maximum Operating Rate	For maximum life: 600 operating cycles per hour
Minimum Force for Positive Opening	4.5 lbs (20 N)
Conduit Entry	XCSA: 1 entry. Conduit entry tapped for 1/2" NPT

References for Actuating Keys

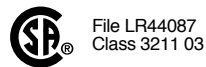
				
Description	Straight Key	Wide Key	Pivoting Key	Sliding Bolt Actuating Key
For switches XCSA, B, C, E	XCSZ01	XCSZ02	XCSZ03	XCSZ05
Weight (oz.)	1.0 (0.028 kg)	1.0 (0.028 kg)	3.3 (0.095 kg)	21.2 (0.600 kg)

The devices above are available with metric conduit.

- To order devices tapped for 13 mm cable gland, conforming to NF C 68-300 (DIN Pg 13.5): Change the last character in the part number to 1
For example: XCSA723 is changed to XCSA721
- To order devices tapped for M20 x 1.5 for ISO cable gland: Change the last character in the part number to 2
For example: XCSA723 is changed to XCSA722

When designing a door or gate guarding system, these guidelines must be followed:

- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold the door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided. (EN 1088 - 1995: 5.2.2)
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached to cables, cords or chains.




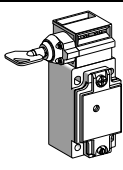














Acceptable Wire Sizes 14-20 AWG
Terminal Clamp Torque . . . 7 in.lbs
Application Information. . . . 40-54
Specifications 55
Accessories and
Spare Parts. 63
Connectors. 65
Wiring 71-76
Dimensions. 66-68

XCS Safety Interlock Switches Selection

Metal, Turret Head ■, Types XCSB and XCSC, Locking, Conduit Entry Tapped 1/2" NPT

Reference of switches without actuating key

Positive opening N.C. contacts meets the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (positive opening action).

Type of Switch	With Locking, Push Button Unlocking ●			With Locking, Manual Unlocking ▼		
						
LED indication on opening of N.C. contacts	Without LED	1 orange LED 24/48 Vac or Vdc	1 orange LED 110/240 Vac	Without LED	1 orange LED 24/48 Vac or Vdc	1 orange LED 110/240 Vac
N.C. + N.O. + N.O. slow break † ★	 XCSB503	 XCSB513	 XCSB523	 XCSC503	 XCSC513	 XCSC523
N.C. + N.C. + N.O. slow break † ★	 XCSB703	 XCSB713	 XCSB723	 XCSC703	 XCSC713	 XCSC723
N.C. + N.C. + N.C. slow break †	 XCSB803	—	—	 XCSC803	—	—
Weight (oz.)	17 (0.480 kg)			17 (0.480 kg)		

- 90° increments throughout 360°
- ▼ Unlocking by tubular high security key operated lock
- † Schematic diagrams shown represent the contact state while the actuating key is fully inserted and engaged in the head of the switch.
- ★ The N.O. contacts will close after the N.C. contacts open. They do not change state simultaneously.
- When the locking mechanisms (push button or tubular high security key operated lock) are operated, the actuating key is unlocked and is free to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed from the switch.

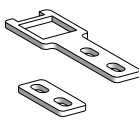
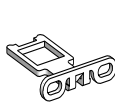
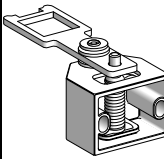
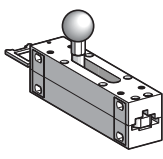
Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signalling – NOT for safety functions.

The only replacement parts or components available are covers and LED indicator modules. These devices are not to be repaired or adjusted. The complete switch should be replaced.

Complementary Characteristics (not shown under general characteristics)

Actuation Speed	Maximum: 19.7 in/s (0.5 m/s), Minimum: 0.39 in/s (0.01 m/s)
Resistance to Forcible Actuating Key Withdrawal	XCSC and XCSB: >337 lbs. (1500 N)
Maximum Operating Rate	For maximum life: 600 operating cycles per hour
Minimum Force for Positive Opening	4.5 lbs (20 N)
Conduit Entry	XCSB, XCSC: 1 entry. Conduit entry tapped for 1/2 NPT

References for Actuating Keys

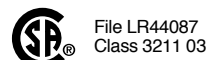
				
Description	Straight Key	Wide Key	Pivoting Key	Sliding Bolt Actuating Key
For switches XCSA, B, C, E	XCSZ01	XCSZ02	XCSZ03	XCSZ05
Weight (oz.)	1.0 (0.028 kg)	1.0 (0.028 kg)	3.3 (0.095 kg)	21.2 (0.600 kg)

The devices above are available with metric conduit.

- To order devices tapped for 13 mm cable gland, conforming to NF C 68-300 (DIN Pg 13.5): Change the last character in the part number to 1
For example: XCSC723 is changed to XCSC721
- To order devices tapped for M20 x 1.5 for ISO cable gland: Change the last character in the part number to 2
For example: XCSC723 is changed to XCSC722

When designing a door or gate guarding system, these guidelines must be followed:

- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold the door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995: 5.2.2).
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached to cables, cords or chains.



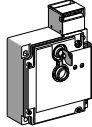



Acceptable Wire Sizes 14-20 AWG
Terminal Clamp Torque . . . 7 in.lbs
Application Information . . . 40-54
Specifications55
Accessories and
Spare Parts63
Connectors65
Wiring71-76
Dimensions66-68

XCS Safety Interlock Switches Selection

Metal, Turret Head ■, Type XCSE, Locking Without Power, Conduit Entry Tapped 1/2" NPT

References of switches without actuating key (select actuating key from page 64)

Positive opening N.C. contacts meet the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (positive opening action).

Type of Switch	With Interlocking, Locking by Electromagnet ●				
					
Type of interlocking	Locking Without Power. Actuating key locks into switch when inserted. This is typically preferred as the door is secured regardless of electrical power availability or power failure. Applying power to the electromagnet will unlock actuating key and allow it to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed.				
LED indication	Orange LED: "guard open" signalling		Green LED: "guard closed and locked" signalling		
Supply voltage of electromagnet	24 Vac or Vdc	48 Vac or Vdc	110/120 Vac or Vdc †	220/240 Vac or Vdc †	
N.C. + N.O. + N.O. (2 N.O. staggered) slow break ‡ ★		XCSE5313 (→)	XCSE5323 (→)	XCSE5333 (→)	XCSE5343 (→)
N.C. + N.C. + N.O. (N.O. staggered) slow break ‡ ★		XCSE7313 (→)	XCSE7323 (→)	XCSE7333 (→)	XCSE7343 (→)
N.C. + N.C. + N.C. slow break ‡ ▲		XCSE8313 (→)	XCSE8323 (→)	XCSE8333 (→)	XCSE8343 (→)
Weight (oz.)	40 (1.140 kg)	40 (1.140 kg)	40 (1.140 kg)	40 (1.140 kg)	

■ 90° increments throughout 360°

● A tubular high security key operated lock allows the forced opening of the guard in an emergency situation. When the tubular high security key is turned to the unlock position, the actuating key is unlocked and is free to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed from the switch.

† For use on 110/120 Vac/dc or 220/240 Vac/dc, remove the LED indicator module.

‡ Schematic diagrams shown represent the contact states while the actuating key is fully inserted and engaged in the head of the switch.

★ The N.O. contacts will close after the N.C. contacts open. They do not change state simultaneously.

▲ Devices with N.C. contacts only are supplied with a single green LED.

Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signalling – NOT for safety functions.

The only replacement parts or components available are covers and LED indicator modules. These devices are not to be repaired or adjusted. The complete switch should be replaced.

Complementary Characteristics (not shown under general characteristics)

Actuation Speed	Maximum: 19.7 in/s (0.5 m/s), Minimum: 0.39 in/s (0.01 m/s)
Resistance to Forcible Key Withdrawal	XCSE: 450 lbs. (2000 N)
Maximum Operating Rate	For maximum life: 600 operating cycles per hour, i.e.: 10/min. (or once in 6 seconds)
Minimum Force for Positive Opening	4.5 lbs (20 N)
Conduit Entry	XCSE: 2 entries. Conduit entries tapped for 1/2" NPT

Electromagnet Characteristics

Load Factor	100%			
Rated Operational Voltage	24 Vac or Vdc	48 Vac or Vdc	110/120 Vac or Vdc	220/240 Vac or Vdc
Voltage Limits	-20%, +10% of the rated operational voltage (including ripple on) conforming to IEC 60947-1			
Consumption	Inrush: 10 VA. Sealed: 10 VA			

LED Indicator Characteristics

Rated Insulation Voltage	50 V conforming to IEC 60947-1	250 V conforming to IEC 60947-1
Current Consumption	7 mA	7 mA
Rated Operational Voltage	24/48 Vac or Vdc	110/240 Vac
Voltage Limits	20...52 Vac or Vdc (including ripple)	95...264 Vac (including ripple)
Protection Against Over voltages	Yes	Yes

The devices above are available with metric conduit.

- To order devices tapped for 13mm cable gland, conforming to NF C 68-300 (DIN Pg 13.5): Change the last character in the part number to 1
For example: XCSE7333 is changed to XCSE7331
- To order devices tapped for M20 x 1.5 for ISO cable gland: Change the last character in the part number to 2
For example: XCSE7333 is changed to XCSE7332

When designing a door or gate guarding system, these guidelines must be followed:

- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold the door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995: 5.2.2).
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached to cables, cords or chains.



File E164353
CCN NKCR



File LR44087
Class 3211 03



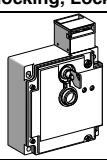












Acceptable Wire Sizes 14-20 AWG	
Terminal Clamp Torque . . . 7 in.lbs	
Application Information . . . 40-54	
Specifications . . . 55	
Accessories and	
Spare Parts . . . 63	
Connectors . . . 65	
Wiring . . . 71-76	
Dimensions . . . 66-68	

XCS Safety Interlock Switches Selection

Metal, Turret Head ■, Type XCSE, Locking With Power, Conduit Entry Tapped 1/2" NPT

References of switches without actuating key (select actuating key from page 56)

Positive opening N.C. contacts meets the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (positive opening action).

Type of Switch	With Interlocking, Locking by Electromagnet ●			
				
Type of interlocking	Locking With Power. Actuating key locks into switch <i>only</i> when actuating key is inserted <i>and</i> power is applied to the electromagnet. Door or guard is not locked in the event of a power failure or when power is removed from the electro-magnet. Removing power from the electromagnet will unlock actuating key and allow it to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed.			
Note: Locking with power devices does not meet European standards regarding the safety of machinery, especially EN 1088 regarding guard locking. European standards do not allow a "locking with power" function for gate or door guarding/locking. Locking without power devices meets European requirements, and should be used when machinery is to be shipped to Europe or where machinery must meet European standards.				
LED indication	Orange LED: "guard open" signaling		Green LED: "guard closed and locked" signaling	
Supply voltage of electromagnet	24 Vac or Vdc	48 Vac or Vdc	110/120 Vac or Vdc †	220/240 Vac or Vdc †
N.C. + N.O. + N.O. (2 N.O. staggered) slow break ‡ ★	 XCSE5513 (→)	 XCSE5523 (→)	 XCSE5533 (→)	 XCSE5543 (→)
N.C. + N.C. + N.O. (N.O. staggered) slow break ‡ ★	 XCSE7513 (→)	 XCSE7523 (→)	 XCSE7533 (→)	 XCSE7543 (→)
N.C. + N.C. + N.C. slow break ‡ ▲	 XCSE8513 (→)	 XCSE8523 (→)	 XCSE8533 (→)	 XCSE8543 (→)
Weight (oz.)	40 (1.140 kg)	40 (1.140 kg)	40 (1.140 kg)	40 (1.140 kg)

■ 90° increments throughout 360°

● A tubular high security key operated lock allows the forced opening of the guard in an emergency situation. When the tubular high security key is turned to the unlock position, the actuating key is unlocked and is free to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed from the switch.

† For use on 110/120 Vdc or 220/240 Vdc, remove the LED indicator module.

‡ Schematic diagrams shown represent the contact states while the actuating key is fully inserted and engaged in the head of the switch.

★ The N.O. contacts will close after the N.C. contacts open. They do not change state simultaneously.

▲ Devices with N.C. contacts only are supplied with a single green LED.

Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signaling – NOT for safety functions.

The only replacement parts or components available are covers and LED indicator modules. These devices are not to be repaired or adjusted. The complete switch should be replaced.

Complementary Characteristics (not shown under general characteristics)

Actuation Speed	Maximum: 19.7 in/s (0.5 m/s), Minimum: 0.39 in/s (0.01 m/s)
Resistance to Forcible Key Withdrawal	XCSE: 450 lbs. (2000 N)
Maximum Operating Rate	For maximum life: 600 operating cycles per hour, i.e.: 10/min. (or once in 6 seconds)
Minimum Force for Positive Opening	4.5 lbs (20 N)
Conduit Entry	XCSE: 2 entries. Conduit entries tapped for 1/2" NPT

Electromagnet Characteristics

Load Factor	100%			
Rated Operational Voltage	24 Vac or Vdc	48 Vac or Vdc	110/120 Vac or Vdc	220/240 Vac or Vdc
Voltage Limits	-20%, +10% of the rated operational voltage (including ripple on) conforming to IEC 60947-1			
Consumption	Inrush: 10 VA. Sealed: 10 VA			

LED Indicator Characteristics

Rated Insulation Voltage	50 V conforming to IEC 60947-1	250 V conforming to IEC 60947-1
Current Consumption	7 mA	7 mA
Rated Operational Voltage	24/48 Vac or Vdc	110/240 Vac
Voltage Limits	20...52 Vac or Vdc (including ripple)	95...264 Vac (including ripple)
Protection Against Over voltages	Yes	Yes

The devices above are available with metric conduit.

• To order devices tapped for 13 mm cable gland, conforming to NF C 68-300 (DIN Pg 13.5): Change the last character in the part number to 1
For example: XCSE7533 is changed to XCSE7531

• To order devices tapped for M20 x 1.5 for ISO cable gland: Change the last character in the part number to 2
For example: XCSE7533 is changed to XCSE7532

When designing a door or gate guarding system, these guidelines must be followed:

- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995: 5.2.2).
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached to cables, cords or chains.



File E164353
CCN NKCR

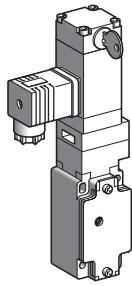


File LR44087
Class 3211 03

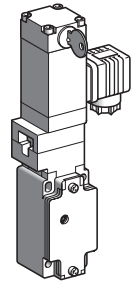


Acceptable Wire Sizes 14-20 AWG
Terminal Clamp Torque . . . 7 in.lbs
Application Information. . . . 40-54
Specifications. 55
Accessories and
Spare Parts. 63
Connectors. 65
Wiring. 71-76
Dimensions. 66-68

XCS Safety Interlock Switches Selection



XCSL764F3



XCSL766F3

Metal, Type XCSL, Conduit Entry Tapped 1/2 NPT - Locking Without Power

References of switches without actuating key (select actuating key from page 64)

Positive opening N.C. contacts meet the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (positive opening action).

Standard devices are shown on pages 60 and 61. If these devices do not meet your application requirements, refer to page 62 to build a part number.

Type of Switch	With Interlocking, Locking by Electromagnet ●						
Type of interlocking	Locking Without Power. Actuating key locks into switch when inserted. This is typically preferred as the door is secured regardless of electrical power availability or power failure. Applying power to the electromagnet will unlock actuating key and allow it to be removed from the switch. Applying power to the electromagnet will open the N.C. safety contacts as well.						
Position of Head (for actuating key)	To Right			To Left			
Position of Electromagnet Connector	To Left			To Right			
Position of Ronis key release lock	Front			Front			
LED indication	Orange LED: "guard open" signaling						
Supply voltage of electromagnet	24 Vdc	120 Vac or Vdc †	230 Vac or Vdc †	24 Vdc	120 Vac or Vdc †	230 Vac or Vdc †	
N.C. + N.O. + N.O. (2 N.O. staggered) slow break ‡ ★		XCSL564B3 ⊖	XCSL564F3 ⊖	XCSL564M3 ⊖	XCSL566B3 ⊖	XCSL566F3 ⊖	XCSL566M3 ⊖
N.C. + N.C. + N.O. (N.O. staggered) slow break ‡ ★		XCSL764B3 ⊖	XCSL764F3 ⊖	XCSL764M3 ⊖	XCSL766B3 ⊖	XCSL766F3 ⊖	XCSL766M3 ⊖
Weight (oz.)	32 (0.920 kg)	32 (0.920 kg)	32 (0.920 kg)	32 (0.920 kg)	32 (0.920 kg)	32 (0.920 kg)	

● A Ronis key operated lock allows the forced opening of the guard in an emergency situation. When the Ronis key is turned to the unlock position, the actuating key is unlocked and is free to be removed from the switch. The N.C. safety contacts will open when the Ronis key is turned to the unlock position as well.

† For use on 110/120 Vdc or 220/240 Vdc, remove the LED indicator module.

‡ Schematic diagrams shown represent the contact states while the actuating key is fully inserted and engaged in the head of the switch.

★ The N.O. contacts will close after the N.C. contacts open. They do not change state simultaneously.

Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signalling – NOT for safety functions.

Actuating head, solenoid and related components are NOT field convertible and should not be rotated or modified.

The only replacement parts or components available are covers and LED indicator modules. **These devices are not to be repaired or adjusted.** The complete switch should be replaced.

Complementary Characteristics (not shown under general characteristics)

Actuation speed	Maximum: 19.7 in/s (0.5 m/s), Minimum: 0.39 in/s (0.01 m/s)
Resistance to Forcible Key Withdrawal	XCSL: 337 lbs. (1500 N)
Maximum Operating Rate	For maximum life: 600 operating cycles per hour, i.e.: 10/min. (or once in 6 seconds)
Minimum Force for Positive Opening	4.5 lbs (20 N)
Conduit Entry	XCSL: 1 entry. Conduit entry tapped for 1/2 NPT

Electromagnet Characteristics

DC electromagnet is supplied on all XCSL models. For use with an AC power supply, a bridge rectifier is supplied in the connector on all AC devices.

Load Factor	100%		
Rated Operational Voltage	24 Vac or Vdc	110/120 Vac or Vdc	220/240 Vac or Vdc
Voltage Limits	-10%, +10% of the rated operational voltage (including ripple on) conforming to IEC 60947-1		
Consumption	Inrush: 10 VA. Sealed: 10 VA		

LED Indicator Characteristics

Rated Operational Voltage	24 Vac or Vdc	110 Vac	220 Vac
Rated Insulation Voltage	50 V conforming to IEC 60947-1	250 V conforming to IEC 60947-1	
Current Consumption	7 mA	2.5 mA	5 mA
Voltage Limits	20...30 Vac or Vdc (including ripple)	95...130 Vac (including ripple)	190...260 Vac (including ripple)
Protection Against Over voltages	Yes	Yes	

The devices above are available with metric conduit.

- To order devices tapped for 13mm cable gland, conforming to NF C 68-300 (DIN Pg 13.5): Change the last character in the part number to 1
For example: XCSL764B3 is changed to XCSL764B1
- To order devices tapped for M20 x 1.5 for ISO cable gland: Change the last character in the part number to 2
For example: XCSL764B3 is changed to XCSL764B2

When designing a door or gate guarding system, these guidelines must be followed:

- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995: 5.2.2).
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached to cables, cords or chains.



File E164353
CCN NKCR



File LR44087
Class 3211 03



Acceptable Wire Sizes 14-20 AWG
Terminal Clamp Torque . . . 7 in.lbs
Application Information . . . 40-54
Specifications 55
Accessories and
Spare Parts 64
Connectors 65
Wiring 71-76
Dimensions 69-70

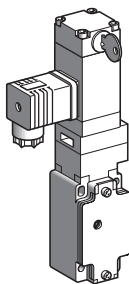
XCS Safety Interlock Switches Selection

Metal, Type XCSL, Conduit Entry Tapped 1/2 NPT - Locking With Power

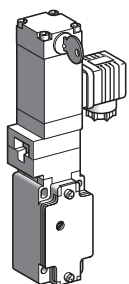
References of switches without actuating key (select actuating key from page 64)

Positive opening N.C. contacts meets the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (positive opening action).

Standard devices are shown on pages 60 and 61. If these devices do not meet your application requirements, refer to page 62 to build a part number.



XCSL784F3



XCSL786F3

Type of Switch	With Interlocking, Locking by Electromagnet ●					
Type of interlocking	Locking With Power. Actuating key locks into switch <i>only</i> when actuating key is inserted <i>and</i> power is applied to the electromagnet. Door or guard is not locked in the event of a power failure or when power is removed from the electromagnet. Removing power from the electromagnet will unlock actuating key and allow it to be removed from the switch. Removing power to the electromagnet will open the N.C. safety contacts as well.					
Note: Locking with power devices do not meet European standards regarding the safety of machinery, especially EN 1088 regarding guard locking. European standards do not allow a "locking with power" function for gate or door guarding/locking. Locking without power devices meet European requirements, and should be used when machinery is to be shipped to Europe or where machinery must meet European standards.						
Position of Head (for actuating key)	To Right			To Left		
Position of Electromagnet Connector	To Left			To Right		
Position of Ronis key release lock	Front			Front		
LED indication	Orange LED: "guard open" signaling					
Supply voltage of electromagnet	24 Vdc	120 Vac or Vdc †	230 Vac or Vdc †	24 Vdc	120 Vac or Vdc †	230 Vac or Vdc †
N.C. + N.O. + N.O. (2 N.O. staggered) slow break ‡ ★	XCSL584B3 ⊖	XCSL584F3 ⊖	XCSL584M3 ⊖	XCSL586B3 ⊖	XCSL586F3 ⊖	XCSL586M3 ⊖
N.C. + N.C. + N.O. (N.O. staggered) slow break ‡ ★	XCSL784B3 ⊖	XCSL784F3 ⊖	XCSL784M3 ⊖	XCSL786B3 ⊖	XCSL786F3 ⊖	XCSL786M3 ⊖
Weight (oz.)	32 (0.920 kg)	32 (0.920 kg)	32 (0.920 kg)	32 (0.920 kg)	32 (0.920 kg)	32 (0.920 kg)

● A Ronis key operated lock allows the forced opening of the guard in an emergency situation. When the Ronis key is turned to the unlock position, the actuating key is unlocked and is free to be removed from the switch. The N.C. safety contacts will open when the Ronis key is turned to the unlock position as well.

† For use on 110/120 Vdc or 220/240 Vdc, remove the LED indicator module.

‡ Schematic diagrams shown represent the contact states while the actuating key is fully inserted and engaged in the head of the switch.

★ The N.O. contacts will close after the N.C. contacts open. They do not change state simultaneously.

Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signalling – NOT for safety functions.

Actuating head, solenoid and related components are NOT field convertible and should not be rotated or modified.

The only replacement parts or components available are covers and LED indicator modules. **These devices are not to be repaired or adjusted.** The complete switch should be replaced.

Complementary Characteristics (not shown under general characteristics)

Actuation Speed	Maximum: 19.7 in/s (0.5 m/s), Minimum: 0.39 in/s (0.01 m/s)
Resistance to Forcible Key Withdrawal	XCSL: 337 lbs. (1500 N)
Maximum Operating Rate	For maximum life: 600 operating cycles per hour, i.e.: 10/min. (or once in 6 seconds)
Minimum Force for Positive Opening	4.5 lbs (20 N)
Conduit Entry	XCSL: 1 entry. Conduit entry tapped for 1/2 NPT

Electromagnet characteristics

DC electromagnet is supplied on all XCSL models. For use with an AC power supply, a bridge rectifier is supplied in the connector on all AC devices.

Load Factor	100%		
Rated Operational Voltage	24 Vac or Vdc	110/120 Vac or Vdc	220/240 Vac or Vdc
Voltage Limits	-10%, +10% of the rated operational voltage (including ripple on) conforming to IEC 60947-1		
Consumption	Inrush: 10 VA. Sealed: 10 VA		

LED Indicator Characteristics

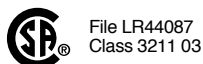
Rated Operational Voltage	24 Vac or Vdc	110/240 Vac	220 Vac
Rated Insulation Voltage	50 V conforming to IEC 60947-1	250 V conforming to IEC 60947-1	
Current Consumption	7 mA	7 mA	5 mA
Voltage Limits	20...30 Vac or Vdc (including ripple)	95...264 Vac (including ripple)	190...260 Vac (including ripple)
Protection Against Over voltages	Yes	Yes	

The devices above are available with metric conduit.

- To order devices tapped for 13mm cable gland, conforming to NF C 68-300 (DIN Pg 13.5): Change the last character in the part number to 1
For example: XCSL784B3 is changed to XCSL784B1
- To order devices tapped for M20 x 1.5 for ISO cable gland: Change the last character in the part number to 2
For example: XCSL784B3 is changed to XCSL784B2

When designing a door or gate guarding system, these guidelines must be followed:

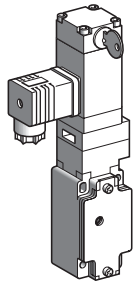
- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995: 5.2.2).
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached to cables, cords or chains.



Acceptable Wire Sizes 14-20 AWG

Terminal Clamp Torque	7 in.lbs
Application Information	40-54
Specifications	55
Accessories and Spare Parts	64
Connectors	65
Wiring	71-76
Dimensions	69-70

XCS Safety Interlock Switches Selection



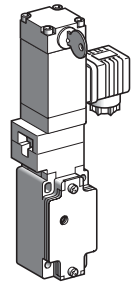
Metal, Type XCSL, Conduit Entry Tapped 1/2 NPT

References of switches without actuating key (select actuating key from page 64)

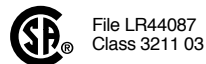
Positive opening N.C. contacts meets the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (positive opening action).

If the devices shown on pages 60 and 61 do not meet your application needs, use the table below to build a part number. A complete part number requires a code character from each of the following columns: Base Number, Ronis Key Position, Actuating Key and Connector, Electromagnet Voltage, and Conduit Connection. A code character column Connector is optional, and is only used if a connector is required for the application.

All devices have an Orange LED as standard.



	Base Number	Ronis Key Position	Actuating Key and Connector	Electromagnet Voltage	Conduit Connection	Connector (Optional)
Contact Arrangement						
N.C. + N.O. + N.O.	XCSL5					
N.C. + N.C. + N.O.	XCSL7					
Locking Without Power						
Ronis Key Position						
Front		6				
Right		2				
Left		0				
Back		4				
Locking With Power						
Note: A Ronis key lock is NOT provided on the Locking With Power devices.		8				
Actuating Key and Connector Position						
Actuating Key Position		Connector Position				
Front		Left	1			
		Right	2			
		Back	3			
Right		Left	4			
		Front	5			
		Right	6			
Left		Front	7			
		Left	8			
Back		Right	9			
		Front	0			
Electromagnet Supply Voltage						
24 Vdc				B		
110 Vac				F		
220 Vac				M		
Conduit Connection						
PG 13.5					1	
M20 x 1.5					2	
1/2 inch NPT					3	
Connector (optional)						
5 Pin Mini (LEDs not wired/powerd)						CA
6 Pin Mini (use with LEDs)						DA



Type of Interlocking

Locking Without Power. Actuating key locks into switch when inserted. This is typically preferred as the door is secured regardless of electrical power availability or power failure. Applying power to the electromagnet will unlock actuating key and allow it to be removed from the switch. Applying power to the electromagnet will open the N.C. safety contacts as well.

Locking With Power. Actuating key locks into switch *only* when actuating key is inserted *and* power is applied to the electromagnet. Door or guard is not locked in the event of a power failure or when power is removed from the electromagnet. Removing power from the electromagnet will unlock actuating key and allow it to be removed from the switch. Removing power to the electromagnet will open the N.C. safety contacts as well.

Note: Locking with power devices do not meet European standards regarding the safety of machinery, especially EN 1088 regarding guard locking. European standards do not allow a "locking with power" function for gate or door guarding/locking. Locking without power devices meet European requirements, and should be used when machinery is to be shipped to Europe or where machinery must meet European standards.

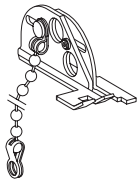
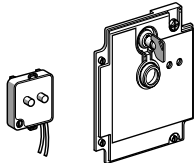
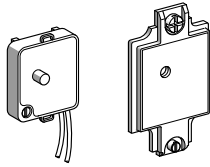
When designing a door or gate guarding system, these guidelines must be followed:

- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995: 5.2.2).
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached to cables, cords or chains.

Acceptable Wire Sizes 14-20 AWG
Terminal Clamp Torque . . . 7 in.lbs
Application Information . . . 40-54
Specifications . . . 55
Accessories and
Spare Parts . . . 64
Connectors . . . 65
Wiring . . . 71-76
Dimensions . . . 69-70

XCS Safety Interlock Switches Accessories and Spare Parts

References of Accessories and Spare Parts



XCSZ90

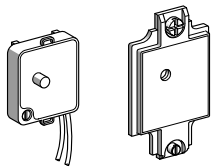
Description	For use with	Supply Voltage	Catalog Number	Weight oz. (kg)
Indicator light module, 1 orange LED with cover, seal, and 2 mounting screws	XCSA XCSB XCSC	24/48 Vac or Vdc	XCSZ31	1.4 (0.040)
		110/240 Vac	XCSZ32	1.4 (0.040)
Indicator light module, 1 orange LED + 1 green LED with cover, seal, 4 mounting screws, and lock ■	XCSE53 ●●	24/48 Vac or Vdc	XCSZ41	6.125 (0.175)
		110/240 Vac	XCSZ45	6.125 (0.175)
	XCSE55 ●●	24/48 Vac or Vdc	XCSZ42	6.125 (0.175)
		110/240 Vac	XCSZ46	6.125 (0.175)
	XCSE73 ●●	24/48 Vac or Vdc	XCSZ43	6.125 (0.175)
		110/240 Vac	XCSZ47	6.125 (0.175)
	XCSE75 ●●	24/48 Vac or Vdc	XCSZ44	6.125 (0.175)
		110/240 Vac	XCSZ48	6.125 (0.175)
Description	For use with	Positions of tubular high security key withdrawal from lock	Catalog Number	Weight oz. (kg)
Lock (+ 2 keys) mounted on cover, with seal and 4 mounting screws	XCSE53 ●●	LOCK: yes/UNLOCK: yes ■	XCSZ51	0.875 (0.025)
		LOCK: yes/UNLOCK: no	XCSZ55	0.875 (0.025)
		LOCK: no/UNLOCK: yes	XCSZ59	0.875 (0.025)
	XCSE55 ●●	LOCK: yes/UNLOCK: yes ■	XCSZ52	0.875 (0.025)
		LOCK: yes/UNLOCK: no	XCSZ56	0.875 (0.025)
		LOCK: no/UNLOCK: yes	XCSZ60	0.875 (0.025)
	XCSE73 ●●	LOCK: yes/UNLOCK: yes ■	XCSZ53	0.875 (0.025)
		LOCK: yes/UNLOCK: no	XCSZ57	0.875 (0.025)
		LOCK: no/UNLOCK: yes	XCSZ61	0.875 (0.025)
	XCSE75 ●●	LOCK: yes/UNLOCK: yes ■	XCSZ54	0.875 (0.025)
		LOCK: yes/UNLOCK: no	XCSZ58	0.875 (0.025)
		LOCK: no/UNLOCK: yes	XCSZ62	0.875 (0.025)
	XCSE83 ●●	LOCK: yes/UNLOCK: yes ■	XCSZ63	0.875 (0.025)
		LOCK: yes/UNLOCK: no	XCSZ64	0.875 (0.025)
		LOCK: no/UNLOCK: yes	XCSZ65	0.875 (0.025)
	XCSE85 ●●	LOCK: yes/UNLOCK: yes ■	XCSZ66	0.875 (0.025)
LOCK: yes/UNLOCK: no		XCSZ67	0.875 (0.025)	
LOCK: no/UNLOCK: yes		XCSZ68	0.875 (0.025)	
Padlock Attachment Prevents actuating key from entering switch. Note: Cannot be used as a lock-out tag-out means.	XCSA, XCSB, XCSC, XCSE		XCSZ90	2.22 (0.063)
Set of 10 blanking plugs for operating head slot	XCSA, XCSB, XCSC, XCSE		XCSZ27	1.75 (0.050)
Set of 10 pairs of tubular high security keys	XCSC, XCSE		XCSZ25	3.5 (0.100)

■ Lock supplied as standard with XCSE switches. Key withdrawal in both LOCK and UNLOCK positions.

The only replacement parts or components available are covers and LED indicator modules. These devices are not to be repaired or adjusted. The complete switch should be replaced.

XCS Safety Interlock Switches

Actuating Keys and Accessories



XCSZ33



BH206

ZCKJ921



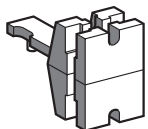
ZCKY071



ZCKY081



ZCKY091



ZCKY061



ZCKY101



ZCKZ01

For Use With XCSL Only

Description	Type	Catalog Number
Indicator light module, 1 orange LED with cover, seal, and 2 mounting screws.	24/48 Vac or Vdc	XCSZ33
	110/230 Vac	XCSZ34
Connector for electromagnet (supplied with switches as standard)	DC	ZCKJ921
	AC Contains a rectifier bridge inside connector for use on AC	ZCKJ922
Plug and cable assemblies mini-style 5 pins ▲	Cable 6' (2m) length	XSZCA1501Y
	Cable 12' (4m) length	XSZCA1502Y
Plug and cable assemblies mini-style 6 pins ▲	Cable 6' (2m) length	XSZCA1601Y
	Cable 12' (4m) length	XSZCA1602Y
Straight actuating key		ZCKY071
Actuating key for perpendicular fixing/mounting		ZCKY081
Adjustable actuating key for Horizontal movement		ZCKY091
Adjustable actuating key for Vertical movement		ZCKY061
Sliding bolt actuating key		ZCKY101
Overriding key: Ronis 520 key (sold in lots of 2)		Q9990912
Padlock attachment to lock into actuating key opening. Painted yellow. Prevents actuating key from entering switch. Note: Cannot be used as a lock-out tag-out means.		ZCKZ01

▲ More varieties and lengths of connector cables are available. See Sensors catalog # 9006CT0101.



File E164353
CCN NKCR



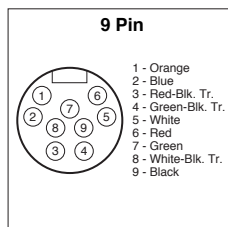
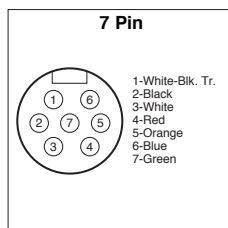
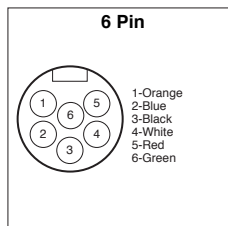
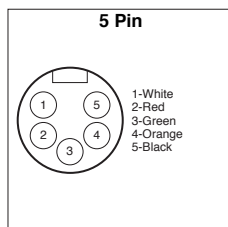
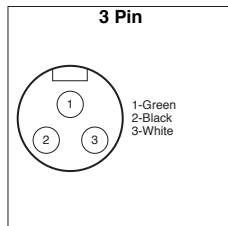
File LR44087
Class 3211 03



XCS Safety Interlock Switches Pre-wired Mini Connectors

Pre-Wired Mini Connectors for XCS Safety Interlocks

The XCS safety interlock switches are available with mini connectors in several different wiring schemes. Each wiring option shown below has a notation of which devices are available with that option. Add the following suffixes to the appropriate XCS catalog number. Only a small number of the pre-wiring options available are listed here. **Many other connectors and wiring schemes are available. New wiring schemes to meet your applications are available upon request.**



3 Pin: (for all XCS except XCSE, XCSMP, and XCSDM) Suffix AA			
Switch Terminals	Wire Color		
21	Black		
22	White		
Ground	Green		
5 Pin: (for all XCS except XCSE, XCSMP, and XCSDM) Suffix CA ■		5 Pin: (for XCSE) Suffix CC ■	
Switch Terminals	Wire Color	Switch Terminals	Wire Color
13	Orange	13	Orange
14	Red	14	Red
21	White	E1	White
22	Black	E2	Black
Ground	Green	Ground	Green
5 Pin: (for all XCS except XCSE, XCSMP, and XCSDM) Suffix CB ■		5 Pin: (for XCSE) Suffix CD ■	
Switch Terminals	Wire Color	Switch Terminals	Wire Color
13	White	13	White
14	Black	14	Black
21	Orange	E1	Orange
22	Red	E2	Red
Ground	Green	Ground	Green
6 Pin: (for all XCS with LED except for XCSE) Suffix DA			
Switch Terminals	Wire Color		
13	Orange		
14	Blue		
21	Red		
22	White		
X1	Black		
Ground	Green		
7 Pin: (for XCSE) Suffix EA ■		7 Pin: (for XCSE - locking without power) Suffix ED ■	
Switch Terminals	Wire Color	Switch Terminals	Wire Color
13	Orange	33	White
14	Red	34	Black
21	White	51	Orange
22	Black	X1	Red
Ground	Green	Ground	Green
E1	Blue	E1	Blue
E2	White with Black tracer/stripe	E2	White with Black tracer/stripe
7 Pin: (for XCSE) Suffix EB ■		Jumper between 52 and 21 (installed by Schneider Electric)	
Switch Terminals	Wire Color	Jumper between 22 and X2 (installed by Schneider Electric)	
13	White	Jumper between 34 and X3 (installed by Schneider Electric)	
14	Black		
21	Orange		
22	Red		
Ground	Green		
E1	Blue		
E2	White with Black tracer/stripe		
7 Pin: (for XCSE - locking without power) Suffix EC ■		7 Pin: (for XCSE) Suffix EE	
Switch Terminals	Wire Color	Switch Terminals	Wire Color
33	Orange	21	Orange
34	Red	22	Red
51	White	51	White
X1	Black	52	Black
Ground	Green	Ground	Green
E1	Blue	E1	Blue
E2	White with Black tracer/stripe	E2	White with Black tracer/stripe
9 Pin: (for XCSE) Suffix EF		9 Pin: (for XCSE) Suffix EF	
Switch Terminals	Wire Color	Switch Terminals	Wire Color
21	White	21	White
22	Black	22	Black
51	Orange	51	Orange
52	Red	52	Red
Ground	Green	Ground	Green
E1	Blue	E1	Blue
E2	White with Black tracer/stripe	E2	White with Black tracer/stripe
9 Pin: (for XCSE) Suffix GA ■		9 Pin: (for XCSE) Suffix GB ■	
Switch Terminals	Wire Color	Switch Terminals	Wire Color
13	Orange	13	White
14	Red	14	Black
21	White	21	Orange
22	Black	22	Red
Ground	Green	Ground	Green
51	Red with Black tracer/stripe	51	Red with Black tracer/stripe
52	Green with Black tracer/stripe	52	Green with Black tracer/stripe
E1	Blue	E1	Blue
E2	White with Black tracer/stripe	E2	White with Black tracer/stripe
9 Pin: (for XCSE) (Locking with Power) Suffix GC		9 Pin: (for XCSE) (Locking without Power) Suffix GD	
Switch Terminals	Wire Color	Switch Terminals	Wire Color
31	Orange	31	Orange
32	Red	32	Red
21	White	21	White
22	Black	22	Black
Ground	Green	Ground	Green
43	Red with Black tracer/stripe	51	Red with Black tracer/stripe
44	Green with Black tracer/stripe	52	Green with Black tracer/stripe
E1	Blue	E1	Blue
E2	White with Black tracer/stripe	E2	White with Black tracer/stripe

■ Not for XCS devices with all N.C. contacts. Device must have at least 1 N.O. contact.

NOTE: View of connectors shown above are the male views as it is installed in the switch.

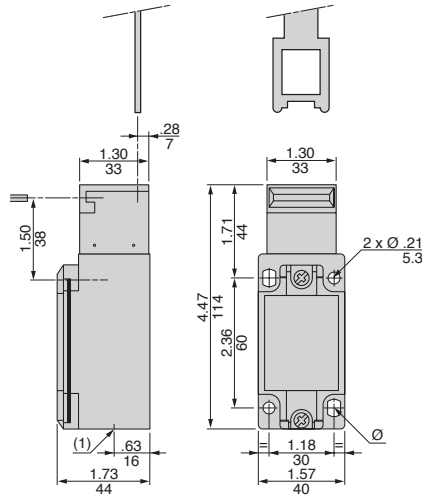
XCS Safety Interlock Switches

Dimensions

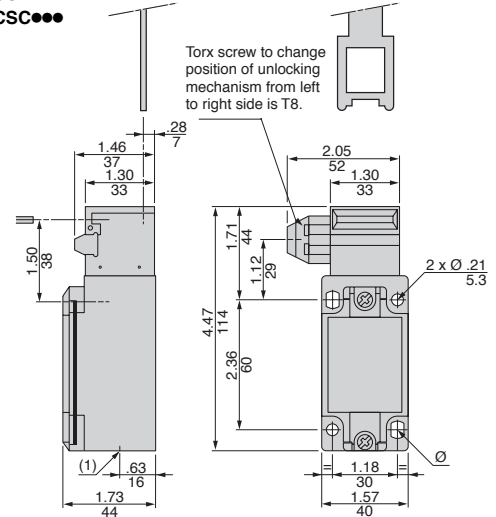
Metal, Turret Head, Types XCSA, XCSB, XCSC, and XCSE

NOTE: Metal, turret head, types XCSA, XCSB, XCSC, and XCSE

XCSA●●●



XCSB●●● XCSC●●●



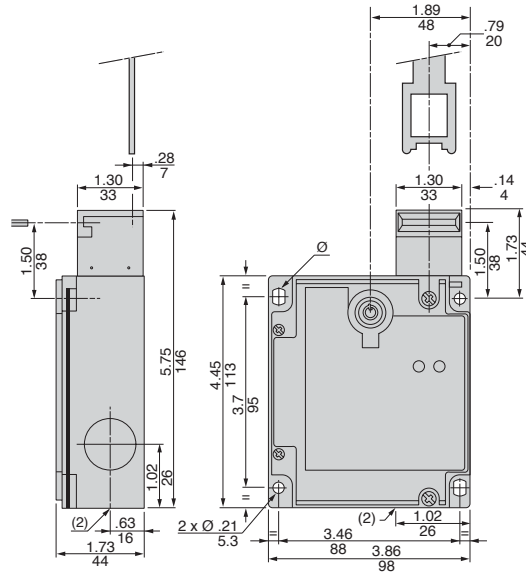
(1) 1/2" NPT Conduit Entry

Ø: 2 elongated holes 0.29" (7.3 mm) x 0.21" (5.3 mm)

(1) 1/2" NPT Conduit Entry

Ø: 2 elongated holes 0.29" (7.3 mm) x 0.21" (5.3 mm)

XCSE●●●●



(2) 1/2" NPT Conduit Entry

Ø: 2 elongated holes 0.29" (7.3 mm) x 0.21" (5.3 mm)

Dual Dimensions: INCHES
Millimeters

When designing a door or gate guarding system, these guidelines must be followed:

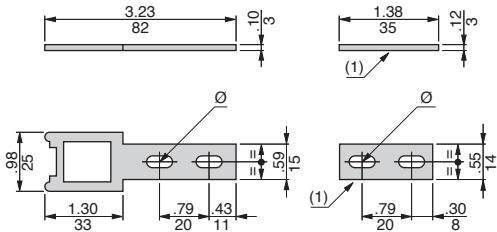
- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995: 5.2.2).
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached to cables, cords or chains.

XCS Safety Interlock Switches Dimensions

Actuating Keys For Metal, Turret Head, Types XCSA, XCSB, XCSC, and XCSE

Dimensions

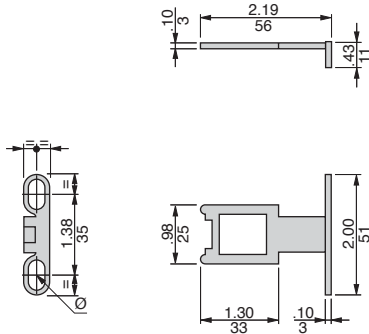
XCSZ01



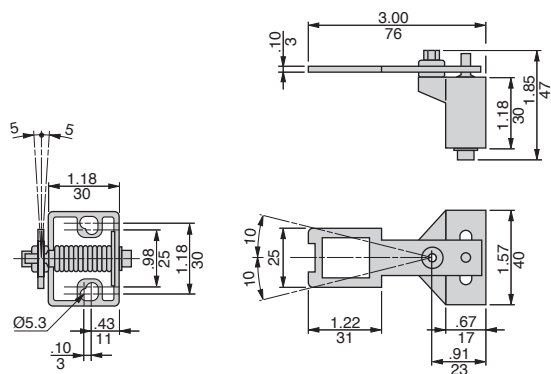
(1) Adapter (supplied with actuating key XCS-Z01) for replacing, without drilling additional mounting hole, an XCK-J safety interlock switch with actuating key ZCK-Y07 by an XCS-A, C or E safety interlock switch with actuating key XCS-Z01

Ø: 2 elongated holes 0.21" (5.3 mm) x 0.39" (10 mm)

XCSZ02

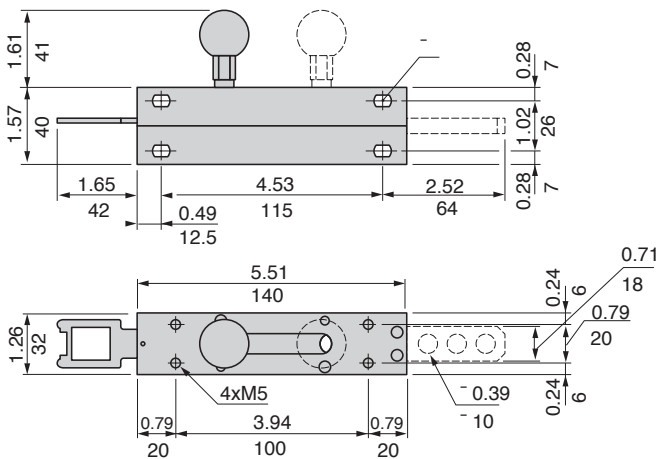


XCSZ03



Ø: 2 elongated holes 0.21" (5.3 mm) x 0.39" (10 mm)

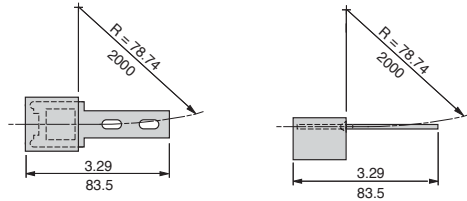
XCSZ05



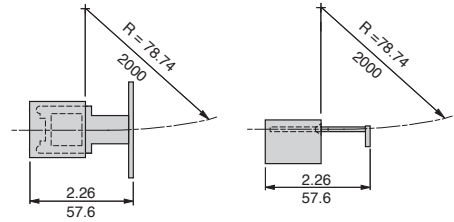
Ø: 4 elongated holes 0.21" (5.3 mm) x 0.39" (10 mm)

XCS Safety Interlock Switches Dimensions

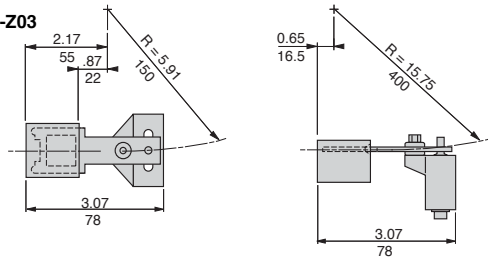
Operating Radius Required for Actuating Key XCSZ01



XCSZ02



XCS-Z03

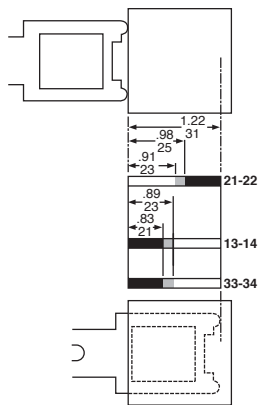


R = minimum radius

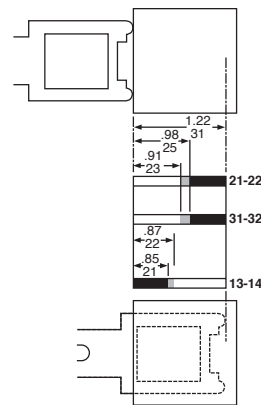
Contact Status Relative to Actuating Key Position

Function Diagrams

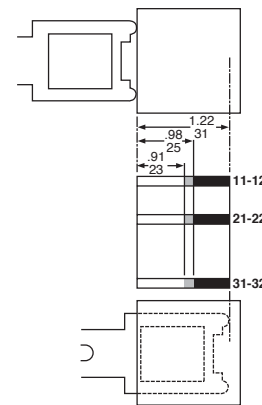
XCS●5●●●



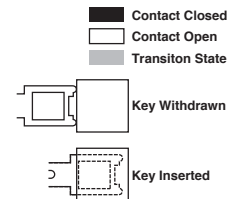
XCS●7●●●



XCS●8●●●



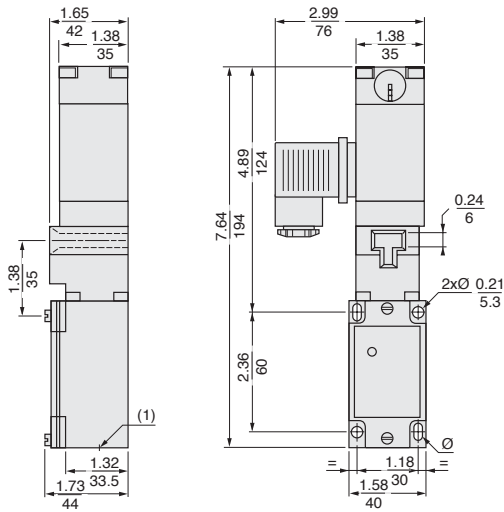
Contact Operation



XCS Safety Interlock Switches Dimensions

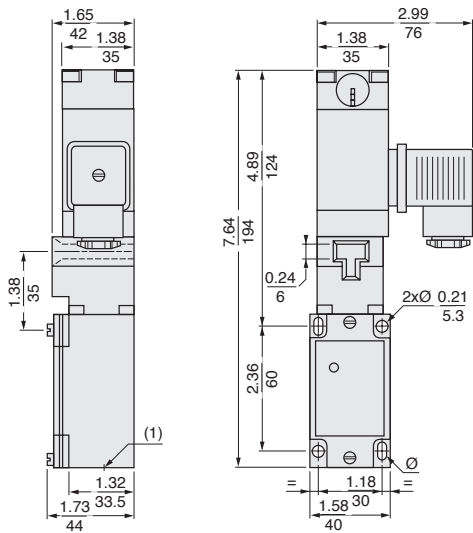
Metal, Turret Head, Type XCSL

XCSL●64●●



Ø: 2 elongated holes Ø 0.21 x 0.29 (5.3 x 7.3)
(1) 1 tapped entry for Pg 13.5 (n° 13) cable gland

XCSL●66●●



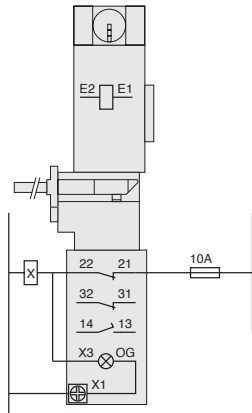
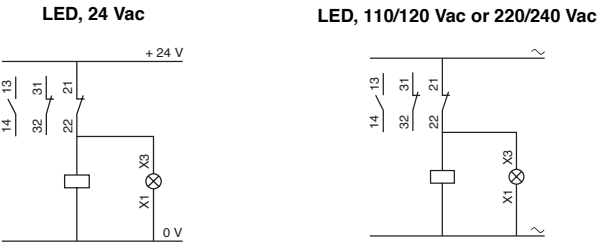
Ø: 2 elongated holes Ø 0.21 x 0.29 (5.3 x 7.3)
(1) 1 tapped entry for Pg 13.5 (n° 13) cable gland

Dual Dimensions: **INCHES**
Millimeters

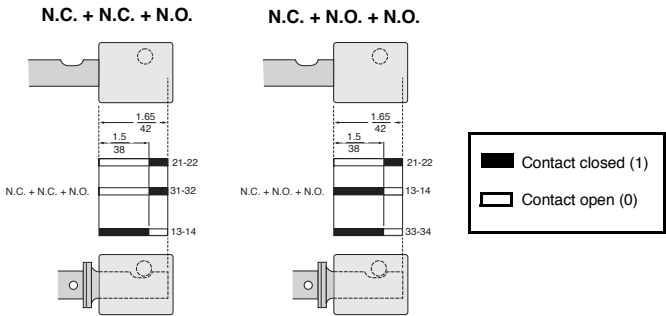
Wiring Diagrams

Wiring diagram example using a 3-pole N.C. + N.C. + N.O. safety interlock switch
LED wiring
Shown with actuating key inserted

Recommended wiring diagram
Locking with and without power



Contact Status Relative to Actuating Key Position Function diagrams



XCS Safety Interlock
Switches

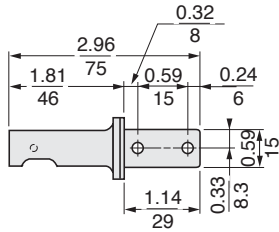
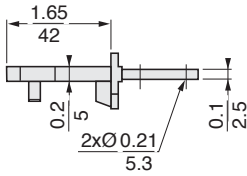
XCS Safety Interlock Switches

Dimensions

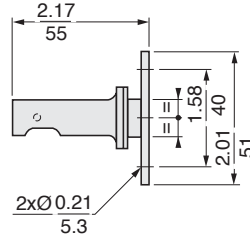
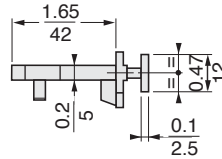
Actuating Keys for Metal, Turret Head, Type XCSL

Actuating keys

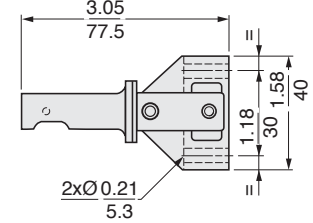
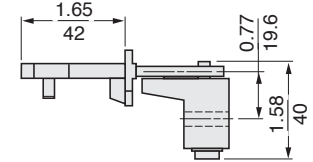
ZCKY071



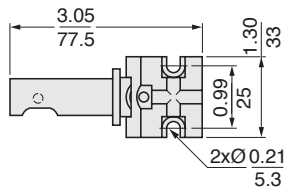
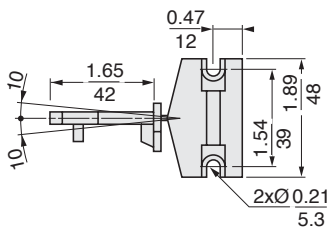
ZCKY081



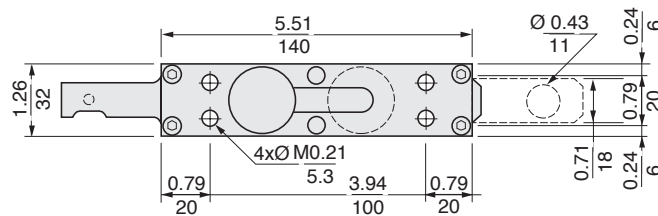
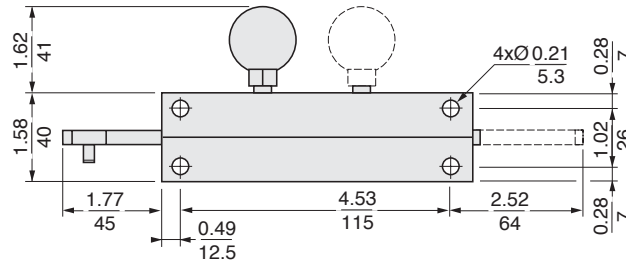
ZCKY091



ZCKY061



ZCKY101

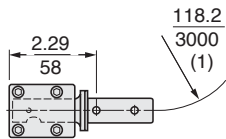


Dual Dimensions: **INCHES**
Millimeters

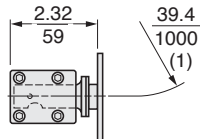
Operating radius required for actuating key

Horizontal mounting

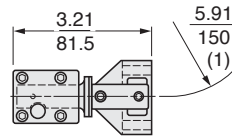
ZCKY071



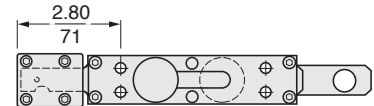
ZCKY081



ZCKY091

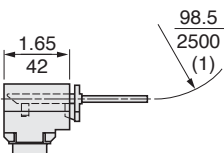


ZCKY101

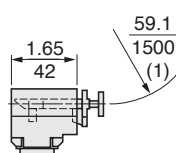


Vertical mounting

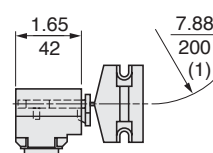
ZCKY071



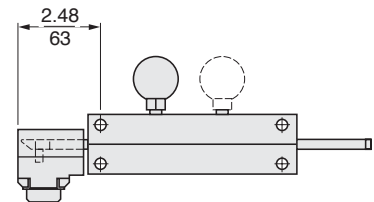
ZCKY081



ZCKY061



ZCKY101



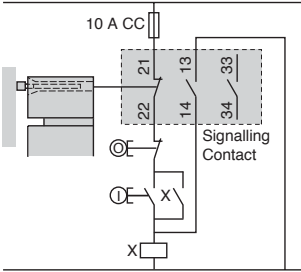
(1) For mounting the actuating key on hinged guards (minimum radius)

XCS Safety Interlock Switches Wiring Diagrams

Metal, Turret Head, Types XCSA, XCSB, XCSC, XCSE, and XCSL

Wiring to category 1 conforming to EN 954-1

Example with 3-Pole N.C. + N.O. + N.O. contact and protection fuse to prevent jumpering of the N.C. contact, either by cable damage or by unauthorized tampering.



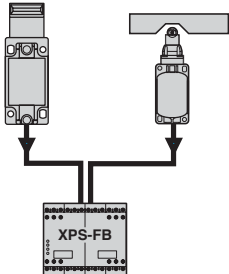
Wiring to category 3 or 4 conforming to EN 954-1. Wiring method used with Preventa™ XPS Safety Relay. (The key operated safety interlock switch is generally used in conjunction with a standard limit switch with positive opening N.C. contacts.)

To achieve category 3 or 4 when using safety interlocks or limit switches, there must be **both** mechanical and electrical redundancy, requiring 2 separate devices. Therefore, using **only** one safety interlock or **only** one limit switch will meet **only** category B, 1 or 2.

Method for machines with quick rundown or stop time (low inertia)

Access time > Stop time

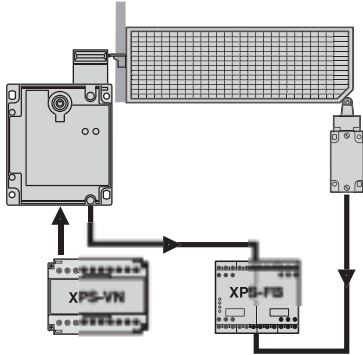
Locking or interlocking devices rely on redundancy and autocheck. The safety relays provide these functions



Locking by actuating key and actuation in positive mode associated with a safety relay.

Method for machines with long rundown or stop time (high inertia)

Access time < Stop time



Interlocking device with actuating key of the guard and zero speed detection.

The categories for control systems relating to safety (per EN 954-1) referred to above (i.e.: category 1), indicate the maximum category possible based on the inputs only to the safety control circuit. The actual maximum category possible for the safety control circuit may be lower when the rest of the safety control circuit is considered. Only with proper wiring of the complete safety system can the referenced category be achieved. Actual category of the system depends on the other components used and method of wiring. For more information on wiring Preventa™ XPS safety relays see pages 154 and 155, and Appendix B pages 286 to 288.

XCS Safety Interlock Switches Wiring Diagrams

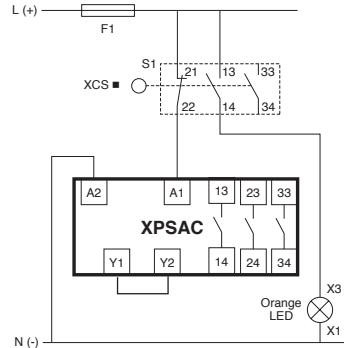
Wiring the XCS Safety Interlocks and Preventa™ XPS Safety Relays

The wiring diagrams below show Type XCS wired with various Preventa™ XPS Safety Relays. The safety interlocks shown are versions with the orange LED.

NOTE: The orange LED, when lit, indicates that the actuating key has been removed from the switch.

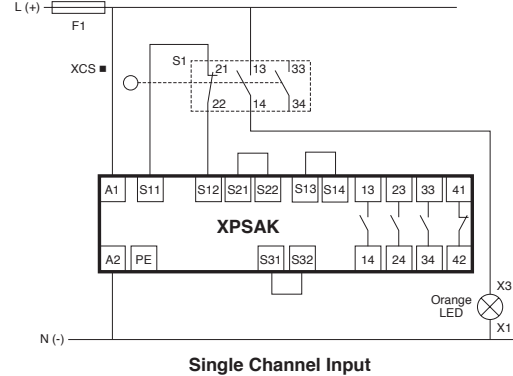
1. XCS ■ wired with XPSAC.
Orange LED is powered by the XCS N.O. contact

Single Channel Input
Wiring to category 1 conforming to EN 954-1



2. XCS ■ wired with XPSAK
Orange LED is powered by the XCS N.O. contact:

Single Channel Input
Wiring to category 1 conforming to EN 954



The categories for control systems relating to safety (per EN 954-1) referred to above (i.e.: category 1), indicate the maximum category possible based on the inputs only to the safety control circuit. The actual maximum category possible for the safety control circuit may be lower when the rest of the safety control circuit is considered. Only with proper wiring of the complete safety system can the referenced category be achieved. Actual category of the system depends on the other components used and method of wiring. For more information on wiring Preventa™ XPS safety relays, see pages 154 and 155, and Appendix B pages 286 to 288.

- The diagrams above show the XCSA, XCSB, and XCSC safety interlocks (which have an LED). The rest of the XCS safety interlock line can also be used in the diagrams above. If the device being used does not have an LED or if the use of an LED is not desired, disregard the wiring to 13-14.

XCS Safety Interlock Switches Wiring Diagrams

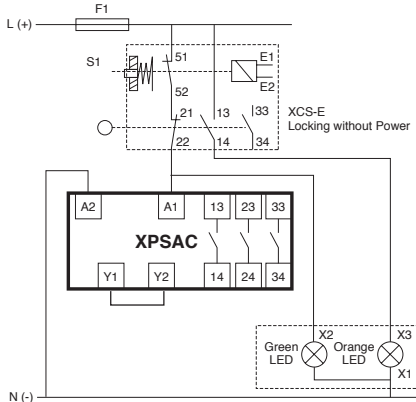
Wiring the XCS Safety Interlocks and Preventa™ XPS Safety Relays

The wiring diagrams below show the XCSE wired with various Preventa™ XPS Safety Relays.

NOTE: The orange LED, when lit, indicates that the actuating key has been removed from the switch.

1. XCSE (locking without power) wired with XPSAC.
Orange LED is powered by the XCS N.O. contact.

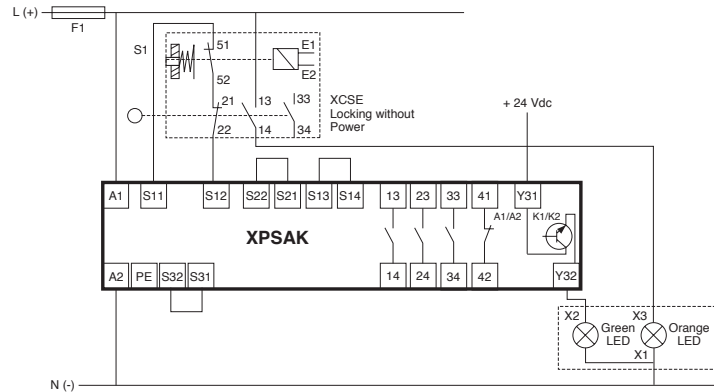
Single Channel Input
Wiring to category 1 conforming to EN 954-1



Single Channel Input

2. XCSE (Locking without Power) wired with XPSAK.
Orange LED is powered by the XCS N.O. contact. The green LED, when lit, indicates the XPS safety outputs are closed. The conductor that connects terminals 22 and X2 inside the XCSE device must be removed, **regardless of whether or not they will be used** in the final application.

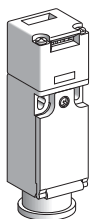
Single Channel Input
Wiring to category 1 conforming to EN 954



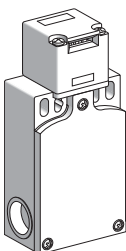
Single Channel Input

The categories for control systems relating to safety (per EN 954-1) referred to above (i.e.: category 1), indicate the maximum category possible based on the inputs only to the safety control circuit. The actual maximum category possible for the safety control circuit may be lower when the rest of the safety control circuit is considered. Only with proper wiring of the complete safety system can the referenced category be achieved. Actual category of the system depends on the other components used and method of wiring. For more information on wiring Preventa™ XPS safety relays, see pages 154 and 155, and Appendix B pages 286 to 288.

XCS Safety Interlock Switches Selection



XCSPA593



XCSTA593

Plastic, Turret Head ■, Type XCSPA and XCSTA, Non-locking, 1/2" NPT Conduit

References of switches without actuating key

Positive opening N.C. contacts meet the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (positive opening action.)

Type of Switch	Without Locking of Actuating Key	Type of Switch	Without Locking of Actuating Key
N.C. + N.O. break before make, slow break †★	XCSPA593	N.C. + N.O. + N.O. (2 N.O. staggered) slow break †★	XCSTA593
N.O. + N.C. make before break, slow break †	XCSPA693	N.C. + N.C. + N.O. (N.O. staggered) slow break †★	XCSTA793
N.C. + N.C. slow break †	XCSPA793	N.C. + N.C. + N.C. slow break †	XCSTA893
Weight (oz.)	3.4 (0.095 kg)	Weight (oz.)	6.7 (0.190 kg)

■ 90° increments throughout 360°

† Schematic diagrams shown represent the contact states while the actuating key is fully inserted and engaged in the head of the switch.

★ The N.O. contacts will close after the N.C. contacts open. They do not change state simultaneously.

Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signalling – NOT for safety functions.

Neither replacement parts nor components are available. These devices are not to be repaired or adjusted. The complete switch should be replaced.

Complementary Characteristics

Actuation Speed	Maximum: 19.7 in/s (0.5 m/s). Minimum: 0.39 in/s (0.01 m/s)	
Resistance to Forcible Actuating Key Withdrawal	2.26 lbs. (10 N) using actuating keys only. 11.3 lbs (50 N) using actuating keys XCSZ12 or XCSZ13 together with guard retaining device XCSZ21	
Maximum Operating Rate	For maximum life: 600 operations per hour	
Minimum Force for Positive Opening	3.4 lbs (15 N)	
Conduit Entry	1 tapped entry for 1/2" NPT	2 tapped entries for 1/2" conduit adapter

References of Actuating Keys and Guard Retaining Device

Description	Straight key	Wide key	Pivoting key	Right-angled key	Guard retaining device ▼
For switches XCSPA/TA	XCSZ11	XCSZ12	XCSZ13	XCSZ14	XCSZ21
Weight (oz.)	0.5 (0.015 kg)	0.5 (0.015 kg)	3.0 (0.085 kg)	0.9 (0.025 kg)	3.0 (0.085 kg)

▼ Only for use with operating keys XCSZ12 and XCSZ13.

The guard retaining device is used to provide additional force to hold the door or gate closed. One of the two parts is a plate that mounts to the head of the switch, and the other is a magnet assembly that is mounted with the actuating key. The magnet and plate act as a magnetic catch to aid in keeping the door closed. This assembly increases the force required to remove the key.

References of Supplementary Accessories

Description	Catalog Number	Weight oz. (0.050 kg)
Set of 10 blanking plugs for operating head slot	XCSZ28	1.8
Padlock attachment Prevents actuating key from entering switch. Note: Cannot be used as a lock-out tag-out means.	XCSZ91	2.0

The devices above are available with metric conduit.

- To order devices tapped for 11 mm cable gland, conforming to NFC 68-300 (DIN Pg 11): Change the last character in the part number to 1.
For example: XCSPA593 is changed to XCSPA591
- To order devices tapped for M16 x 1.5 for ISO cable gland: Change the last character in the part number to 2.
For example: XCSPA593 is changed to XCSPA592

When designing a door or gate guarding system, these guidelines must be followed:

- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold the door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995: 5.2.2).
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached to cables, cords or chains.



File E164353
CCN NKCR



File LR44087
Class 3211 03



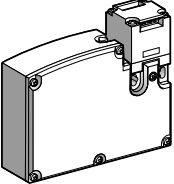
Acceptable Wire Sizes 14-20 AWG
Terminal Clamp Torque . . . 7 in.lbs.
Application Information . . . 40-54
Specifications 55
Accessories and
Spare Parts 77, 80
Connectors 65
Wiring 83-85
Dimensions 81-82

XCS Safety Interlock Switches Selection

Plastic, Double, Turret Head ⚡, Type XCSTE, Locking Without Power, 1/2" NPT Conduit

References of Switches Without Actuating Key (select key from page 80)

Positive opening N.C. contacts meet the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (positive opening action.)

Type of Switch	With Interlocking, Locking by Electromagnet ▲		
			
Type of interlocking	Locking Without Power. Actuating key locks into switch when inserted. This is typically preferred as the door is secured regardless of electrical power availability or failure. Applying power to the electromagnet will unlock actuating key and allow it to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed.		
Supply voltage of electromagnet	24 Vac or Vdc	120 Vac or Vdc	230 Vac or Vdc
N.C. + N.O. break before make slow break ★‡	XCSTE5313 ⊕	XCSTE5333 ⊕	XCSTE5343 ⊕
N.O. + N.C. make before break slow break ‡	XCSTE6313 ⊕	XCSTE6333 ⊕	XCSTE6343 ⊕
N.C. + N.C. slow break ‡	XCSTE7313 ⊕	XCSTE7333 ⊕	XCSTE7343 ⊕
Weight (oz)	13 (0.360 kg)	13 (0.360 kg)	13 (0.360 kg)

- 90° increments throughout 360
- ▲ A special tool and lock allows the forced opening of the guard in an emergency situation. When the special tool is turned to the unlock position, the actuating key is unlocked and is free to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed from the switch.
- ‡ Schematic diagrams shown represent the contact states while the actuating key is fully inserted and engaged in the head of the switch.
- ★ The N.O. contacts will close after the N.C. contacts open. They do not change state simultaneously.

Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signaling – NOT for safety functions.

Neither replacement parts nor components are available. These devices are not to be repaired or adjusted. The complete switch should be replaced.

Complementary Characteristics (not shown under general characteristics)

Actuation Speed	Maximum: 19.7 in/s (0.5 m/s). Minimum: 0.39 in/s (0.01 m/s)
Resistance to Forcible Actuating Key Withdrawal	XCSTE 112 lbs (500 N)
Maximum Operating Rate	For maximum life: 600 operations per hour
Minimum Force for Positive Opening	3.4 lbs (15 N)
Conduit Entry	1 tapped entry for 1/2" conduit adapter

Electromagnet Characteristics

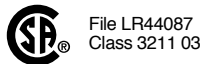
Type of Switch	With Interlocking, Locking by Electromagnet		
Load factor	100%		
Rated operational voltage	24 Vac or Vdc	120 Vac or Vdc	230 Vac or Vdc
Voltage limits	-20 %, +10 % of the rated operational voltage (including ripple on DC) conforming to IEC 60947-1		
Consumption - Maximum	10 VA.		

The devices above are available with metric conduit.

- To order devices tapped for 11 mm cable gland, conforming to NFC 68-300 (DIN Pg 11): Change the last character in the part number to 1. For example: XCSTE5313 is changed to XCSTE5311.
- To order devices tapped for M16 x 1.5 for ISO cable gland: Change the last character in the part number to 2. For example: XCSTE5313 is changed to XCSTE5312.

When designing a door or gate guarding system, these guidelines must be followed:

- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995: 5.2.2).
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- The actuating key must not be used as a means for grounding.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached to cables, cords or chains.



Acceptable Wire Sizes	14-20 AWG
Terminal Clamp Torque	.7 in.lbs.
Application Information	40-54
Specifications	55
Accessories and	
Actuating Keys	80
Wiring	83-85
Dimensions	81-82

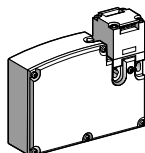
XCS Safety Interlock Switches Selection

Plastic, Turret Head \blacktriangleright , Type XCSTE, Locking With Power, 1/2" NPT Conduit

References of Switches Without Actuating Key (select key from page 80)

Positive opening N.C. contacts meet the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (positive opening action.)

Type of Switch	With Interlocking, Locking by Electromagnet \blacktriangle
-----------------------	--



Type of interlocking	Locking with Power. Actuating key is locked into the switch <i>only</i> when actuating key is inserted <i>and</i> power is applied to the electromagnet. Door or guard is not locked in the event of a power failure or when power is removed from the electromagnet. Removing power to the electromagnet will unlock the actuating key and allow it to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed.
-----------------------------	---

Note: Locking with Power devices does not meet European standards regarding the safety of machinery, especially EN 1088 regarding guard locking. European standards do not allow a "locking with power" function for gate or door guarding/locking. Locking without power devices meets European requirements, and should be used when machinery is to be shipped to Europe or where machinery must meet European standards.

Supply voltage of electromagnet	24 Vac or Vdc	120 Vac or Vdc	230 Vac or Vdc
N.C. + N.O. break before make slow break $\star\ddagger$	XCSTE5513 \rightarrow	XCSTE5533 \rightarrow	XCSTE5543 \rightarrow
N.O. + N.C. make before break slow break \ddagger	XCSTE6513 \rightarrow	XCSTE6533 \rightarrow	XCSTE6543 \rightarrow
N.C. + N.C. slow break \ddagger	XCSTE7513 \rightarrow	XCSTE7533 \rightarrow	XCSTE7543 \rightarrow
Weight (oz)	13 (0.360 kg)	13 (0.360 kg)	13 (0.360 kg)

- \blacksquare 90° increments throughout 360°
- \blacktriangle A special tool and lock allows the forced opening of the guard in an emergency situation. When the special tool is turned to the unlock position, the actuating key is unlocked and is free to be removed from the switch. The N.C. safety contacts will not open until the actuating key is removed from the switch.
- \ddagger Schematic diagrams shown represent the contact states while the actuating key is fully inserted and engaged in the head of the switch.
- \star The N.O. contacts will close after the N.C. contacts open. They do not change state simultaneously.

Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signalling – NOT for safety functions.

Neither replacement parts nor components are available. These devices are not to be repaired or adjusted. The complete switch should be replaced.

Complementary Characteristics (not shown under general characteristics)

Actuation Speed	Maximum: 19.7 in/s (0.5 m/s). Minimum: 0.39 in/s (0.01 m/s)
Resistance to Forcible Actuating Key Withdrawal	XCSTE 112 lbs (500 N)
Maximum Operating Rate	For maximum life: 600 operations per hour
Minimum Force for Positive Opening	3.4 lbs (15 N)
Conduit Entry	1 tapped entry for 1/2" conduit adapter

Electromagnet Characteristics

Type of Switch	With Interlocking, Locking by Electromagnet
Load factor	100%
Rated operational voltage	24 Vac or Vdc 120 Vac or Vdc 230 Vac or Vdc
Voltage limits	-20 %, +10 % of the rated operational voltage (including ripple on DC) conforming to IEC 60947-1
Consumption - Maximum	10 VA.

- The devices above are available with metric conduit.
- To order devices tapped for 11 mm cable gland, conforming to NFC 68-300 (DIN Pg 11): Change the last character in the part number to 1. For example: XCSTE5513 is changed to XCSTE5511.
 - To order devices tapped for M16 x 1.5 for ISO cable gland: Change the last character in the part number to 2. For example: XCSTE5513 is changed to XCSTE5512.

When designing a door or gate guarding system, these guidelines must be followed:

- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995: 5.2.2).
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- The actuating key must not be used as a means for grounding.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached to cables, cords or chains.

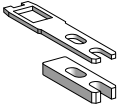
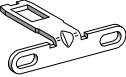
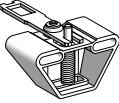
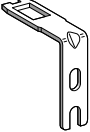
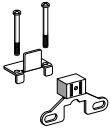
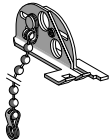
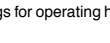


Acceptable Wire Sizes 14-20 AWG
Terminal Clamp Torque . . . 7 in.lbs.
Application Information . . . 40-54
Specifications 55
Accessories and
Actuating Keys 80
Wiring 83-85
Dimensions 81-82

XCS Safety Interlock Switches

Actuating Keys and Accessories

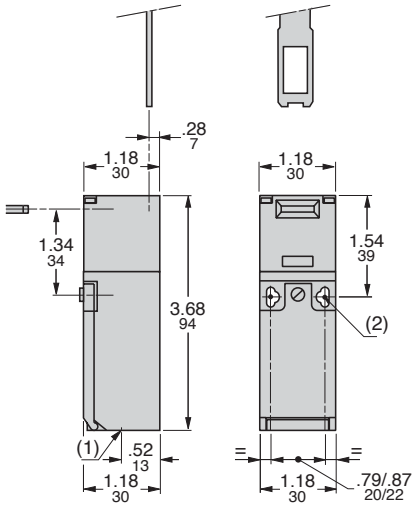
References of Actuating Keys and Padlocking Device

Description	For use with	Catalog Number	Weight.oz (kg)
Straight Key 	XCSPA XCSTA XCSTE	XCSZ11	0.5 (0.015)
Wide Key 	XCSPA XCSTA XCSTE	XCSZ12	0.5 (0.015)
Pivoting Key 	XCSPA XCSTA XCSTE	XCSZ13	3.0 (0.085)
Right-angled key 	XCSPA XCSTA XCSTE	XCSZ14	0.9 (0.025)
Guard Retaining Device (magnetic) 	XCSPA XCSTA XCSTE	XCSZ21	3.0 (0.085)
Padlocking Device Prevents actuating key from entering switch. Note: Cannot be used as a lock-out tag-out means. 	XCSPA XCSTA XCSTE	XCSZ91	2.0 (0.057)
Set of 10 blanking plugs for operating head slot 	XCSPA XCSTA XCSTE	XCSZ28	1.8 (0.057)

XCS Safety Interlock Switches Dimensions

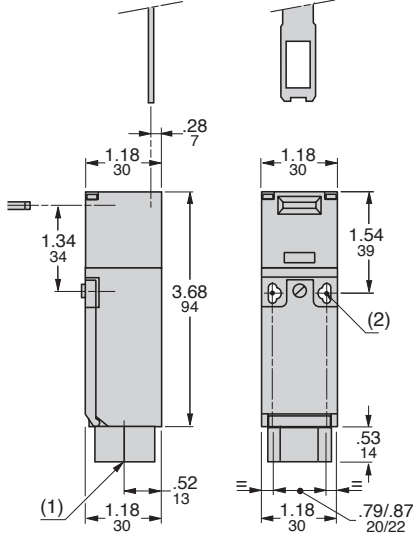
Plastic, Turret Head Type XCSPA, XCSTA, and XCSTE.

XCSPA#91, XCSPA#92



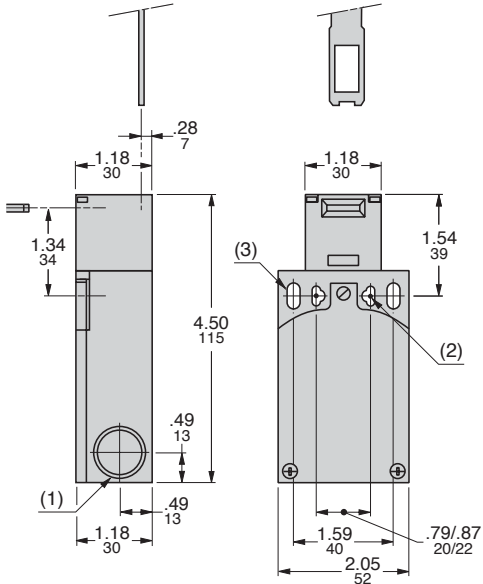
- (1) 1 conduit entry tapped for metric cable gland
- (2) 2 elongated holes $\varnothing 0.17"$ (4.3 mm) x 0.33" (8.3 mm) on 0.87" (22 mm) centers
2 holes $\varnothing 0.17"$ (4.3 mm) on 0.79" (20 mm) centers

XCSPA#93



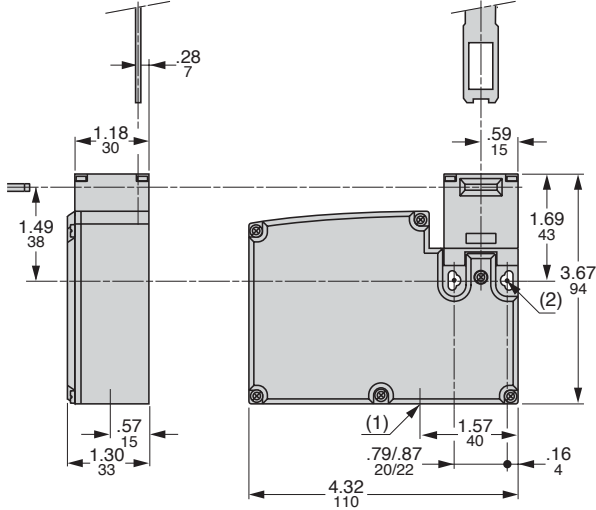
- (1) 1 conduit entry tapped 1/2" NPT
- (2) 2 elongated holes $\varnothing 0.17"$ (4.3 mm) x 0.33" (8.3 mm) on 0.87" (22 mm) centers
2 holes $\varnothing 0.17"$ (4.3 mm) on 0.79" (20 mm) centers

XCSTA#9



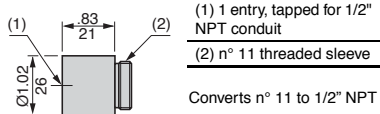
- (1) 2 conduit entries, tapped n° 11 for 1/2" NPT adapter
- (2) 2 elongated holes $\varnothing 0.17"$ (4.3 mm) x 0.33" (8.3 mm) on 0.87" (22 mm) centers
2 holes $\varnothing 0.17"$ (4.3 mm) on 0.79" (20 mm) centers
- (3) 2 elongated holes $\varnothing 0.21"$ (5.3 mm) x 0.52" (13.3 mm) on 1.59" (40.3 mm) center

XCSTE#



- (1) 1 conduit entry, tapped n° 11 for 1/2" NPT adapter
- (2) 2 elongated holes $\varnothing 0.17"$ (4.3 mm) x 0.33" (8.3 mm) on 0.87" (22 mm) centers
2 holes $\varnothing 0.17"$ (4.3 mm) on 0.79" (20 mm) centers

Adapter DE9-RA1012



- (1) 1 entry, tapped for 1/2" NPT conduit
- (2) n° 11 threaded sleeve

Converts n° 11 to 1/2" NPT

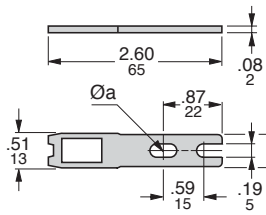
XCS Safety Interlock Switches

XCS Safety Interlock Switches

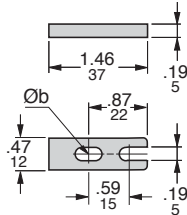
Dimensions

Plastic, Turret Head, Type XCS-PA, XCS-STA, and XCS-TE

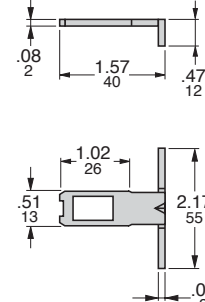
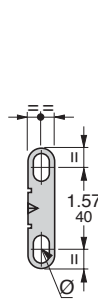
XCSZ11



Adapter (1)



XCSZ12



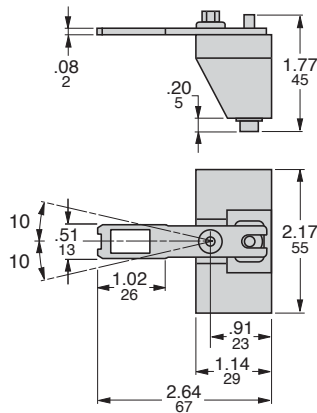
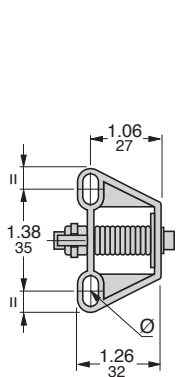
(1) Adapter (supplied with actuating key XCS-Z11) for replacing, without drilling additional mounting hole, an XCK-P safety interlock switch with actuating key XCK-Y01 by an XCS-PA safety interlock switch with actuating key XCS-Z11

Ø a: 2 elongated holes Ø 0.19" (4.7 mm) x 0.39" (10 mm)

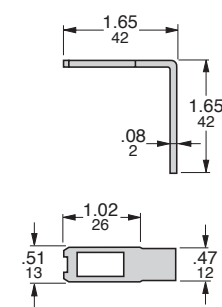
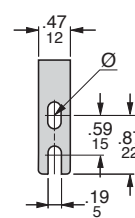
Ø b: 1 elongated hole for M4 or M4.5 screw

Ø: 1 elongated hole Ø 0.19" (4.7 mm) x 0.39" (10 mm)

XCSZ13



XCSZ14



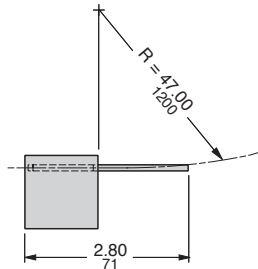
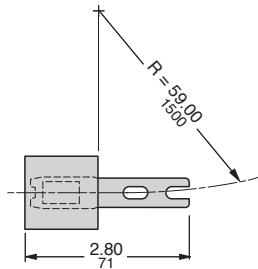
Dual Dimensions: INCHES
Millimeters

Ø: 1 elongated hole Ø 0.19" (4.7 mm) x 0.39" (10 mm)

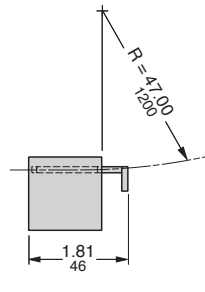
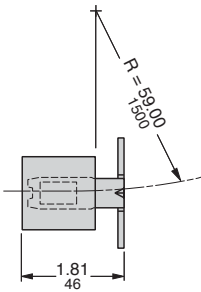
Ø: 1 elongated hole Ø 0.19" (4.7 mm) x 0.39" (10 mm)

Operating radius required for actuating key

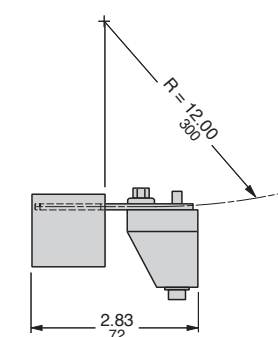
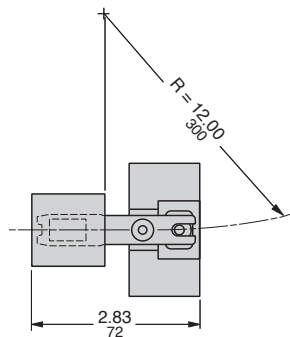
XCSZ11



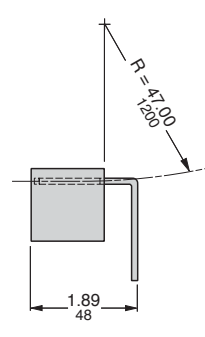
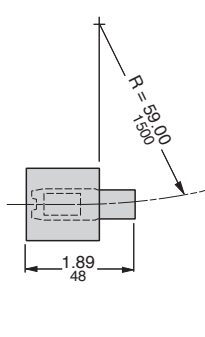
XCSZ12



XCSZ13



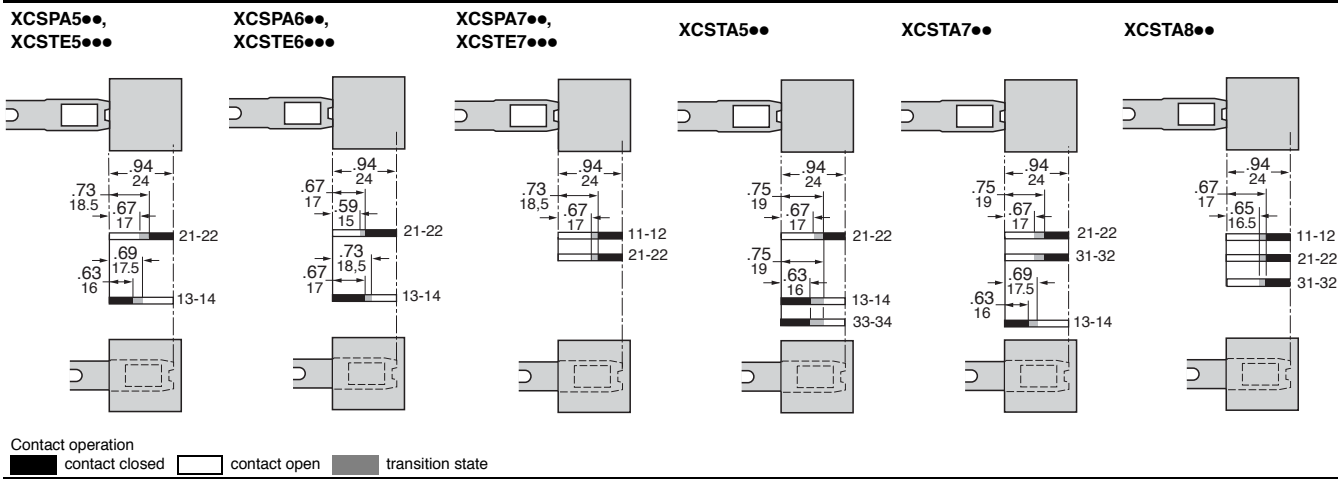
XCSZ14



R = minimum radius

XCS Safety Interlock Switches Contact Status

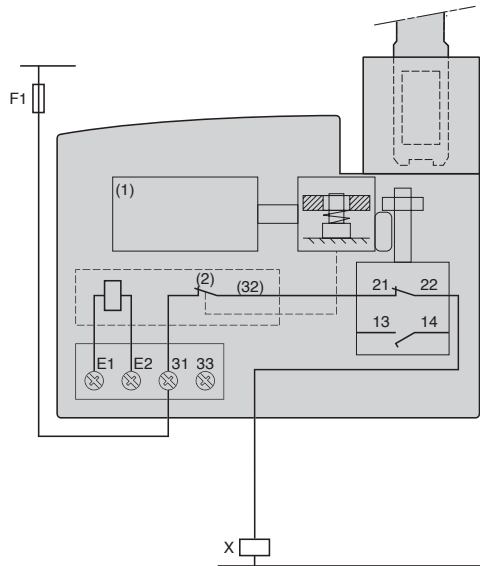
Plastic, Turret Head, Type XCSPA, XCSTA, and XCSTE Contact Status Relative to Actuating Key Position



XCS Safety Interlock Switches Wiring Diagrams

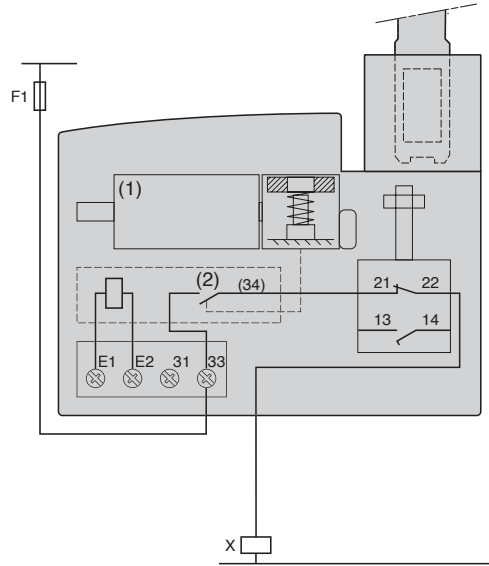
Plastic, Turret Head Type XCSTE

Locking without Power
N.C. + N.O.
XCSTE53●●



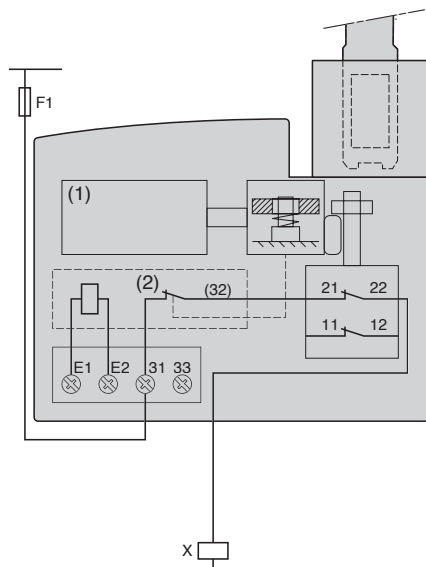
- (1) Solenoid
- (2) Auxiliary contact
- E1-E2: Solenoid supply
- 13-14: Additional contact, available for signalling

Locking with Power
N.C. + N.O.
XCSTE55●●



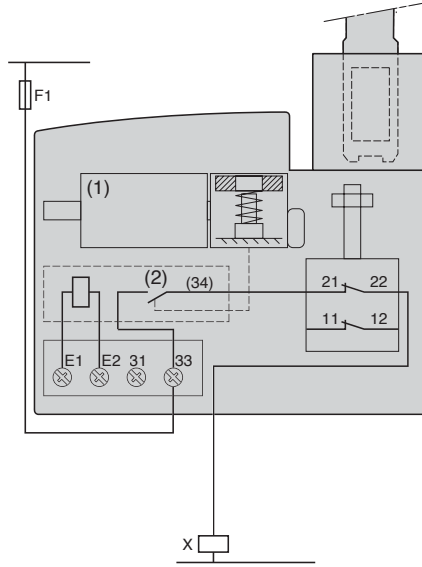
- (1) Solenoid
- (2) Auxiliary contact
- E1-E2: Solenoid supply
- 13-14: Additional contact, available for signalling

Locking without Power
N.C. + N.C.
XCSTE73●●



- (1) Solenoid
- (2) Auxiliary contact
- E1-E2: Solenoid supply
- 11-12: Safety contact, available for redundancy

Locking with Power
N.C. + N.C.
XCSTE75●●



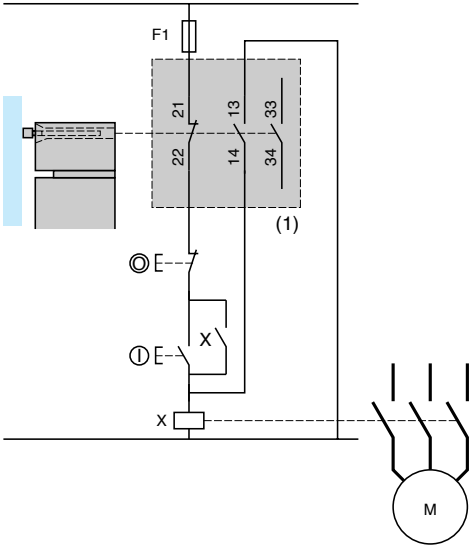
- (1) Solenoid
- (2) Auxiliary contact
- E1-E2: Solenoid supply
- 11-12: Safety contact, available for redundancy

XCS Safety Interlock Switches Wiring Diagrams

Wiring to category 1 conforming to EN 954-1

Example with a 3-Pole (N.C. + N.O. + N.O.) contact and protection fuse to prevent jumpering of the N.C. contact, either by cable damage or by unauthorized tampering.

For more wiring diagrams see pages 73 to 76.



(1) Signalling contact

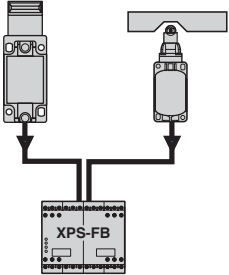
Wiring to category 3 or 4 conforming to EN 954-1. Wiring method used with Preventa™ XPS safety relay. (The key operated safety interlock switch is generally used in conjunction with a standard limit switch with positive opening N.C. contacts.)

To achieve category 3 or 4 when using safety interlocks or limit switches, their must be both mechanical and electrical redundancy, requiring 2 separate devices. Therefore, using **only** one safety interlock or **only** one limit switch ill meet **only** category B, 1 or 2.

Method for machines with quick rundown or stop time (low inertia)

Access time > Stop time

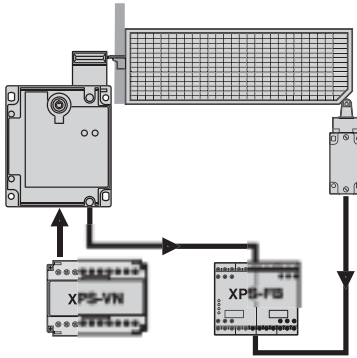
Locking or interlocking devices rely on redundancy and autocheck. The safety relays provide these functions



Locking by actuating key and actuation in positive mode associated with a safety relay.

Method for machines with long rundown or stop time (high inertia)

Access time < Stop time



Interlocking device with actuating key of the guard and zero speed detection.

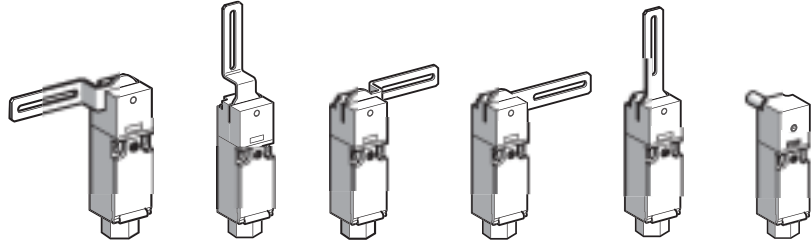
The categories for control systems relating to safety (per EN 954-1) referred to above (i.e.: category 1, 3 or 4), indicate the maximum category possible based on the inputs only to the safety control circuit. The actual maximum category possible for the safety control circuit may be lower when the rest of the safety control circuit is considered. Only with proper wiring of the complete safety system can the referenced category be achieved. Actual category of the system depends on the other components used and method of wiring. For more information on wiring Preventa™ XPS safety relays, see pages 154 and 155, and Appendix B pages 286 to 288.



XCS Safety Interlock Switches Selection

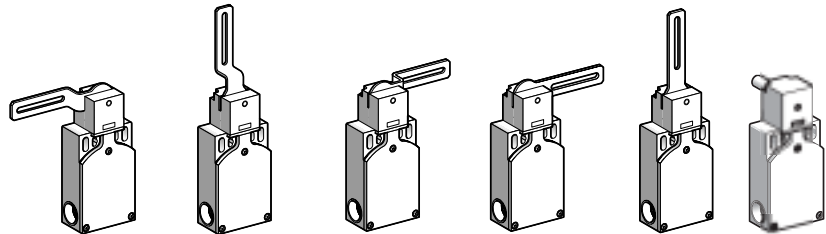
Plastic, Turret Head ■, Type XCSPL, XCSPR, XCSTL, and XCSTR Rotary Operated, 1/2" NPT Conduit References of Switches with Rotary Lever or Rotary Shaft




Positive opening N.C. contacts meet the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (positive opening action.)

Type of lever	Elbowed (flush with rear of switch)	Straight	Rotary Shaft
---------------	-------------------------------------	----------	--------------



Orientation of operating lever	To left	Centered	To right	To right or to left	Centered	Length 30 mm ♦
N.C. + N.O. break before make slow break †★ 	XCSPL593 ⇨	XCSPL583 ⇨	XCSPL573 ⇨	XCSPL563 ⇨	XCSPL553 ⇨	XCSPR553 ⇨
N.C. + N.C. slow break † 	XCSPL793 ⇨	XCSPL783 ⇨	XCSPL773 ⇨	XCSPL763 ⇨	XCSPL753 ⇨	XCSPR753 ⇨
Weight (oz)	3.9 (0.110 kg)	3.9 (0.110 kg)	3.9 (0.110 kg)	3.9 (0.110 kg)	3.9 (0.110 kg)	4.2 (0.120 kg)



Orientation of operating lever	To left	Centered	To right	To right or to left	Centered	Length 30 mm ♦
N.C. + N.O. + N.O. (2 N.O. staggered) slow break †★ 	XCSTL593 ⇨	XCSTL583 ⇨	XCSTL573	XCSTL563 ⇨	XCSTL553 ⇨	XCSTR553 ⇨
N.C. + N.C. + N.O. (N.O. staggered) slow break †★ 	XCSTL793 ⇨	XCSTL783 ⇨	XCSTL773 ⇨	XCSTL763 ⇨	XCSTL753 ⇨	XCSTR753 ⇨
N.C. + N.C. + N.C. slow break † 	XCSTL893 ⇨	XCSTL883 ⇨	XCSTL873 ⇨	XCSTL863 ⇨	XCSTL853 ⇨	XCSTR853 ⇨
Weight (oz)	5.6 (0.160 kg)	5.6 (0.160 kg)	5.6 (0.160 kg)	5.6 (0.160 kg)	5.6 (0.160 kg)	5.5 (0.155 kg)

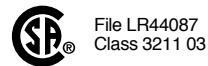
- 90° increments throughout 360°
- † Schematic diagrams shown represent the contact states when the rotary lever is in positions as indicated in diagrams directly above the part numbers in selection table.
- ♦ References listed have a shaft that is 1.18 in (30 mm) long. To order a switch with a shaft that is 3.15 in (80 mm) long, replace the second digit, 5, with a 6.
For example: XCSPR553 is changed to XCSPR563.
- ★ The N.O. contacts will close after the N.C. contacts open. They do not change state simultaneously.

The devices above are available with metric conduit.

- To order devices tapped for 11 mm cable gland, conforming to NFC 68-300 (DIN Pg 11): Change the last character in the part number to 1.
For example: XCSPL593 is changed to XCSPL591.
- To order devices tapped for M16 x 1.5 for ISO cable gland: Change the last character in the part number to 2.
For example: XCSPL593 is changed to XCSPL592.

When designing a door or gate guarding system, these guidelines must be followed:

- The rotary lever alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold the door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995: 5.2.2).
- The rotary lever must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- The actuating lever or shaft must not be used as a means for grounding.



XCS Safety Interlock Switches

Acceptable Wire Sizes 14-20 AWG
Terminal Clamp Torque . . . 7 in.lbs.
Application Information . . . 40-54
Specifications 55
Wiring 88
Dimensions 87

XCS Safety Interlock Switches Characteristics and Dimensions

Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signaling – NOT for safety functions.

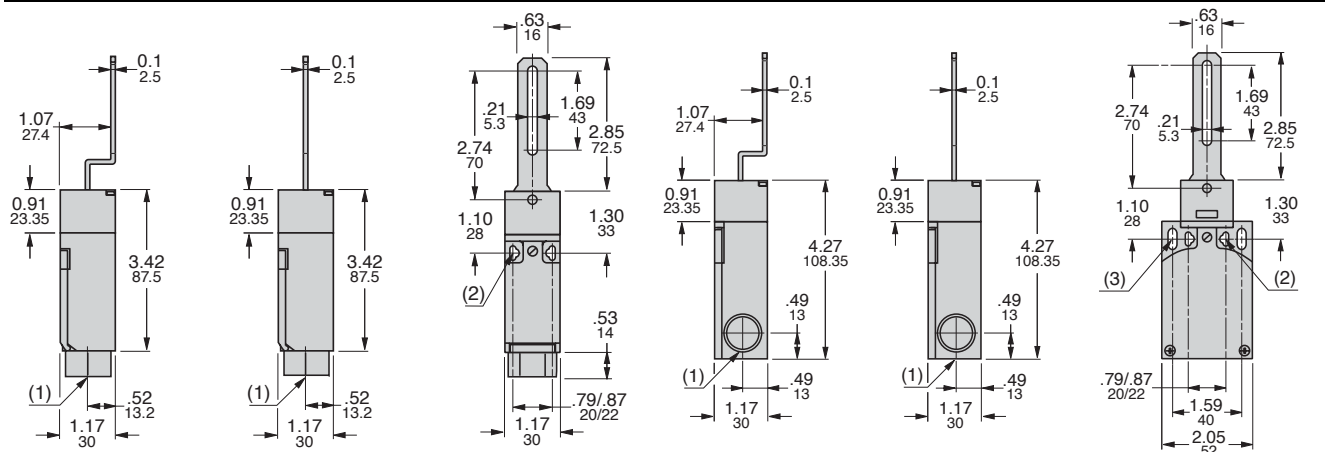
Neither replacement parts nor components are available. These devices are not to be repaired or adjusted. The complete switch should be replaced.

Complementary Characteristics (not shown under general characteristics)

Actuation Speed	Minimum: 0.39 in/s (0.01 m/s)
Lever and Shaft Tripping Angle	5°
Minimum Torque	For tripping: 0.88 in-lbs (0.1 N·m). For positive opening: XCSPL and XCSPR: 2.2 in-lbs (0.25 N·m), XCSTL and XCSTR: 4.0 in-lbs (0.45 N·m)
Materials	Plastic body, stainless steel lever, rotary shaft and hardware

Dimensions

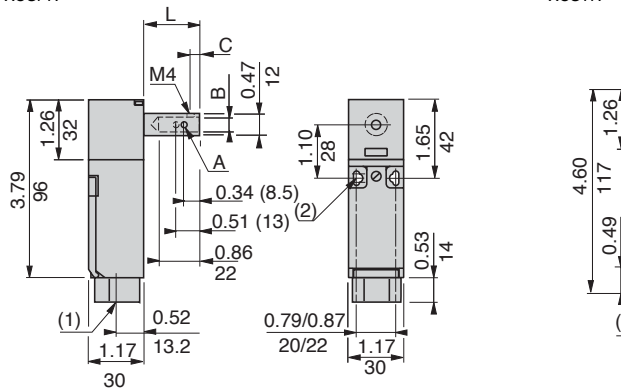
XCSPL●93 XCSPL●83 XCSPL●73	XCSPL●63 XCSPL●53	Front of switch (typical)	XCSTL●93 XCSTL●83 XCSTL●73	XCSTL●63 XCSTL●53	Front of switch (typical)
----------------------------------	----------------------	---------------------------	----------------------------------	----------------------	---------------------------



- (1) 1 conduit entry tapped 1/2" NPT
 (2) 2 elongated holes \varnothing 0.17" (4.3 mm) x 0.33" (8.3 mm) on 0.87" (22 mm) centers
 2 holes \varnothing 0.17" (4.3 mm) on 0.79" (20 mm) centers

- (1) 2 conduit entries, tapped n° 11 for 1/2" NPT adapter
 (2) 2 elongated holes \varnothing 0.17" (4.3 mm) x 0.33" (8.3 mm) on 0.87" (22 mm) centers
 2 holes \varnothing 0.17" (4.3 mm) on 0.79" (20 mm) centers
 (3) 2 elongated holes \varnothing 0.21" (5.3 mm) x 0.52" (13.3 mm) on 1.59" (40.3 mm) centers

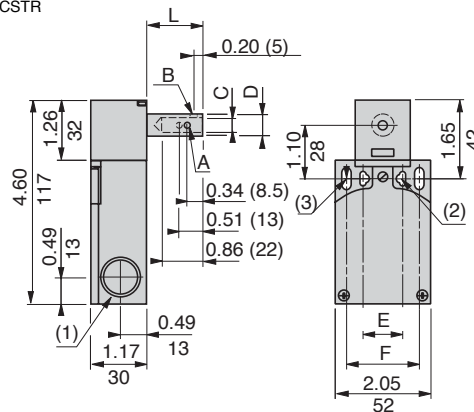
XCSPR



- (1) 1 conduit entry tapped 1/2" NPT
 (2) 2 elongated holes \varnothing 0.17" (4.3 mm) x 0.33" (8.3 mm) on 0.87" (22 mm) centers
 2 holes \varnothing 0.17" (4.3 mm) on 0.79" (20 mm) centers
 L = 1.18 in (30 mm) (XCSPR-53) or 3.15 in (80 mm) (XCSPR-63)

- A = 2 x \varnothing 0.13 in (3.2 mm)
 B = \varnothing 0.32 in (8 mm)
 C = 0.20 in (5 mm)

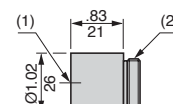
XCSTR



- (1) 2 conduit entries, tapped n° 11 for 1/2" NPT adapter
 (2) 2 elongated holes \varnothing 0.17" (4.3 mm) x 0.33" (8.3 mm) on 0.87" (22 mm) centers
 2 holes \varnothing 0.17" (4.3 mm) on 0.79" (20 mm) centers
 (3) 2 elongated holes \varnothing 0.21" (5.3 mm) x 0.52" (13.3 mm) on 1.59" (40.3 mm) centers
 L = 1.18 in (30 mm) (XCSTR-53) or 3.15 in (80 mm) (XCSTR-63)

- A = 2 x \varnothing 0.13 in (3.2 mm)
 B = 0.16 in (4 mm)
 C = \varnothing 0.32 in (8 mm)
 D = \varnothing 0.47 in (12 mm)
 E = 0.79/0.87 in (20/22 mm)
 F = 1.59 in (40 mm)

Adapter DE9RA1012
for XCSTR, XCSTL



- (1) 1 entry, tapped for 1/2" NPT conduit
 (2) n° 11 threaded sleeve

Dual Dimensions: INCHES
Millimeters

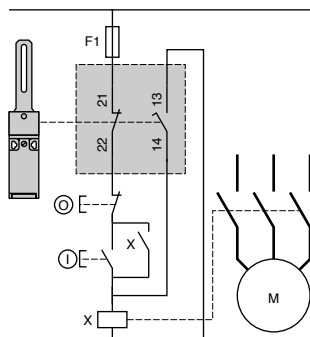
XCS Safety Interlock Switches

Contact Status and Wiring Diagram

Plastic, Double Insulated, Turret Head, Type XCSPL, XCSPL, XCSTL, and XCSTR

Setting-up					
Operating lever displacement and contact status					
XCSPL●93, XCSPL●73 XCSPL●63	XCSPL●83, XCSPL●53	XCSTL●93, XCSTL●73 XCSTL●63	XCSTL●83, XCSTL●53	XCSTL893, XCSTL873 XCSTL863	XCSTL883, XCSTL853
Function diagrams - Contact operation					
XCSPL593, XCSPL573 XCSPL563	XCSPL583, XCSPL553	XCSTL593, XCSTL573 XCSTL563	XCSTL583, XCSTL553	XCSTL893, XCSTL873 XCSTL863	XCSTL883, XCSPL853
XCSPL793, XCSPL773 XCSPL763	XCSPL783, XCSPL753	XCSTL793, XCSTL773 XCSTL763	XCSTL7813, XCSTL753	Contact operation 	
XCSPR●53	XCSTR●53	Mounting for XCSPL and XCSTL 1) The lever operated switch must be mounted as close as possible to the pivoting point of the rotating protective cover 1. 2) The lever/cover connecting pin 2 must freely slide within the lever slot and its travel must not reach the extremities of the slot when the cover is in the open or closed position (play "a"). 3) Fit a cover opening retainer 3 to act as a mechanical stop.			
Function diagrams - Contact operation		Mounting for XCSPR and XCSTR The hinge-operated switch is mounted on the frame of the door, and with the hinge pin inserted into the end of the switch shaft. The shaft is secured to the hinge pin by the use of a set-screw or roll pin.			
XCSPR553	XCSTR553	XCSPR753	XCSTR753	XCSTR853	

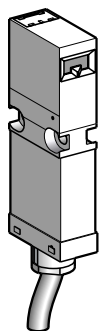
Wiring to category 1 conforming to EN 954-1



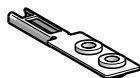
Example with 2-Pole N.C. + N.O. contact and protection fuse to prevent shunting of the N.C. contact, either by cable damage or by unauthorized tampering.

For more wiring diagrams see pages 73 to 76.

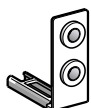
The categories for control systems relating to safety (per EN 954-1) referred to above (i.e.: category 1, 3 or 4), indicate the maximum category possible based on the inputs only to the safety control circuit. The actual maximum category possible for the safety control circuit may be lower when the rest of the safety control circuit is considered. Only with proper wiring of the complete safety system can the referenced category be achieved. Actual category of the system depends on the other components used and method of wiring. For more information on wiring Preventa™ XPS safety relays, see pages 154 and 155, and Appendix B pages 286 to 288.



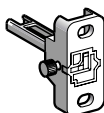
XCSMP59L2



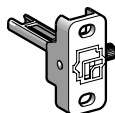
XCSZ81



XCSZ84



XCSZ83



XCSZ85

Plastic, Type XCSMP Prewired

References of switches without actuating key

Order the actuating key at bottom the of the page.

Devices listed below are provided with 6.6 ft. (2 m) of cable. Other lengths of cable are available—see footnotes on how to order.

⊕ Positive opening N.C. contacts meet the IEC and EN requirements for positive opening contacts per IEC/EN 60947-5-1; and NEMA ICS-5, part 6 (positive opening action).

Type of Switch ■	Without Locking of Actuating Key
LED indication on opening of N.C. contacts	
N.C. + N.O. break before make, slow break † ★	 XCSMP59L2 ⊕
N.C. + N.C. slow break †	 XCSMP79L2 ⊕
N.C. + N.C. + N.O. break before make, slow break † ★	 XCSMP70L2 ⊕
N.C. + N.C. + N.C. slow break †	 XCSMP80L2 ⊕
Weight (oz.)	3.9 (0.110 kg)

■ Blanking plug for operating head slot included with switch. Blanking plugs (sold in lots of 10) part number: XCSZ29.

† Schematic diagrams shown represent the contact state while the actuating key is fully inserted and engaged in the head of the switch.

★ The N.O. contacts will close after the N.C. contacts open. They do not change state simultaneously.

Only the N.C. contacts should be used in the safety control circuit. The N.O. contacts are provided solely for signalling – NOT for safety functions.

No replacement parts are available. These devices are not to be repaired or adjusted. The complete switch should be replaced.

Complementary Characteristics (not shown under general characteristics)

Actuation Speed	Maximum: 59 in/s (1.5 m/s), Minimum: 2 in/s (0.05 m/s)
Resistance to forcible Withdrawal of Actuating Key	1.8 lbs (8 N)
Connection	4 #20 AWG (4 x 0.5 mm ²), or 6 #20 AWG (6 x 0.5 mm ²)
Maximum Operating Rate	For maximum life: 1200 operating cycles per hour
Minimum Force for Positive Opening	1.8 lbs (8 N)

References for Actuating Keys

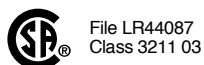
Description	Straight Key	Right-angled Key	Pivoting Key	
			For Right-hand Door	For Left-hand Door
For Switches XCSMP	XCSZ81	XCSZ84	XCSZ83	XCSZ85
Weight (oz.)	0.5 (0.015 kg)	0.9 (0.025 kg)	3.0 (0.085 kg)	3.0 (0.085 kg)

The XCSMP devices listed above are available in additional cable lengths.

- To order devices with a 16.4 ft. (5 m) cable, change the last character in the part number to 5
For example: XCSMP59L2 is changed to XCSMP59L5
- To order devices with a 32.8 ft. (10 m) cable, change the last character in the part number to 10
For example: XCSMP59L2 is changed to XCSMP59L10

When designing a door or gate guarding system, these guidelines must be followed:

- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold the door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995; 5.2.2).
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached to cables, cords, or chains.

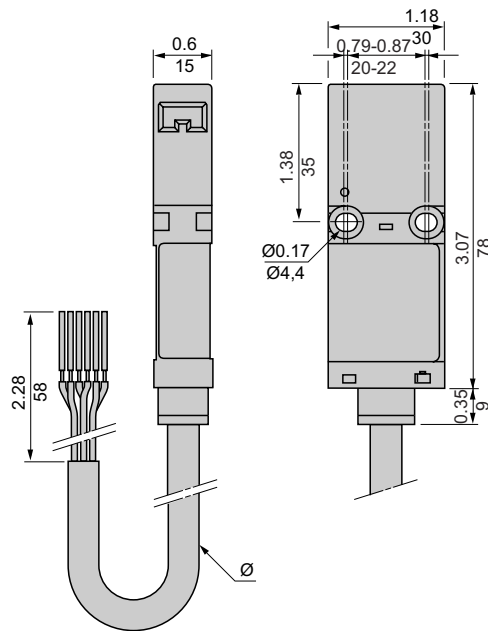


Specifications 55
Accessories and Spare Parts 89
Wiring 91–92
Dimensions 90–91

XCS Safety Interlock Switches Dimensions

Plastic, Type XCSMP Prewired Dimensions

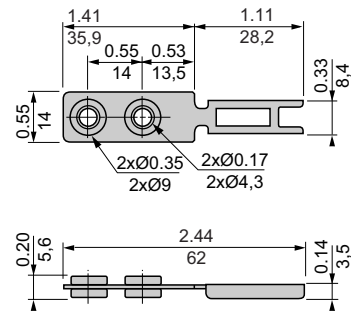
XCSMP



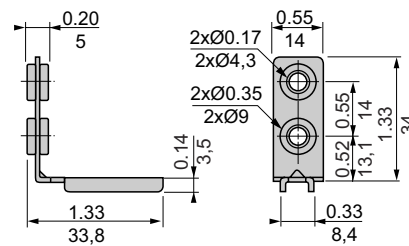
Ø: 0.29 in (7.6 mm); Length 6.6 ft (2 m) , 16.4 ft (5 m), or 32.8 ft (10 m)

Dual Dimensions: INCHES
Millimeters

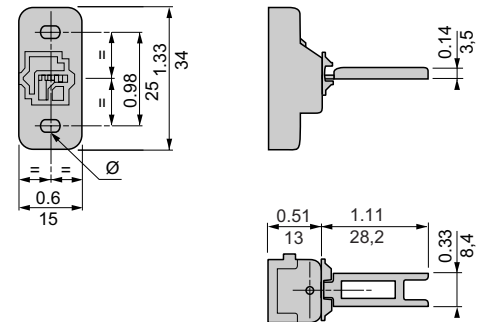
XCSZ81



XCSZ84



XCSZ83

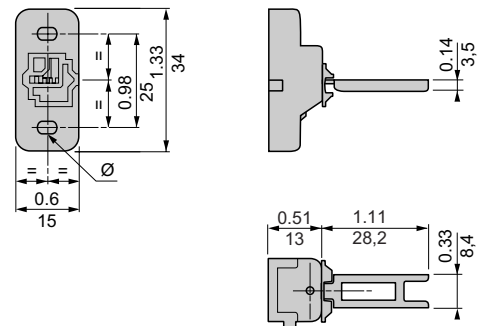


Ø: 2 elongated holes 0.17" (4.2 mm) x 0.24" (6 mm)

When designing a door or gate guarding system, these guidelines must be followed:

- The actuating key alone must not be used as the sole means to hold the gate or guard closed. A separate locking or latching mechanism must be used to hold the door closed.
- The safety interlock switch must not be used as a mechanical stop for the moving guard. A separate mechanical stop must be provided (EN 1088 - 1995; 5.2.2).
- The actuating key must not be used as a gate guiding device. Install a guide for the guard to ensure proper alignment.
- Actuating keys must be securely attached to gates, guards, and doors only. They should not be attached

XCSZ85

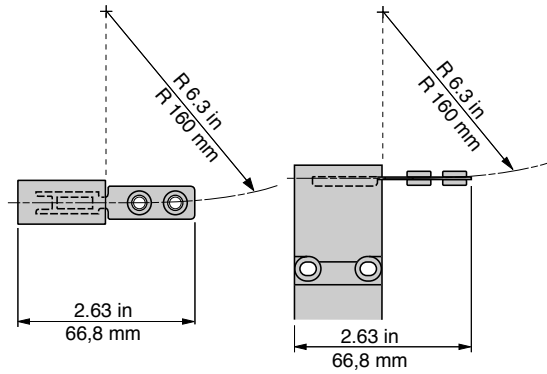


Ø: 2 elongated holes 0.17" (4.2 mm) x 0.24" (6 mm)

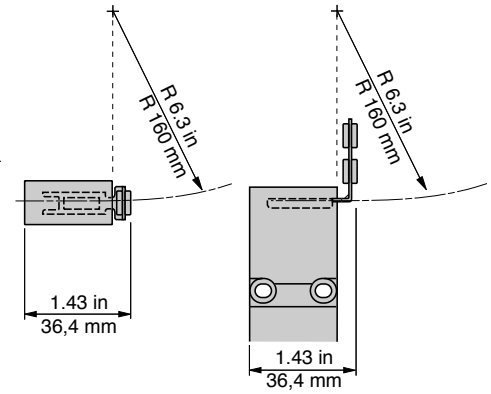
XCS Safety Interlock Switches Dimensions and Wiring Diagrams

Plastic, Type XCSMP Prewired Operating Radius Required for Actuating Key

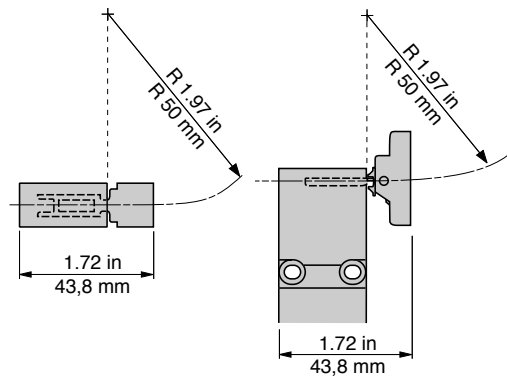
XCSZ81



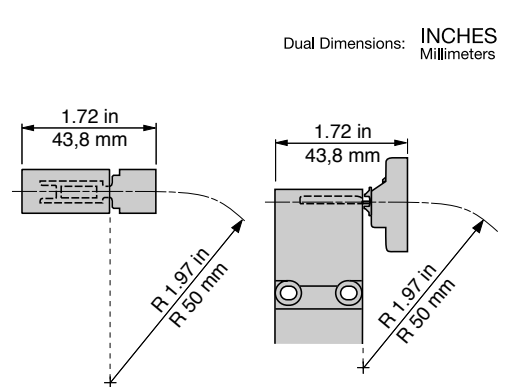
XCSZ84



XCSZ83



XCSZ85



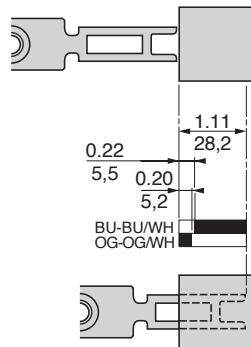
Dual Dimensions: INCHES
Millimeters

R = minimum radius

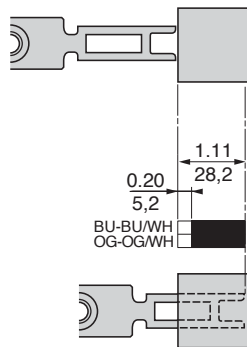
Contact Status Relative to Actuating Key Position

Function Diagrams

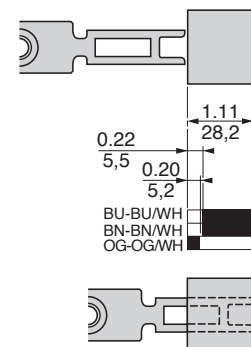
XCSMP59●



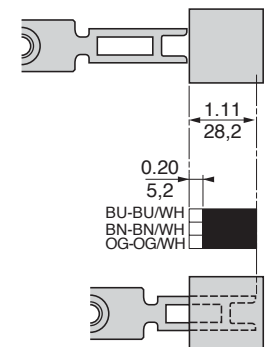
XCSMP79●



XCSMP70●



XCSMP80●



Contact Operation

■ Contact closed
□ Contact open

XCS Safety Interlock
Switches

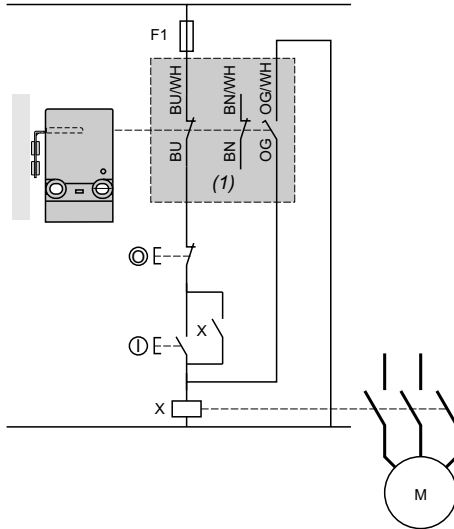
XCS Safety Interlock Switches

Wiring Diagrams

Plastic, Type XCSMP Prewired Wiring Diagrams

Wiring to category 1 conforming to EN 954-1

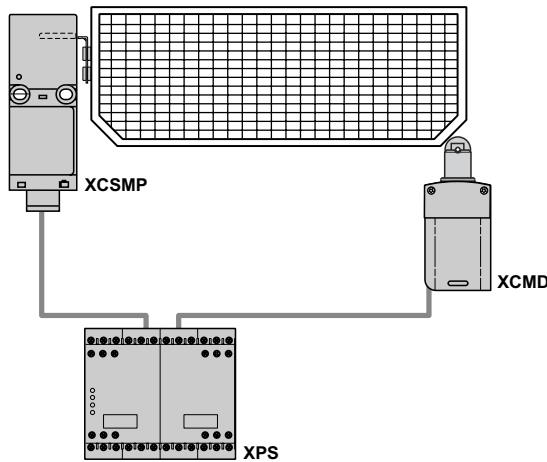
Example shown with N.C. + N.C. + N.O. contact and protection fuse to prevent jumpering of the N.C. contact, either by cable damage or by tampering.



(1) Signalling contact, i.e. to PLC

Wiring to category 4 conforming to EN 954-1. Wiring method used in conjunction with Preventa™ safety relay (the key operated safety interlock is generally used in conjunction with a standard limit switch with positive opening contacts). Method for machines with quick rundown time (low inertia)

Locking or interlocking mechanism uses the principles of redundancy and autocheck. The safety relays provide these functions



Locking by operating key and actuation in positive mode with a safety relay

The categories for control systems relating to safety (per EN 954-1) referred to above (i.e.: category 1, 3, or 4), indicate the maximum category possible based on the inputs only to the safety control circuit. The actual maximum category possible for the safety control circuit may be lower when the rest of the safety control circuit is considered. Only with proper wiring of the complete safety system can the referenced category be achieved. Actual category of the system depends on the other components used and method of wiring. For more information on wiring Preventa™ XPS safety relays, see pages 154 and 155, and Appendix B pages 286 to 288.