

KEYED INTERLOCK SWITCHES WITH SOLENOID LATCHING



2

SELECTION GUIDE

Switch Series	Housing Material	Envelope Dimensions	Contact Configurations	Catalog Page
AZM170	Glass-fiber, reinforced thermoplastic	1¼" × 2½" × 5"	Many arrangements available see catalog page	44
AZM161	Glass-fiber, reinforced thermoplastic	1¼" × 3½" × 5⅛"	1NO/2NC & 1NO/2NC	50
AZM200	Glass-fiber, reinforced thermoplastic	1¾" × 9" × 2"	2 PNP Safety Outputs 1 Diagnostic Output	54
MZM100	Glass-fiber, reinforced thermoplastic	1¾" × 7¼" × 1¾"	2 PNP Safety Outputs 1 Diagnostic Output	56
TZF/TZM	Glass-fiber, reinforced thermoplastic	1½" × 4" × 5"	1 NO & 2 NC 2 NO & 2 NC	58
TKF/TKM	Die-cast aluminum	2½" × 3½" × 8"	2 NO & 2 NC	62
TZKF/TZKM	Glass-fiber, reinforced thermoplastic	1¾" × 2" × 7"	Many arrangements available see catalog page	66
AZM415	Die-cast aluminum	2" × 5" × 5½"	2 NO & 2 NC 3 NO & 3 NC	70

SERIES AZM170

Solenoid-Latching Machine Guard Safety Interlock Switch



Features & Benefits

- **Compact design** ... only 1¼" x 3" x 4¼". Ideal where space is limited.
- **Watertight design** ... meets IP67 washdown requirements.
- **Highly tamper-resistant** ... difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **"Positive-break" NC contacts** ... assure interruption of safety circuit upon actuator key removal.
- **Two key entry locations** ... provide mounting flexibility.
- **Rugged, corrosion-resistant, high-impact glass-fibre reinforced housing** ... tolerates the most hostile environments.
- **High-strength stainless steel actuator key** ... tolerant to mechanical abuse without damage.
- **Several styles of actuator key** ... accommodate a wide variety of movable guards.
- **"Power-on" or "Power-off" latching option** ... for application versatility.
- **Built-in manual unlatching release (via special triangular key)** ... for easier installation.
- **"Padlockable" key** ... for added security during maintenance.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**
- **Units available with quick-connect "ST", screw terminals, or insulation displacement connectors (IDC).**

Description

The AZM170 Series is designed for machines/work cells where access to a hazardous work area must be controlled until safe conditions exist. Their solenoid-latching feature permits locking a machine guard until dangerous conditions, which may exist immediately after removal of power, have abated. Solenoid-latching may be controlled by a time delay, motion detector, position sensor or other suitable component.

The unit features independent actuator key (guard) position and solenoid-latching pin position contacts. These permit the prevention of machine restart until the guard is closed **and** the solenoid-latching pin is in the locked position.

The AZM170 consists of an electromechanical safety interlock switch joined to a solenoid-latching mechanism. Both the safety switch and solenoid mechanism feature "positive-break" contacts. In addition the actuator key features a built-in latch (unlocked key holding force of 7 pounds), and an auxiliary manual unlocking device ... the latter provided to aid in installation and for use in the event of a power failure (when using the "unlocking by solenoid" model).

Each unit is supplied with a cord grip and a cap to seal the unused key entry port in the solenoid-latching mechanism.

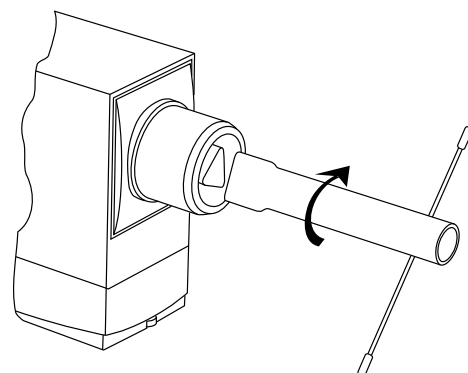


Two optional key entrances

Typical Applications



The AZM170 is intended for use as a safety interlock switch on movable machine guards which must not be opened until dangerous conditions, which may exist after the removal of power, have abated. Such conditions are flywheel overrun, spindle momentum, unstable rest positions, etc. Typical applications are textile machines, stamping presses, articulating robot arms, mixing machines, metal working equipment, printing presses and packaging machinery.



Solenoid-latch bypass/override key "-2197" (for locking via spring models only)

AZM170 AVAILABLE MODELS AND ACCESSORIES

AVAILABLE STANDARD MODELS (Order desired actuator key separately)

Part Number	Contact Configuration	Connections
Spring to Lock/Power to unlock		
AZM170-02ZRK	2NC	IDC
AZM170-11ZRK	1NO & 1NC	IDC
AZM170-02ZRK-ST-2197-*	2NC	M12x1 Quick Connect
AZM170-11ZRK-ST-2197-*	1NO & 1NC	M12x1 Quick Connect
AZM170SK-02ZRK-2197-*	2NC	Screw Terminals
AZM170SK-11ZRK-2197-*	1NO & 1NC	Screw Terminals
AZM170ST-11/02ZRK-2197-24VAC/DC	1NO & 1NC / 2NC	M12x1 Quick Connect
AZM170ST-11/11ZRK-2197-24VAC/DC	1NO & 1NC / 1NO & 1NC	M12x1 Quick Connect
AZM170ST-12/02ZRK-2197-24VAC/DC	1NO & 2NC / 2NC	M12x1 Quick Connect
AZM170ST-12/11ZRK-2197-24VAC/DC	1NO & 2NC / 1NO & 1NC	M12x1 Quick Connect
AZM170SK-02/01ZRK-2197-24VAC/DC	2NC / 1 NC	Screw Terminals
AZM170SK-02/10ZRK-2197-24VAC/DC	2NC / 1 NO	Screw Terminals
AZM170SK-11/02ZRK-2197-24VAC/DC	1NO & 1NC / 2NC	Screw Terminals
AZM170SK-11/11ZRK-2197-24VAC/DC	1NO & 1NC / 1NO & 1NC	Screw Terminals
AZM170SK-12/00ZRK-2197-24VAC/DC	1NO & 2NC / no contacts	Screw Terminals
Power to Lock – see Note 1 below		
AZM170-02ZRKA-*	2NC	IDC
AZM170-11ZRKA-*	1NO & 1NC	IDC
AZM170-02ZRKA-ST-*	2NC	M12x1 Quick Connect
AZM170-11ZRKA-ST-*	1NO & 1NC	M12x1 Quick Connect
AZM170SK-02ZRKA-*	2NC	Screw Terminals
AZM170SK-11ZRKA-*	1NO & 1NC	Screw Terminals
AZM170ST-11/02ZRKA-24VAC/DC	1NO & 1NC / 2NC	M12x1 Quick Connect
AZM170ST-11/11ZRKA-24VAC/DC	1NO & 1NC / 1NO & 1NC	M12x1 Quick Connect
AZM170ST-12/02ZRKA-24VAC/DC	1NO & 2NC / 2NC	M12x1 Quick Connect
AZM170ST-12/11ZRKA-24VAC/DC	1NO & 2NC / 1NO & 1NC	M12x1 Quick Connect
AZM170SK-02/01ZRKA-24VAC/DC	2NC / 1 NC	Screw Terminals
AZM170SK-02/10ZRKA-24VAC/DC	2NC / 1 NO	Screw Terminals
AZM170SK-11/02ZRKA-24VAC/DC	1NO & 1NC / 2NC	Screw Terminals
AZM170SK-11/11ZRKA-24VAC/DC	1NO & 1NC / 1NO & 1NC	Screw Terminals
AZM170SK-12/00ZRKA-24VAC/DC	1NO & 2NC / no contacts	Screw Terminals

*Please specify solenoid operating voltage via the addition of one of the following suffix codes:

Voltage	Add Suffix
24VAC/DC	-24VAC/DC
110VAC	-110VAC
230VAC	-230VAC

Note: Models with xx/yy contact designations are available as 24VAC/DC only.

Note: See page 94 for appropriate connector cables for use with ST models.

Note 1: Use of power-to-lock model permits the guard to be opened in the event of a power failure. Generally accepted safety standards/practices suggest this model only be used after conducting a thorough risk evaluation in the context of the application.

ACTUATOR KEYS & ACCESSORIES

Part Number	Description
AZ17/170-B1	Standard key (7.87" minimum closing radius)
AZ17/170-B5	Right-angle key (7.87" minimum closing radius)
AZM170-B6	Flexible, close-radius key (1.97" minimum closing radius)
AZ17/170-B11	Elongated standard straight key (7.87" minimum closing radius)
AZ17/170-B15	Elongated right-angle key (7.87" minimum closing radius)
AZ17/170-B1-2245	Standard straight key with vibration-resistant mounting (7.87" minimum closing radius)
AZM-KEY	Solenoid latch bypass/override key (for locking via spring models only)
AZM170-B25-L-G1	Door Handle actuator with star-grip for left-hand hinged guard
AZM170-B25-L-G2	Door Handle actuator with T-grip for left-hand hinged guard
AZM170-B25-R-G1	Door Handle actuator with star-grip for right-hand hinged guard
AZM170-B25-R-G2	Door Handle actuator with T-grip for right-hand hinged guard
MS AZM 170-P	*Adjustable mounting kit for parallel mounting
MS AZM 170-R/P	*Adjustable mounting kit for parallel or perpendicular mounting

*MS mounting kits require the use of -B6 keys

AZM170 TECHNICAL DATA

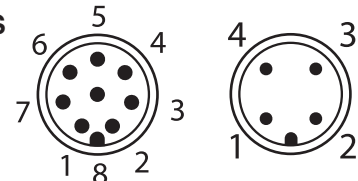
MECHANICAL SPECIFICATIONS

Housing	Glass-fibre reinforced, self-extinguishing thermoplastic	
Actuator Key	Stainless steel	
Degree of Protection	IP67	
Unlocked Key Holding Force	30N (7 pounds)	
Travel for Positive-Break	11 mm (0.440 inches)	
Closing Force	Approx. 12N (2.7 pounds)	
Locking Force	Approx. 1000N (225 pounds)	
Operating Temperature	-22°F to +175°F	
Solenoid Operating Temperature	-7°F to +140°F	
Mechanical Life	> 10 ⁶ operations	
Conformity to Standards	IEC 947-5-1	CE
	EN 60947-5-1	BG-GS-ET-19
	EN ISO 13849-1	UL
	EN 954-1	CSA
Minimum Closing Radius	1.97" (with B6 actuating key) 7.87" (with B1, B5, B11 and B15 actuating key)	

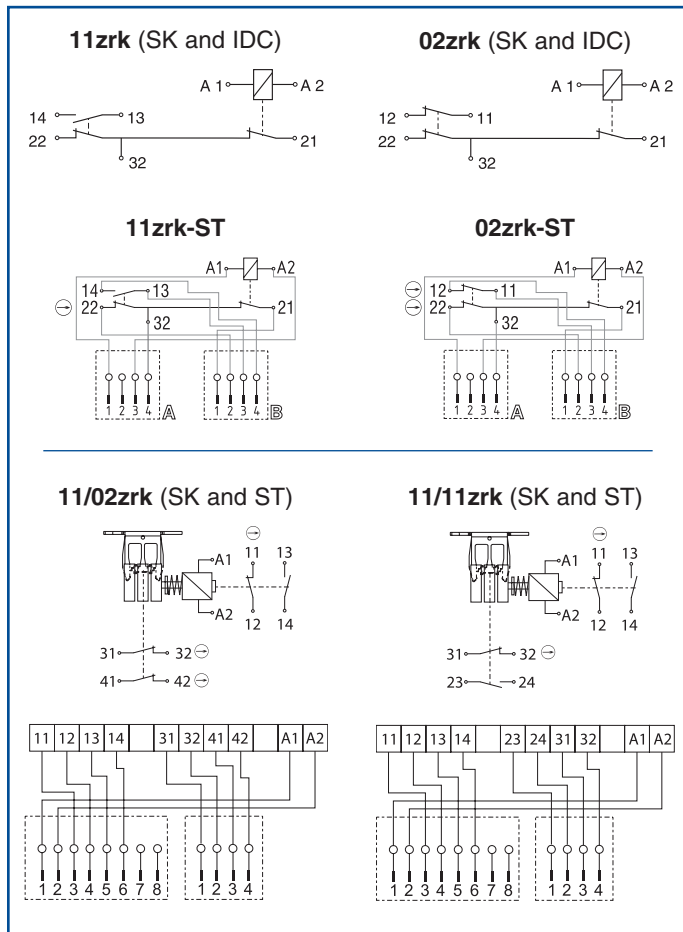
ELECTRICAL SPECIFICATIONS

Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically separated contact bridges
Contact Rating	4A/230VAC
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	6A (time-delay)
Rated Isolation Voltage	250V
Type Terminals	Screw terminals (SK), M12x1 quick connectors (ST), or insulation displacement connection (IDC)
Solenoid Supply Voltages	24VDC/AC 110VAC 40-60 Hz 230VAC 40-60 Hz Max. 10 Watts

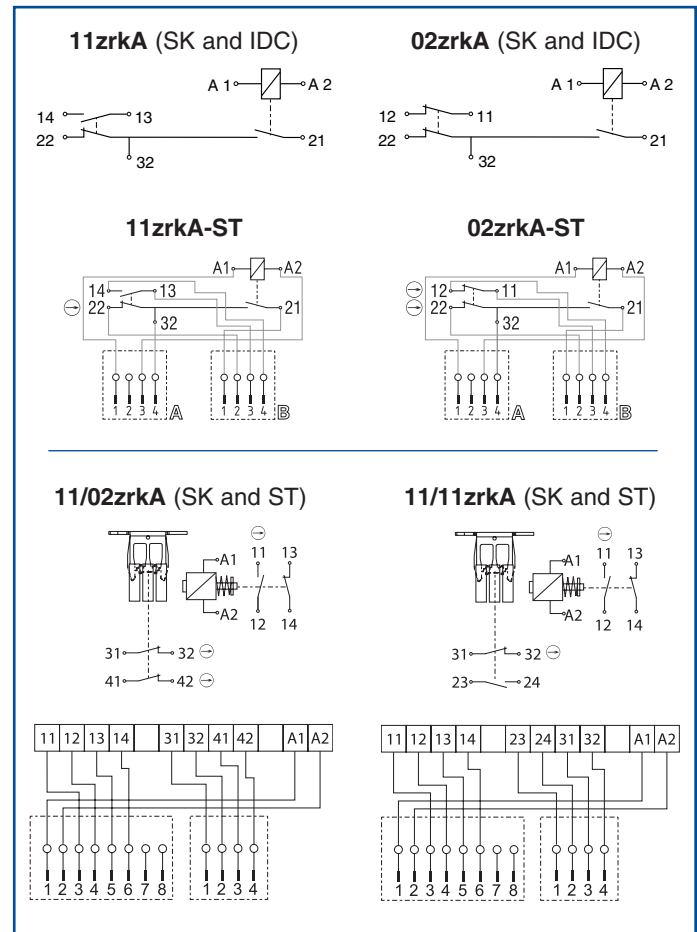
PIN ASSIGNMENTS for M12x1 connectors



SWITCHING DIAGRAMS & CONTACT SCHEMATICS (Power-to-unlock)



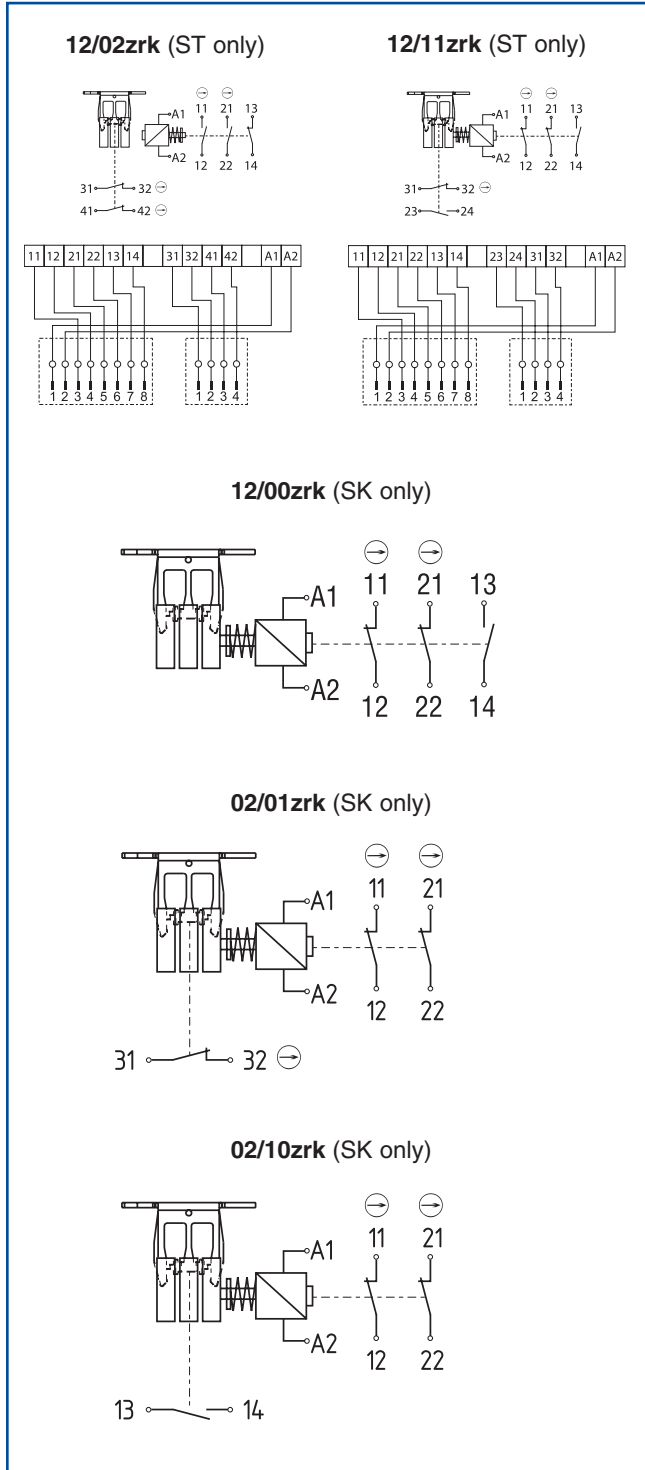
SWITCHING DIAGRAMS & CONTACT SCHEMATICS (Power-to-lock)



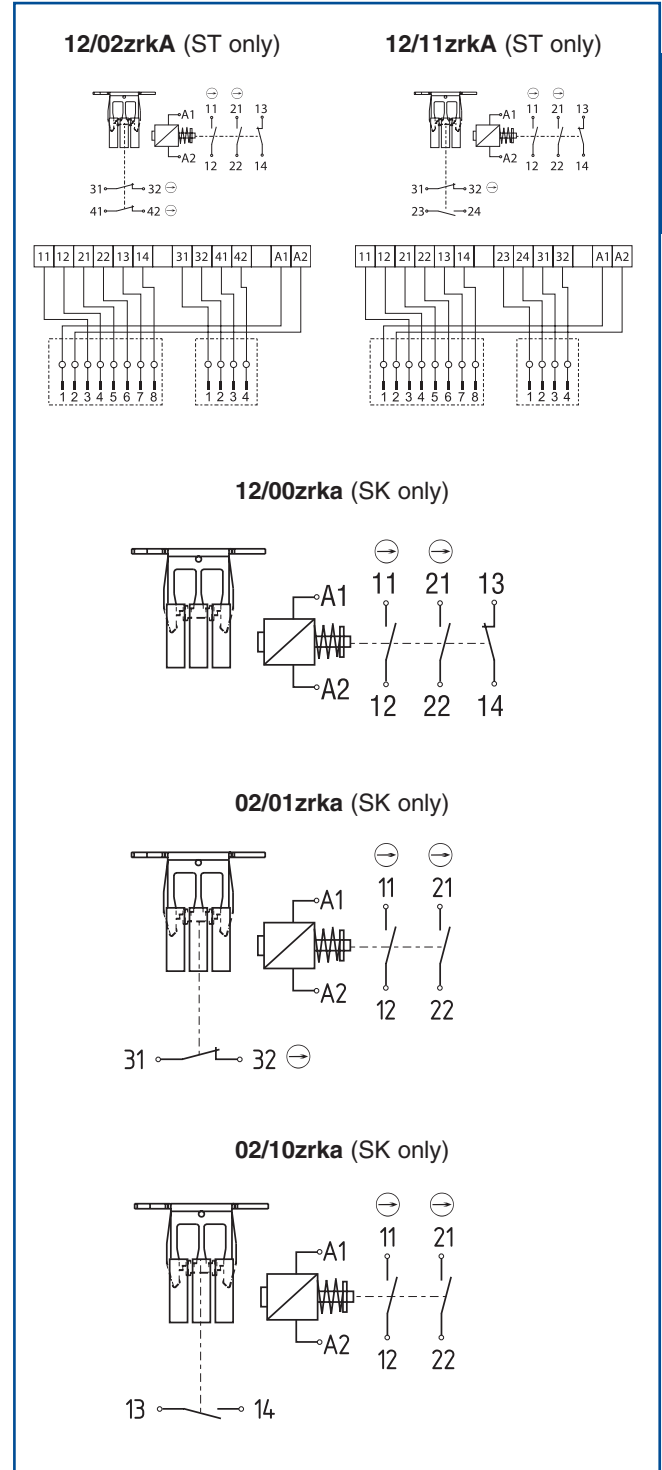
Note: Above diagrams are with actuator key inserted and solenoid de-energized.

AZM170 TECHNICAL DATA

SWITCHING DIAGRAMS & CONTACT SCHEMATICS (Power-to-unlock)



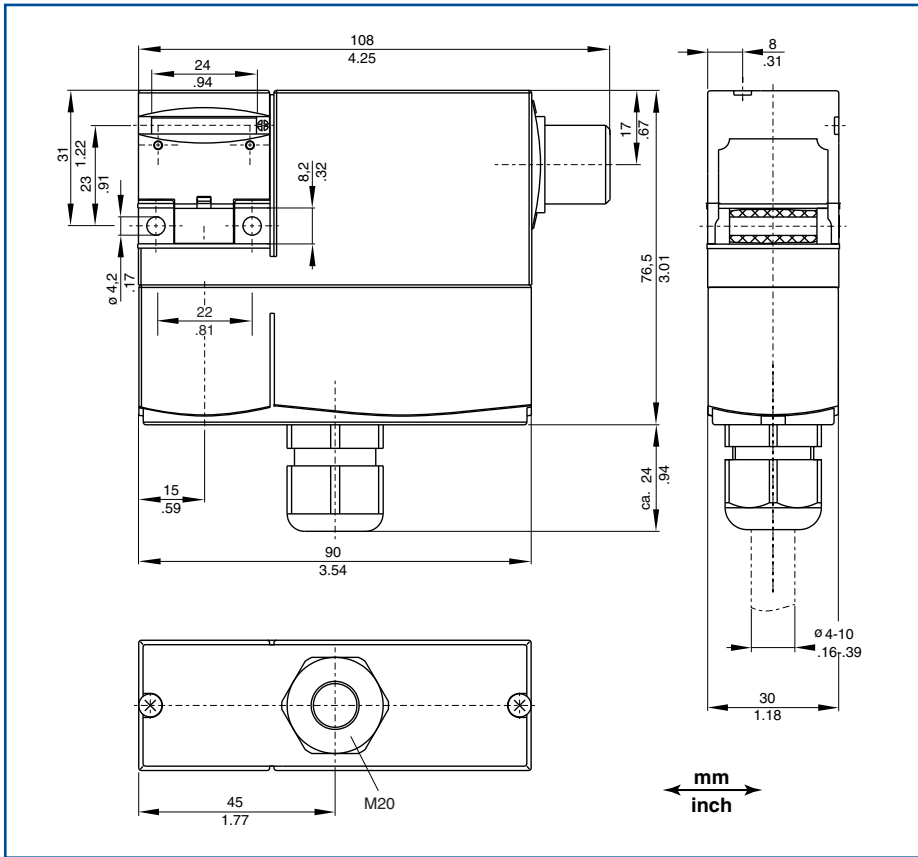
SWITCHING DIAGRAMS & CONTACT SCHEMATICS (Power-to-lock)



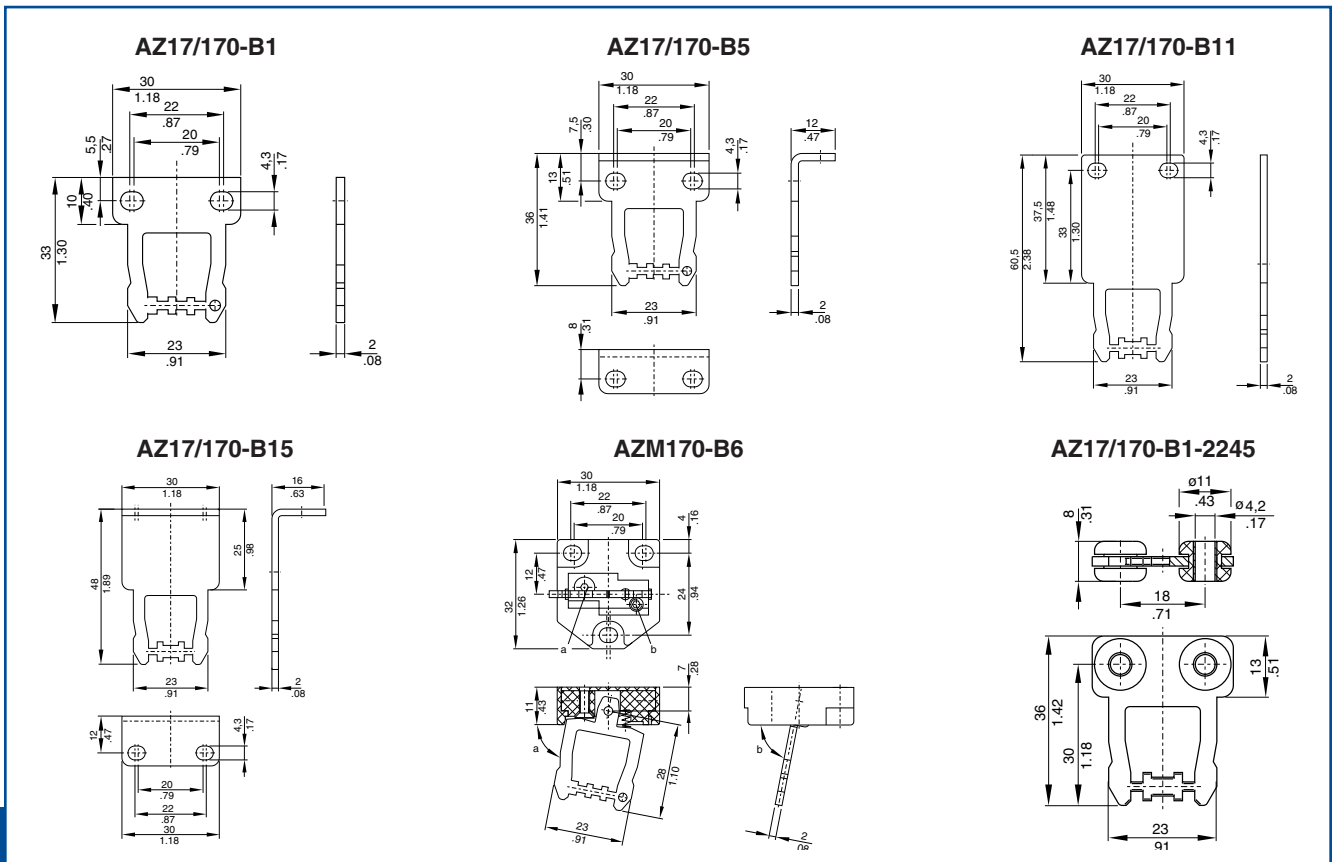
Note: Above diagrams are with actuator key inserted and solenoid de-energized.

AZM170 TECHNICAL DATA

DIMENSIONS

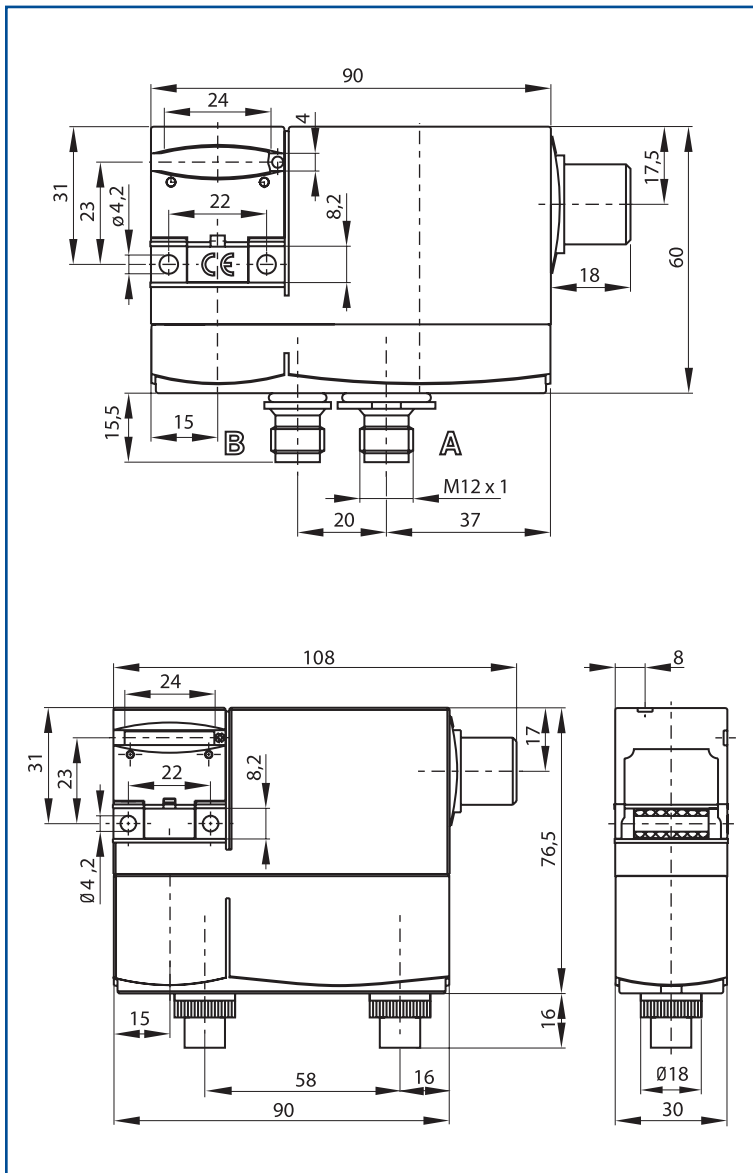


ACTUATOR KEYS

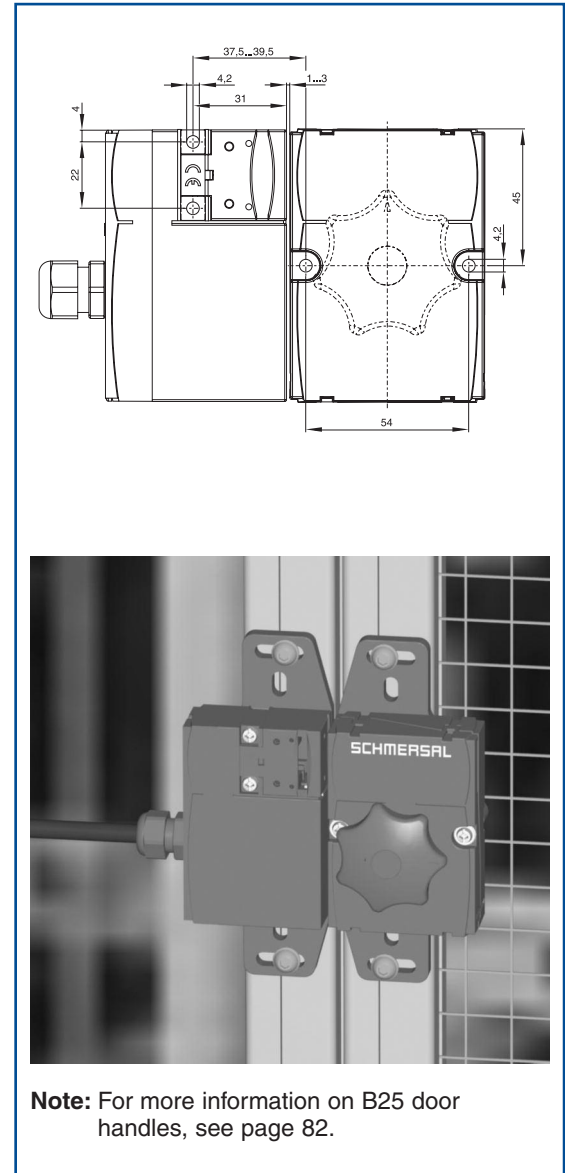


AZM170 TECHNICAL DATA

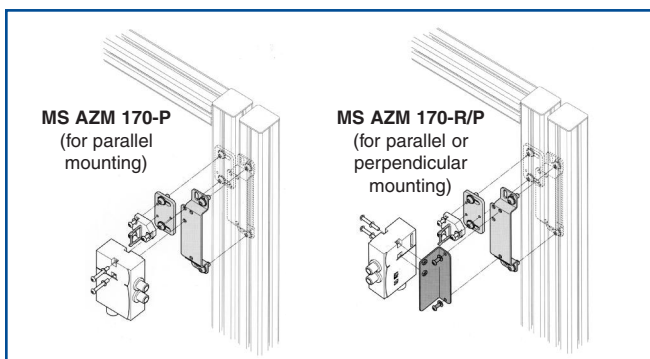
DIMENSIONS ST QUICK CONNECT MODELS

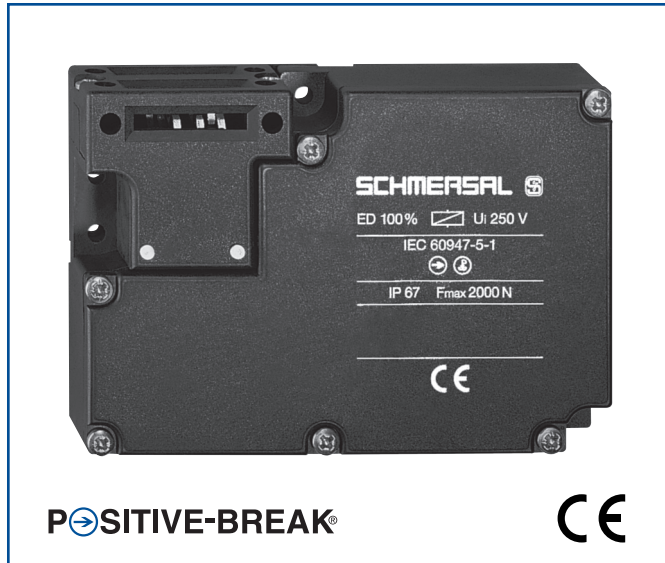


B25 Door Handle Actuator



MS AZM 170 ADJUSTABLE MOUNTING KIT (Eases installation and facilitates adjustments due to guard misalignment)





Features & Benefits

- **Solenoid-locking design** ... controls access to hazardous areas until safe conditions exist.
- **Highly tamper-resistant** ... difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **“Positive-break” NC contacts** ... assure circuit interruption upon actuator key removal.
- **Conditional “safe” outputs** ... actuating key must be fully inserted and solenoid must be actuated to lock key before “closed” safety signal is provided.
- **Watertight design** ... meets IP67 environmental requirements.
- **High-strength, stainless-steel actuator key** ... tolerates mechanical abuse without damage.
- **Rugged, corrosion-resistant housing** ... tolerates hostile environments.
- **Four optional key entry locations** ... provide installation flexibility.
- **Independent actuator key position and locking pin position monitoring contacts** ... provide a higher degree of safety.
- **Available in “solenoid-locking” and “solenoid-unlocking” models** ... for application versatility.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**
- **Wide selection of accessories** ... to meet diverse application requirements.

Description

The AZM161 Series is designed for machines/work cells where access to a hazardous work area must be controlled until safe conditions exist. Their solenoid-latching feature permits locking a machine guard until dangerous conditions, which may exist immediately after removal of power, have abated. Solenoid-latching may be controlled by a time delay, motion detector, position sensor or other suitable component.

The unit features independent actuator key (guard) position and solenoid-latching monitoring contacts. There is a mechanical linkage preventing the solenoid position contacts from changing unless the key is inserted (guard closed).

The AZM161 consists of an electromechanical safety interlock switch section with “positive-break” NC contacts and an actuator key. In addition, the solenoid mechanism features 1 NO and 2 NC solenoid-latching monitoring contacts, and an auxiliary manual unlocking device ... the latter provided to aid in installation and for use in the event of a power failure (when using the “unlocking by solenoid” model).

Operation

The AZM161 electromechanical safety interlock switch assembly consists of a rugged switch-solenoid-latching mechanism and a geometrically-unique locking actuator key. The switch actuating key is typically mounted to a movable machine guard.

When the guard is closed, the actuating key is held in position by the solenoid-latching mechanism. The guard may only be opened by energizing or de-energizing (depending upon model) the solenoid-latching mechanism.

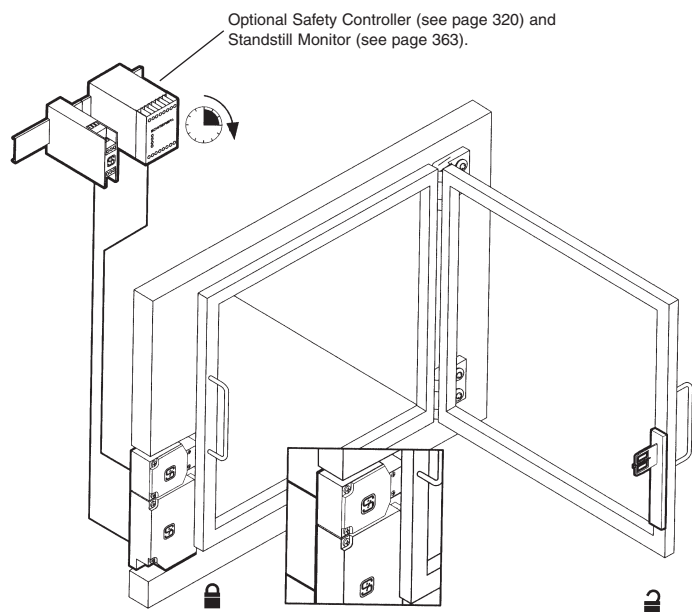
Upon opening of the guard, the switch’s “positive-break” NC contacts are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. The NO contacts close upon key removal.

The machine is prevented from starting until the actuating key is inserted (guard is closed) *and* the solenoid has locked it in the closed position.

Typical Applications



The AZM161 is intended for use as a safety interlock switch on movable machine guards which must not be opened until dangerous conditions, which may exist after the removal of power, have abated. Such conditions are flywheel overrun, spindle momentum, unstable rest positions, etc. Typical applications are textile machines, stamping presses, articulating robot arms, mixing machines, metal working equipment, printing presses and packaging machinery.



AZM161 AVAILABLE MODELS AND ACCESSORIES

AVAILABLE STANDARD MODELS (Includes 1/2" NPT Plastic Adapter. Actuator key ordered separately.)

Part Number	Contacts	Connection
Spring to Lock		
AZM161CC-12/12RK-*	1NO & 2NC/1NO & 2NC	Cage Clamps
AZM161CC-12/12RKT-*	1NO & 2NC/1NO & 2NC	Cage Clamps
AZM161CC-12/12RKN-*	1NO & 2NC/1NO & 2NC	Cage Clamps
AZM161SK-12/12RK-*	1NO & 2NC/1NO & 2NC	Screw terminals
AZM161SK-12/12RKT-*	1NO & 2NC/1NO & 2NC	Screw terminals
AZM161SK-12/12RKN-*	1NO & 2NC/1NO & 2NC	Screw terminals
Power to Lock (see Note 1 below)		
AZM161CC-12/12RKA-*	1NO & 2NC/1NO & 2NC	Cage Clamps
AZM161SK-12/12RKA-*	1NO & 2NC/1NO & 2NC	Screw terminals

* Please specify solenoid operating voltage:
-024 for 24V AC/DC
-110/230 for 110/230V AC

Solenoid By-Pass Options (on spring to lock models):

Suffix "T" indicates Emergency Exit Release
(for units mounted inside hazardous area)

Suffix "N" indicates Emergency Release
(for units mounted outside hazardous area)

See page 53 for diagrams

Note 1: Use of power-to-lock model permits the guard to be opened in the event of a power failure. Generally accepted safety standards/practices suggest this model only be used after conducting a thorough risk evaluation in the context of the application.

POSITIVE-BREAK® is a trademark of SCHMERSAL

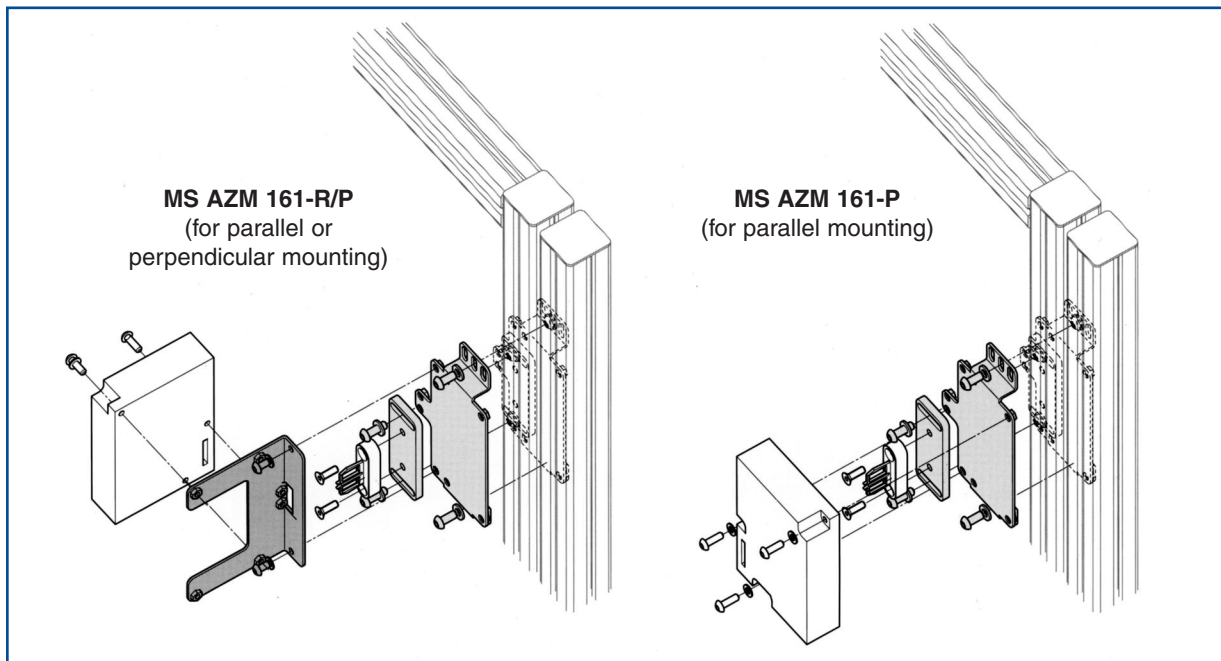
AVAILABLE KEYS & ACCESSORIES

Part Number	Description
AZM161-B1	Standard actuating key
AZM161-B1E	Standard actuating key with heavy-duty mounting bracket
AZM161-B6	Small radius actuating key
AZM161-B6-2177	Funnel entry adapter with elongated flexible-movement actuating key
AZM161-ST30-01	STS door handle systems for use with AZM161. See page 77 for details and selection guide.
AZM161-ST30-02	
AZM161-ST30-03	
AZM161-ST30-04	
AZM161-ST30-05	
AZM161-ST30-06	
AZM161-ST30-07	
AZM161-ST30-08	
AZM-Key	Solenoid-latch bypass key
M16-CG	Cord grip (cable gland)
M16-1/2"P	Plastic 1/2" NPT adapter
M16-1/2"M	Metal 1/2" NPT adapter
PL-M16-24V	24VAC/DC pilot light kit
PL-M16-120V	120VAC/DC pilot light kit
MS AZM 161-P	Adjustable mounting kit for parallel mounting
MS AZM 161-R/P	Adjustable mounting kit for parallel or perpendicular mounting

MS mounting kits require the use of -B6 keys

MS AZM 161 ADJUSTABLE MOUNTING KIT

(Eases installation and facilitates adjustments due to guard misalignment)



AZM161 TECHNICAL DATA

MECHANICAL SPECIFICATIONS

Housing	Glass-fibre reinforced self-extinguishing thermoplastic
Actuator Key	Stainless steel (defeat-resistant design)
Degree of Protection	IP67
Unlocked Holding Force	30N (7 pounds)
Travel for Positive-Break	8mm (0.315 inches)
Force to Reach Positive-Break	10N (Approx. 2.4 pounds)
Closing Force	Approx. 15 N (3.4 pounds)
Operating Temperature	-13°F to +104°F
Mechanical Life	1 million operations
Conformity to Standards	IEC 947-5-1 CE EN 60947-5-1 BG-GS-ET-19 EN ISO 13849-1 UL EN 954-1 CSA
Solenoid Locking Force	2,000N (440 pounds)
Key Return Force	0N
Minimum Closing Radius	5.9" (150mm) with B1 and B1E actuating key 3.7" (95mm) with B6 actuating key

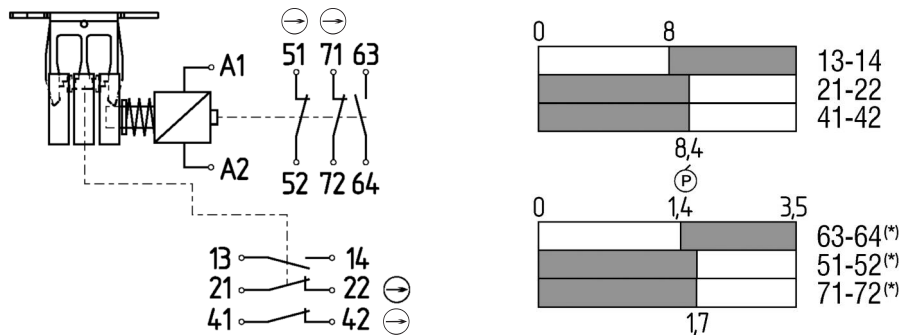
ELECTRICAL SPECIFICATIONS

Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically separated contact bridges
Contact Gap	2 × 2 mm (minimum)
Contact Rating	4A (230VAC)
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	Fuse 6A (time-delay)
Rated Insulation Voltage	250VAC
Rated Impulse Withstand Voltage	6kV
Type Terminals*	Screw terminals Cage Clamps
Available Solenoid Supply Voltages (Vs)	24VDC, 110VDC, 230VDC 24VAC/50Hz 115VAC/60Hz 230VAC/50Hz
Solenoid Power Consumption	10W (maximum)
Solenoid Duty Cycle	100%
Solenoid Pull-in Voltage	(0.85 to 1.1) Vs
Solenoid Drop-out Voltage	(0.2 to 0.75) Vs

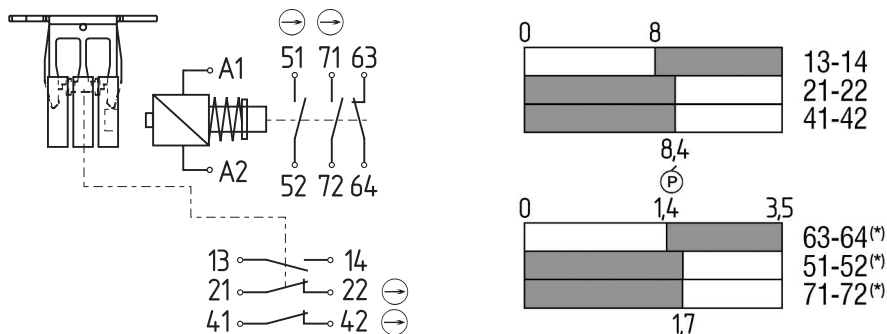
*Optional quick disconnect versions available.
Please consult factory.

SWITCHING DIAGRAMS & CONTACT SCHEMATICS (Solenoid-mechanism not energized)

AZM 161SK-12/12rk

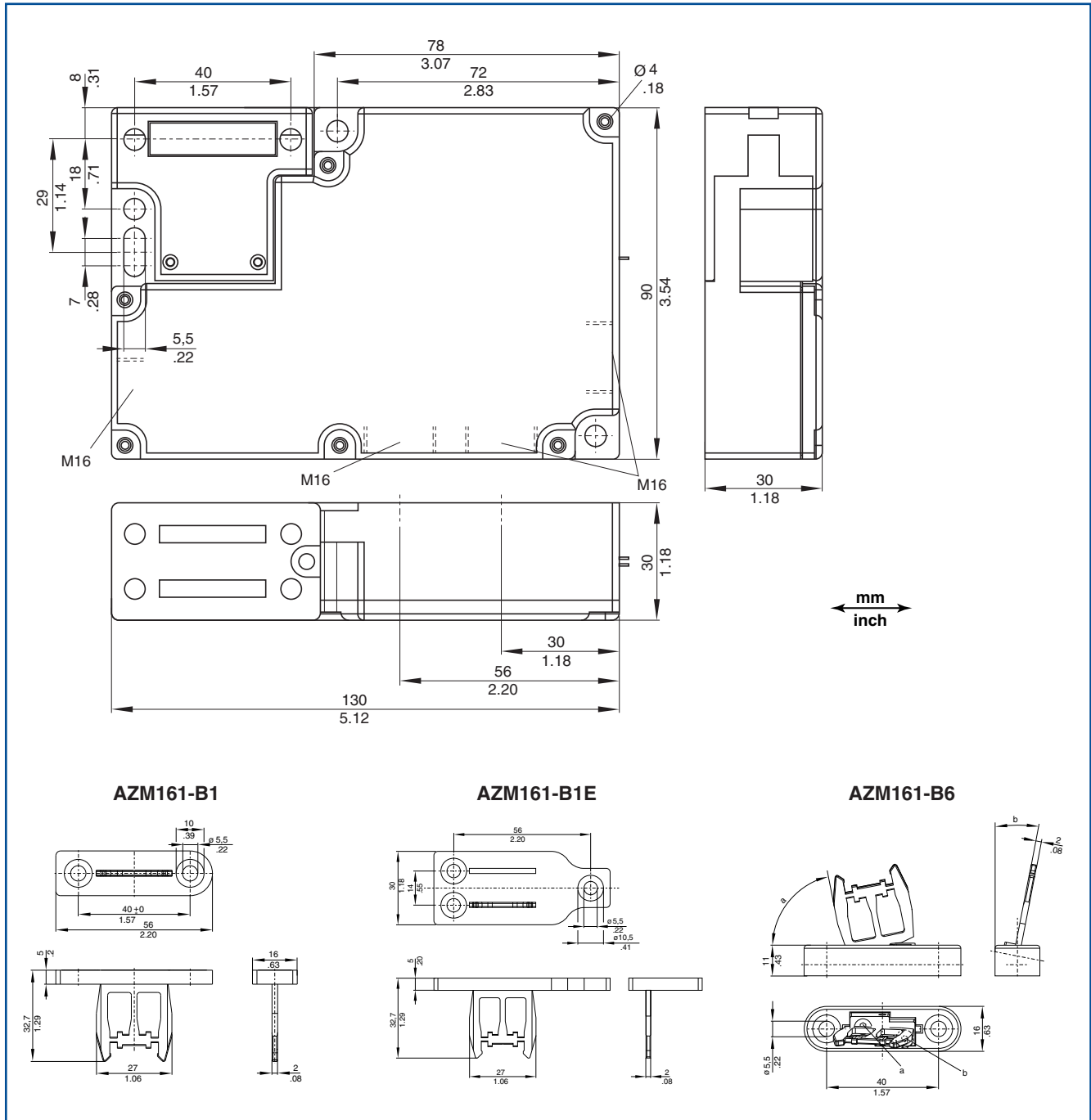


AZM 161SK-12/12rka



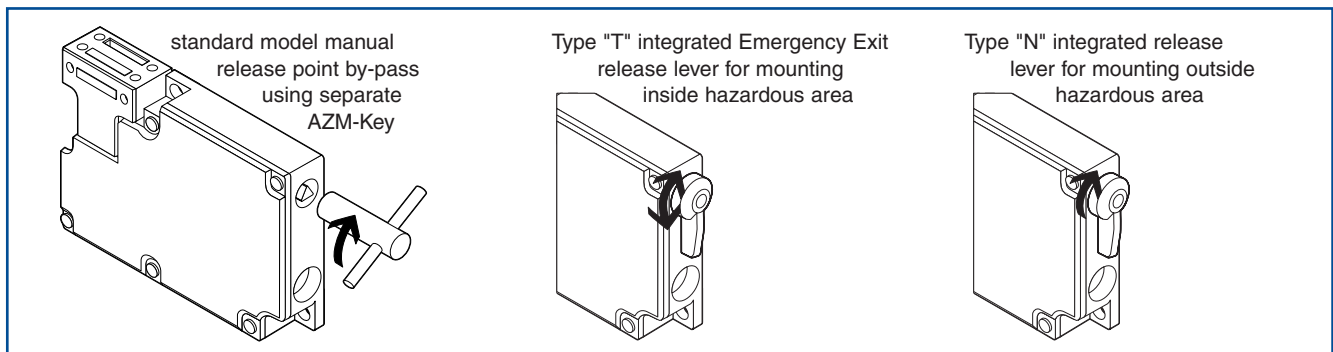
AZM161 TECHNICAL DATA

DIMENSIONS (Switch & Actuator Keys)



2

Solenoid Latch By-pass Release examples (spring-to-lock models)



SERIES AZM 200

Pulse-Echo Based Non-Contact Solenoid Interlock



Description

The AZM 200 Series is designed for machine/work cells where access to a hazardous work area must be controlled until safe conditions exist. Their solenoid-latching feature permits locking a machine guard until dangerous conditions, which may exist immediately after removal of power, have abated. Solenoid-latching may be controlled by a time delay, motion detector, position sensor or other suitable component.

The AZM 200 consists of a solenoid-latching interlock and actuator unit with door handle and optional emergency exit handle. The actuator is always inserted into its housing, protecting the actuator and the operator against damage and injury. Utilizing pulse-echo sensor technology, the actuator and interlock can have an offset of ± 5 mm and the actuator still engages the interlock.

Due to the one-hand operation of the emergency exit handle, the hazardous area can be left quickly and safely—even during a power failure (when using the “unlock by power” model).

The solenoid interlock is a dual channel design with two short-circuit proof, safe PNP outputs, each of which can switch up to 250 mA.

With continuous internal function tests, the monitoring of the safety outputs and the use of door detection sensors, up to 31 AZM 200 solenoid interlocks can be wired in series without detriment to the safety performance level/control category (PL_e to EN ISO 13849-1/Control Category 4 to EN 954-1).

Typical Applications

The AZM 200 is intended for use as a safety interlock switch on movable machine guards which must not be opened until dangerous conditions, which may exist after the removal of power, have abated. Such conditions are flywheel overrun, spindle momentum, unstable rest positions, etc. Typical applications are textile machines, stamping machines, metal working equipment, printing presses and packaging machines.

Features & Benefits

- **Solenoid locking design** ... controls access to hazardous areas until safe conditions exist.
- **Non-contact sensing** ... for long term reliability.
- **Dual purpose handle** ... unlatches and opens guard—no additional door handles are needed.
- **Integral LED diagnostics** ... indicates operating states
- **Integral self-monitoring and door detection sensors** ... satisfy requirements of PL_e to EN ISO 13849-1 Safety Control Category 4 to EN 954-1. *See Note Below.
- **One-hand emergency release** ... hazardous area can be left quickly and safely—even during a power failure.
- **Switch and actuator do not protrude into door opening** ... no risk of injury or damage from a protruding actuator.
- **Dual PNP 250 mA safety outputs** ... for application versatility.
- **Designed for “daisy chaining”** ... up to 31 devices, max 200 m, can be wired in series without detriment to safety performance level.

AVAILABLE AZM200 MODELS

Part Number	Description
Spring to Lock, Power to unlock	
AZM200SK-T1P2P	Diagnostic Output (Screw Terminals)
AZM200SK-TSD2P	Serial Diagnostic Output* (Screw Terminals)
AZM200ST1-T1P2P	Diagnostic Output (M23x1 quick connect, 9 pin)
AZM200ST1-TSD2P	Serial Diagnostic Output* (M23x1 quick connect, 9 pin)
AZM200ST2-T1P2P	Diagnostic Output (M12x1 quick connect, 8 pin)
AZM200ST2-TSD2P	Serial Diagnostic Output* (M12x1 quick connect, 8 pin)
AZM200ST-T1P2P-2568	Diagnostic Output, with pushbutton & LED (M23x1 quick connect, 12 pin)
Power to Lock, Spring to unlock	
AZM200SK-T1P2PA	Diagnostic Output (Screw Terminals)
AZM200SK-TSD2PA	Serial Diagnostic Output* (Screw Terminals)
AZM200ST1-T1P2PA	Diagnostic Output (M23x1 quick connect, 9 pin)
AZM200ST1-TSD2PA	Serial Diagnostic Output* (M23x1 quick connect, 9 pin)
AZM200ST2-T1P2PA	Diagnostic Output (M12x1 quick connect, 8 pin)
AZM200ST2-TSD2PA	Serial Diagnostic Output* (M12x1 quick connect, 8 pin)
AZM200ST-T1P2PA-2568	Diagnostic Output, with pushbutton & LED (M23x1 quick connect, 12 pin)

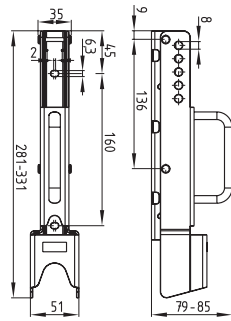
ACTUATORS

Part Number	Description
AZ/AZM200-B1-LT	Sliding Guard Actuator, approach from left
AZ/AZM200-B1-LTP0	Sliding Guard Actuator, approach from left with inside emergency door release
AZ/AZM200-B1-RT	Sliding Guard Actuator, approach from right
AZ/AZM200-B1-RTP0	Sliding Guard Actuator, approach from right with inside emergency door release
AZ/AZM200-B30-LTAG1	Door Handle Actuator, hinged on left
AZ/AZM200-B30-LTAG1P1	Door Handle Actuator, hinged on left with inside emergency door release
AZ/AZM200-B30-RTAG1	Door Handle Actuator, hinged on right
AZ/AZM200-B30-RTAG1P1	Door Handle Actuator, hinged on right with inside emergency door release

SERIES AZM 200 AVAILABLE KEYS AND DIMENSIONS

Part number: SZ200

Description:
Lockout tag, up to 5 padlocks



Connector Cables for ST Models

Please see page 94 for appropriate connector cable part numbers.

ST1 versions use M12, 8 pin connectors
(part numbers starting A-K8P-M12...)

ST2 versions use M23, 9 pin connectors
(part numbers starting A-K8+1-M23...)

ST versions use M23, 12 pin connectors
(part numbers starting A-K12P-M23...)

*Sensors with Serial Diagnostic output are for use with various field bus protocols, see page 204 for SD Gateways.

2

Safety Control Module Requirements Dual-channel safety inputs, suitable for PNP semiconductor outputs. See page 320 for recommended SCHMERSAL safety control modules.

*Note: A safety control module may be required for reset function and/or feedback monitoring functions, as well as increased output current requirements.

AZM200...2568 includes pushbutton for authorized release at switch site.



NOTE: For complete technical data, diagnostics and wiring examples, please see page 172 of the “Pulse-Echo Based Non-Contact Safety Sensors” section.



Description

The MZM 100 Series is designed for machine/work cells where access to a hazardous work area must be controlled until safe conditions exist. Their magnetic-latching feature permits locking a machine guard until dangerous conditions, which may exist immediately after removal of power, have abated.

The MZM 100 consists of a magnetic-latching interlock and actuator unit. An electromagnet is utilized to generate a 500 N holding force. An integrated pulse-echo based sensor detects and monitors the position of the safety guard. This sensor technology permits an offset between the actuator and interlock of ± 5 mm vertical and ± 3 mm horizontal.

The MZM100 magnetic-latching interlock is a dual channel design with two short-circuit proof, safe PNP outputs, each of which can switch up to 250 mA. The holding force is permanently electronically measured and monitored. If the holding force drops below 500 N, the safety outputs are not enabled, recognizing a dirty interlock.

With continuous internal function tests, the monitoring of the safety outputs and the use of door detection sensors, up to 31 MZM 100 magnetic-latching interlocks can be wired in series without detriment to the Safety Performance Level control category (PL_e per EN ISO 13849-1/Control Category 4 per EN954-1).

Typical Applications

The MZM 100 is intended for use as a safety interlock switch on movable machine guards which must not be opened until dangerous conditions, which may exist after the removal of power, have abated. Such conditions are flywheel overrun, spindle momentum, unstable rest positions, etc. Typical applications are textile machines, stamping machines, food processing equipment, metal working equipment, wood working and packaging machines.

Features & Benefits

- **Magnetic-latching design** ... controls access to hazardous areas until safe conditions exist (100 lbs. locked holding force).
- **Forced-closed operating principle** ... no mechanical wear due to non-contact design.
- **Integral LED diagnostics** ... indicates operating states
- **Integral self-monitoring and door detection sensors** ... satisfy requirements of PL_e per EN ISO 13849-1, Control Category 4 per EN 954-1. *See Note Below.
- **Designed for “daisy chaining”** ... up to 31 devices, max 200 m, can be wired in series without detriment to safety performance level.
- **Automatic magnetic latch (35 N)** ... no mechanical latching required (“r” version only).
- **Smooth surfaces allow for easy cleaning** ... ideal where high hygienic standards need to be maintained.
- **Dual PNP 250 mA safety outputs** ... for application versatility.

AVAILABLE MZM100 MODELS

Part Number	Description
MZM100ST-1P2PA	2-PNP safety outputs, diagnostic output
MZM100ST-SD2PA	2-PNP safety outputs, Serial diagnostic output*
MZM100ST-1P2PRA	2-PNP safety outputs, diagnostic output, with variable latching (30N to 240N)
MZM100ST-SD2PRA	2-PNP safety outputs, Serial diagnostic output*, with variable latching (30N to 240N)

*Sensors with Serial Diagnostic output are for use with various field bus protocols, see page 204 for SD Gateways.

ACTUATORS & ACCESSORIES

Part Number	Description
MZM100-B1.1	Actuator
MS MZM 100-W	Mounting Set

Note: For appropriate connector cable, please see page 96. Order cable starting with A-K8+1-M23...

Safety Control Module Requirements

Dual-channel safety inputs, suitable for PNP semiconductor outputs. See page 320 for recommended SCHMERSAL safety control modules.

Note: A safety control module may be required for reset function and/or feedback monitoring functions, as well as increased output current requirements.

SERIES MZM 100 TECHNICAL DATA

MECHANICAL SPECIFICATIONS

Housing	Fiberglass reinforced thermoplastic
Degree of Protection	IP67
Unlocked Holding Force	35N (7 pounds) ("r" version only)
Magnetic Holding Force	500N (112 pounds)
Operating Temperature	-25°C to +55°C
Storage Temperature	-25°C to +85°C
Response Time	≤ 100ms
Vibration Resistance	10-55Hz, amplitude 1mm
Shock Resistance	30g/11ms
Mechanical Life	1 million operations
Mounting	40mm profiles
Conformity to Standards	CE BG EN 60947-5-1 UL/CSA EN 954-1 EN ISO 13849-1 IEC 61508

ELECTRICAL SPECIFICATIONS

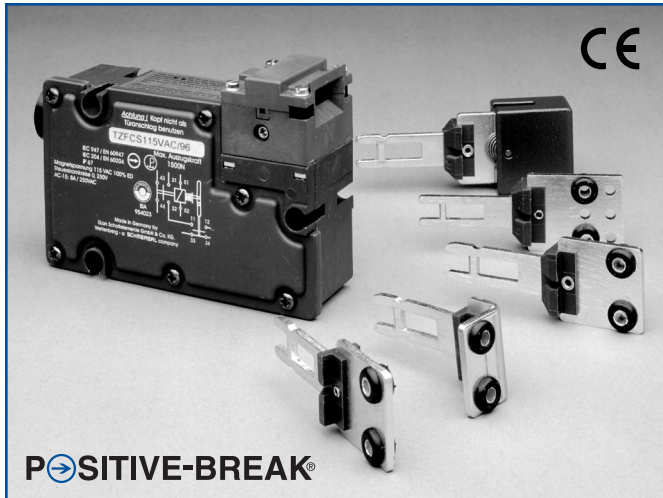
Mode of Operation	Magnetic & Inductive
Rated Operating Voltage	24 VDC -15%/+10%
Rated Operating Current	1.0A
No Load Current	0.5A
Residual Current	≤ 0.5mA
Rated Impulse Withstand Voltage	0.8kV
Rated Insulation Voltage	32 VDC
Safety Outputs	(2) PNP, short-circuit proof
Safety Output Operating Current	0.25A per output
Safety Output Operating Voltage	Max. 4V below rated operating voltage
Signaling Output	PNP, short-circuit proof
Signaling Output Operating Current	Max. 0.05A
Signaling Output Operating Voltage	Max. 4V below rated operating voltage
Termination	Connector M23x1

2

NOTE: For complete technical data, diagnostics and wiring examples, please see page 178 of the "Pulse-Echo Based Non-Contact Safety Sensors" section.

SERIES TZF/TZM

Heavy-Duty Solenoid-Latching Safety Interlock Switch



Description

The TZF/TZM Series is designed for machines/work cells where access to a hazardous work area must be controlled until safe conditions exist. Their solenoid-latching feature permits locking a machine guard until dangerous conditions, which may exist immediately after removal of power, have abated. Solenoid-latching may be controlled by a time delay, motion detector, position sensor or other suitable component.

The unit features independent actuator key (guard) position and solenoid-latching monitoring contacts. These permit the prevention of machine restart until the guard is closed and the solenoid-latching pin is in the locked position.

The TZF/TZM Series consists of an electromechanical safety interlock switch with "positive-break" contacts and a locking actuator key. In addition, the TZFS model features an auxiliary manual unlocking device ... the latter provided to aid in installation and for use in the event of a power failure (when using the "unlocking by solenoid" model).

Operation

The TZF/TZM Series of electromechanical safety interlock switch assembly consists of a rugged switch, a solenoid-operated latching mechanism, and a geometrically-unique actuator key. The switch actuating key is typically mounted to a movable machine guard.

When the guard is closed, the actuating key is held in position by the latching mechanism. The guard may only be opened by energizing or de-energizing (depending upon model) the latching mechanism.

Upon opening of the guard, the switch's "positive-break" NC contacts are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. The NO contacts close upon key removal.

The solenoid-latching mechanism circuit features a NO and a NC contact which permit monitoring its status. This NC contact is wired in series with the NC contact in the safety switch circuit. Thus the machine is prevented from starting until the actuating key is inserted (guard is closed) and the solenoid has locked it in the closed position.

Features & Benefits

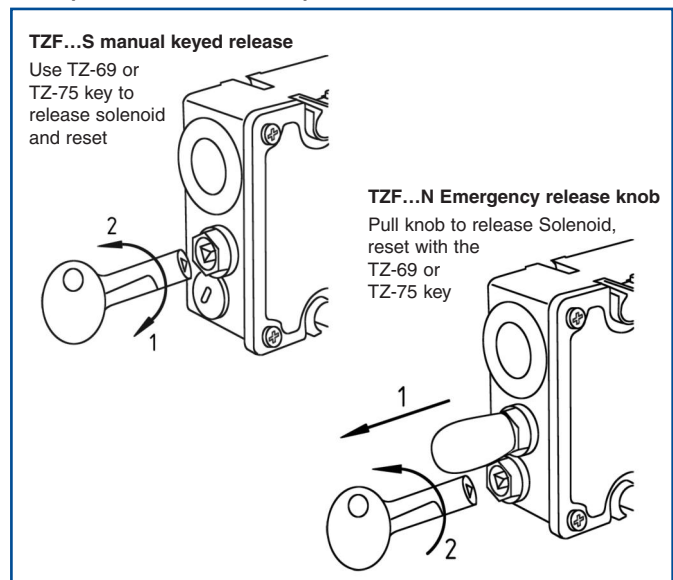
- **Solenoid-locking & spring-locking designs** ... controls access to hazardous areas until safe conditions exist.
- **Highly tamper-resistant** ... difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **"Positive-break" NC contacts** ... assure circuit interruption upon actuator key removal.
- **Conditional "safe" outputs** ... actuating key must be fully inserted and solenoid must be actuated to lock key before "closed" safety signal is provided.
- **Watertight design** ... meets IP67 environmental requirements.
- **High-strength, galvanized-steel actuator key** ... tolerates mechanical abuse without damage.
- **Rugged, corrosion-resistant housing** ... tolerates hostile environments.
- **Three optional key entry locations** ... rotatable actuator head provides installation versatility.
- **Independent actuator key position and locking pin position monitoring contacts** ... provide a higher degree of safety.
- **Padlockable key** ... for added security during equipment maintenance.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**
- **Wide selection of actuating keys** ... to meet diverse application requirements.
- **Special types for food industry** ... please consult factory.

Typical Applications



The TZF/TZM Series is intended for use as a safety interlock switch on movable machine guards which must not be opened until dangerous conditions, which may exist after the removal of power, have abated. Such conditions are flywheel overrun, spindle momentum, unstable rest positions, etc. Typical applications are textile machines, stamping presses, articulating robot arms, mixing machines, metal working equipment, printing presses and packaging machinery.

TZF (SPRING TO LOCK) RELEASE OPTIONS



SERIES TZF/TZM AVAILABLE MODELS AND ACCESSORIES

2

AVAILABLE STANDARD MODELS

(Includes 1/2" NPT Plastic Conduit Adapter and TZ/CO Standard Actuator key)

Part Number	Contacts
Spring lock / Power to unlock	
TZFS-*	2 NC (series) & 1 NO
TZFCS-*	2 NC (series) & 2 NO
TZFWS-*	2 NC (parallel) & 1 NO
TZFCWS	2 NC (parallel) & 2 NO
Power to lock / spring unlock (see Note 1 below)	
TZM-*	2 NC (series) & 1 NO
TZMC-*	2 NC (series) & 2 NO
TZMW-*	2 NC (parallel) & 1 NO
TZMCW	2 NC (parallel) & 2 NO

*Please indicate desired operation voltage:

Voltage:	Suffix:
24VDC	no suffix
115VAC	-115
230VAC	-230

For Spring to Lock (TZF) models:

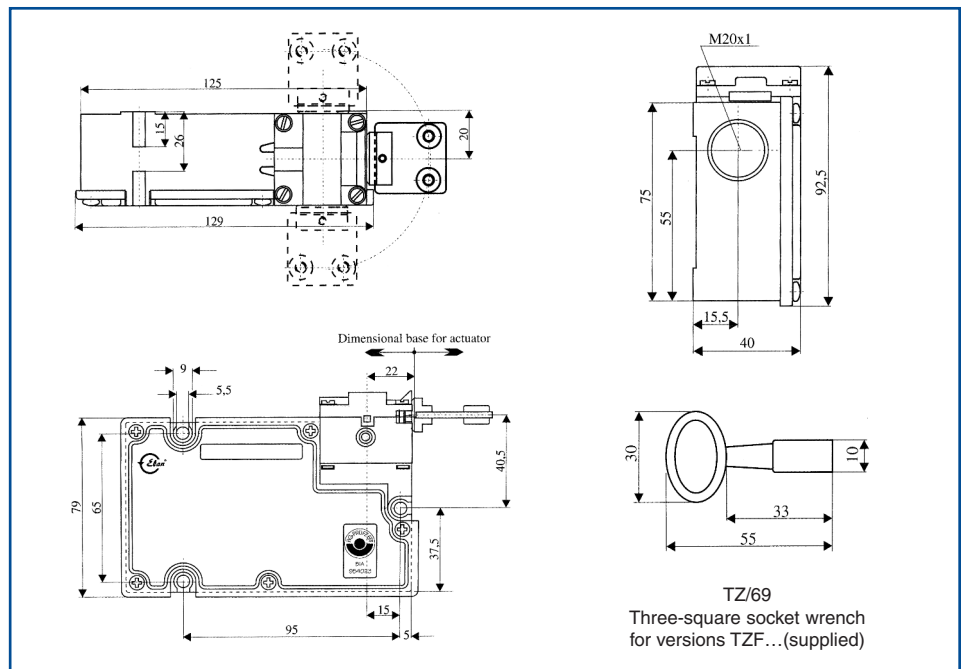
For a manual emergency release, change "S" to "N" in the part number (TZFN)

OPTIONAL ACTUATOR KEYS & ACCESSORIES

Part Number	Description
TZ/CO	Standard straight actuator key (13" minimum closing radius)
TZ/CW	Right-angled straight actuator key (11.8" minimum closing radius)
TZ/COR	Radial entry actuator key (11.8" minimum closing radius)
TZ/CK	Short straight actuator key (6.3" minimum closing radius)
TZ/CWR	Right-angled bent actuator key (11.8" minimum closing radius)
TZ/COF/HIS.1	Pivoting straight actuator key (rear-mounted) (13.8" minimum closing radius)
TZ/COF/HIS.2	Pivoting straight actuator key (top-mounted) (13.8" minimum closing radius)
TZ/CORF/HIS.1	Pivoting straight actuator key (rear-mounted) (7.1" minimum closing radius)
TZ/CORF/HIS.2	Pivoting straight actuator key (top-mounted) (5.9" minimum closing radius)
TZ-69	Straight safety interlock auxiliary release key (for TZF models)
TZ-75	Right-angled safety interlock auxiliary release key (for TZF models)

DIMENSIONS

Note 1: Use of power-to-lock model permits the guard to be opened in the event of a power failure. Generally accepted safety standards/practices suggest this model only be used after conducting a thorough risk evaluation in the context of the application.



SERIES TZF/TZM TECHNICAL DATA

MECHANICAL SPECIFICATIONS

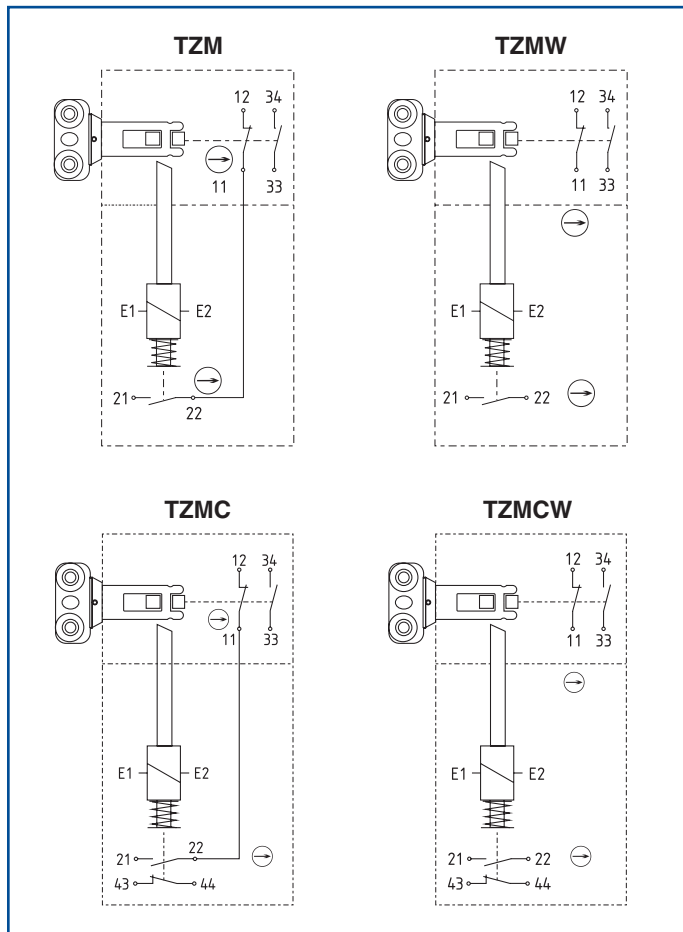
Housing	Glass-fibre reinforced self-extinguishing thermoplastic
Actuator Key	Galvanized steel (defeat-resistant design)
Degree of Protection	IP67
Unlocked Holding Force	20N (4.8 pounds)
Travel for Positive-Break	14.5 mm
Force to Reach Positive-Break	20N (Approx. 4.8 pounds)
Closing Force	Approx. 10 N (2.4 pounds)
Operating Temperature	-13°F to +104°F
Mechanical Life	2 million operations (minimum)
Shock Resistance	30g / 11ms
Vibration Resistance	20g / 10...55Hz
Conformity to Standards	IEC 947-5-1 UL EN 60947-5-1 CSA EN ISO 13849-1 EN 954-1 CE BG-GS-ET-15
Solenoid Locking Force	1,700N (380 pounds)
Minimum Closing Radius	Dependent upon actuator key used. Please see actuator key selection chart.

ELECTRICAL SPECIFICATIONS

Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically separated contact bridges
Contact Gap	Guard monitoring: 2 × 3.5 mm Solenoid monitoring: 2 × 3 mm
Contact Rating	8A (250VAC)
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	10A (slow-blow)
Rated Insulation Voltage	250VAC
Rated Impulse Withstand Voltage	4kV
Type Terminals	Screw terminals with self-lifting clamps for up to 13 AWG solid wire (2.5mm ²) or 13 AWG stranded (1.5mm ²) wire
Available Solenoid Voltages	24VDC 115VAC 230VAC
Solenoid Power Consumption	8.8W (maximum)
Solenoid Duty Cycle	100%

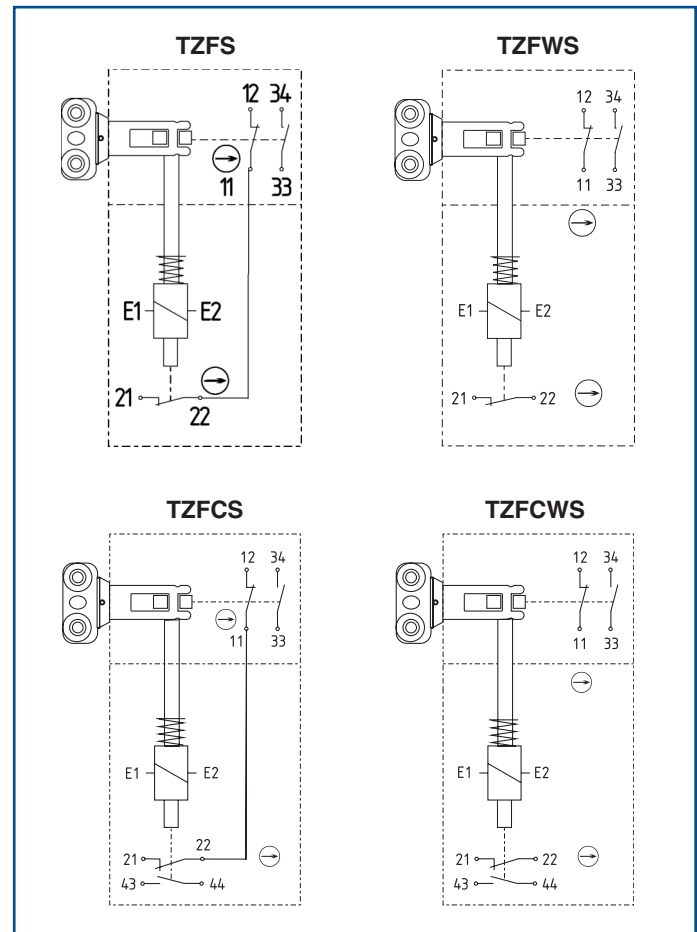
CONTACT CONFIGURATIONS

TZM (power-to-lock) models



CONTACT CONFIGURATIONS

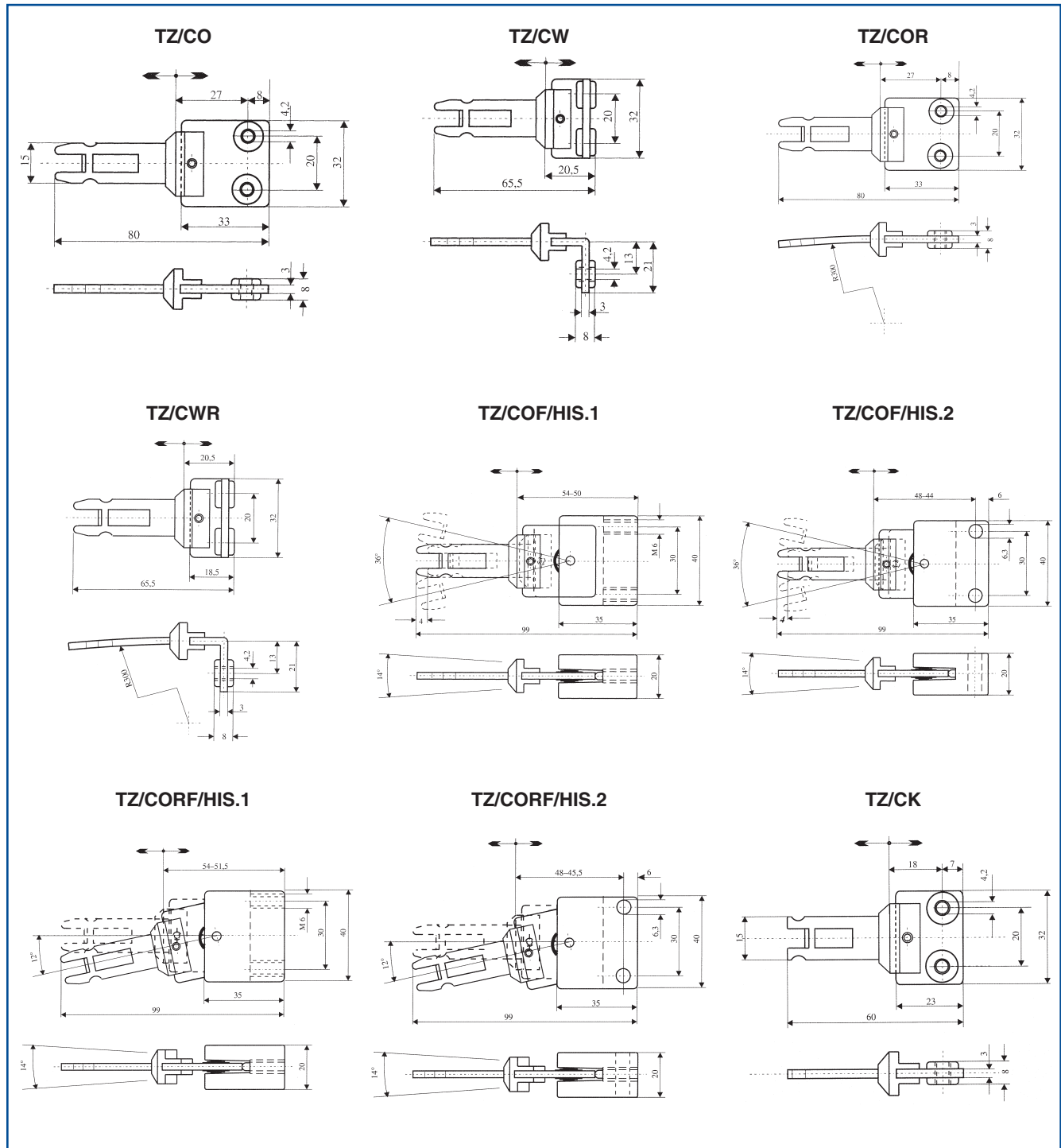
TZF (spring lock/power-to-unlock) models

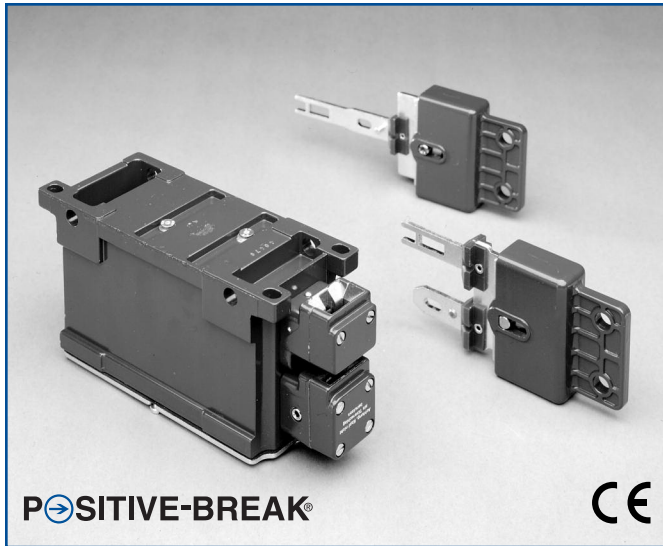


Note: Drawings show contact state with actuator key inserted and solenoid de-energized.

SERIES TZF/TZM ACTUATOR KEY SPECIFICATIONS

ACTUATOR KEYS





Features & Benefits

- **Solenoid-locking & spring-locking designs** ... controls access to hazardous areas until safe conditions exist.
- **Highly tamper-resistant** ... difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **“Positive-break” NC contacts** ... assure circuit interruption upon actuator key removal.
- **Conditional “safe” outputs** ... actuating key must be fully inserted and solenoid must be actuated to lock key before “closed” safety signal is provided (Series TKM).
- **Watertight design** ... meets IP67 environmental requirements.
- **High-strength, galvanized-steel actuator key** ... tolerates mechanical abuse without damage.
- **Rugged, corrosion-resistant metal housing** ... tolerates hostile environments.
- **Three optional key entry locations** ... rotatable actuator head provides installation versatility.
- **Independent actuator key position and locking pin position monitoring contacts** ... provide a higher degree of safety.
- **Padlockable key** ... for added security during equipment maintenance.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**
- **Wide selection of actuating keys** ... to meet diverse application requirements.
- **Special types available for concealed installation** ... please consult factory.

Description

The TKF/TKM Series is designed for machines/work cells where access to a hazardous work area must be controlled until safe conditions exist. Their solenoid-latching feature permits locking a machine guard until dangerous conditions, which may exist immediately after removal of power, have abated. Solenoid-latching may be controlled by a time delay, motion detector, position sensor or other suitable component.

The unit features independent actuator key (guard) position and solenoid-latching monitoring contacts. These permit the prevention of machine restart until the guard is closed **and** the solenoid-latching pin is in the locked position.

The TKF/TKM Series consists of an electromechanical safety interlock switch with “positive-break” contacts and a locking actuator key. In addition, the TKFS model features an auxiliary manual unlocking device ... the latter provided to aid in installation and for use in the event of a power failure (when using the “unlocking by solenoid” model).

Operation

The TKF/TKM Series of electromechanical safety interlock switch assembly consists of a rugged switch, a solenoid-operated latching mechanism, and a geometrically-unique actuator key. The switch actuating key is typically mounted to a movable machine guard.

When the guard is closed, the actuating key is held in position by the latching mechanism. The guard may only be opened by energizing or de-energizing (depending upon model) the latching mechanism.

Upon opening of the guard, the switch’s “positive-break” NC contacts are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. The NO contacts close upon key removal.

The solenoid-latching mechanism circuit features a NO and a NC contact which permit monitoring its status. This NC contact is wired in series with the NC contact in the safety switch circuit. Thus the machine is prevented from starting until the actuating key is inserted (guard is closed) *and* the solenoid has locked it in the closed position.

Typical Applications



The TKF/TKM Series is intended for use as a safety interlock switch on movable machine guards which must not be opened until dangerous conditions, which may exist after the removal of power, have abated. Such conditions are flywheel overrun, spindle momentum, unstable rest positions, etc. Typical applications are textile machines, stamping presses, articulating robot arms, mixing machines, metal working equipment, printing presses and packaging machinery.

SERIES TKF/TKM AVAILABLE MODELS AND ACCESSORIES

AVAILABLE STANDARD MODELS (Includes ½" NPT Conduit Adapter. Actuator key sold separately)

Part Number	Solenoid Operating Voltage	Contacts	Description
TKF/90	24VDC	2NC & 2 NO (NC contacts in series)	"Series" actuating key locked by spring and unlocked by energizing solenoid
TKF/*90	115/230VAC (50/60Hz)		
TKM/90	24VDC	2NC & 2 NO (NC contacts in series)	"Series" actuating key locked by energizing solenoid and unlocked by spring (See Note 1 below)
TKM/*90	115/230VAC (50/60Hz)		
TKF/R/90	24VDC	2NC & 2 NO (NC contacts in series)	"Parallel" actuating key (for right-hand insertion) locked by spring and unlocked by energizing solenoid
TKF/R*/90	115/230VAC (50/60Hz)		
TKM/R/90	24VDC	2NC & 2 NO (NC contacts in series)	"Parallel" actuating key (for right-hand insertion) locked by energizing solenoid and unlocked by spring (See Note 1 below)
TKM/R*/90	115/230VAC (50/60Hz)		
TKF/L/90	24VDC	2NC & 2 NO (NC contacts in series)	"Parallel" actuating key (for left-hand insertion) locked by spring and unlocked by energizing solenoid
TKF/L*/90	115/230VAC (50/60Hz)		
TKM/L/90	24VDC	2NC & 2 NO (NC contacts in series)	"Parallel" actuating key (for left-hand insertion) locked by energizing solenoid and unlocked by spring (See Note 1 below)
TKM/L*/90	115/230VAC (50/60Hz)		

2

* Insert 115 for 115VAC model
Insert 230 for 230VAC model

Note 1: Use of power-to-lock model permits the guard to be opened in the event of a power failure. Generally accepted safety standards/ practices suggest this model only be used after conducting a thorough risk evaluation in the context of the application.

ACTUATOR KEYS

Part Number	Description
TK/R/90	Standard "Series" actuator key (For sliding guards only)
TK/RF/90	"Series" actuator key with telescopic section (For sliding guards only)
TK/P/90	"Parallel" actuator key for right- or left-hand insertion (10" minimum closing radius)
TK/PF/90	"Parallel" actuator key (with telescopic section) for right- or left-hand insertion (10" minimum closing radius)

SERIES TKF/TKM TECHNICAL DATA

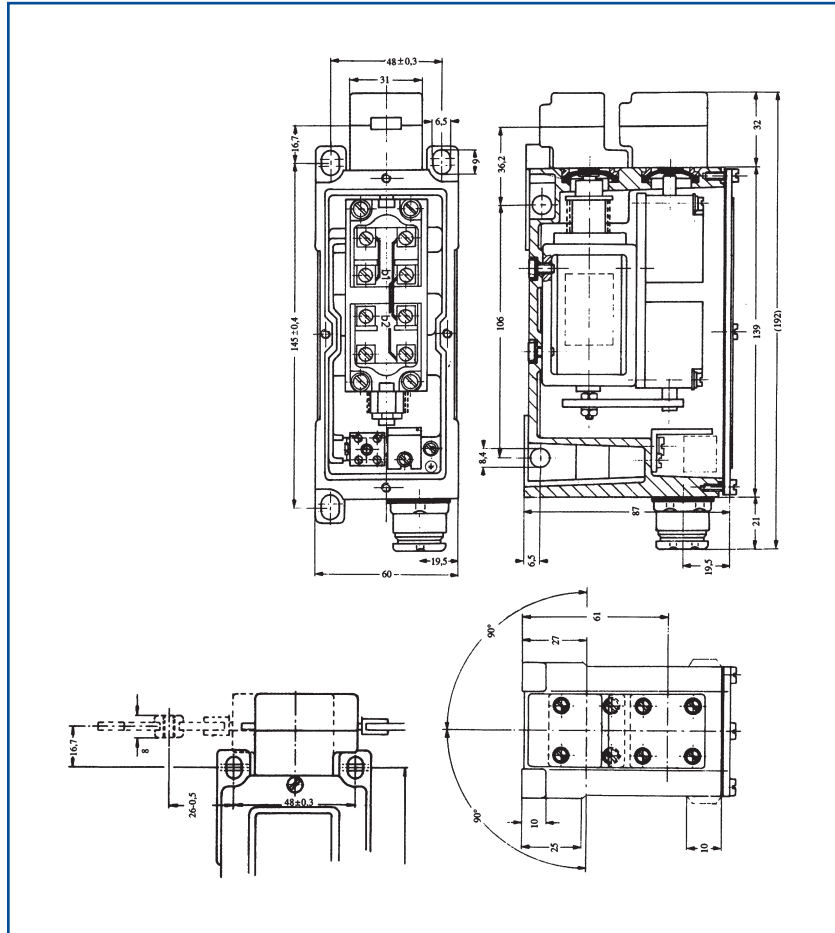
MECHANICAL SPECIFICATIONS

Housing	Cast aluminum, enamel finish	
Actuator Key & Locking Bolt	Steel, chromated (defeat-resistant design)	
Degree of Protection	IP67	
Unlocked Holding Force	5N (1.2 pounds)	
Travel for Positive-Break	72 mm ("Series" actuator) 38 mm ("Parallel" actuator)	
Force to Reach Positive-Break	5N (Approx. 1.2 pounds)	
Closing Force	Approx. 10 N (2.4 pounds)	
Operating Temperature	32°F to 120°F	
Mechanical Life	1 million operations (minimum)	
Shock Resistance	30g / 18ms	
Vibration Resistance	20g / 2...100Hz	
Conformity to Standards	IEC 947-5-1 EN 60947-5-1 EN ISO 13849-1 EN 954-1 CE BG-GS-ET-15	UL CSA
Solenoid Locking Force	2,000N (450 pounds)	
Minimum Closing Radius	250mm ("Parallel" actuator)	

ELECTRICAL SPECIFICATIONS

Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically separated contact bridges
Contact Gap	Guard monitoring: 2 × 3 mm Solenoid monitoring: 2 × 2 mm
Contact Rating	8A (250VAC)
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	10A (slow-blow)
Rated Insulation Voltage	250VAC
Rated Impulse Withstand Voltage	4kV
Type Terminals	Screw terminals with self-lifting clamps for up to 13 AWG solid wire (2.5mm ²) or 13 AWG stranded (1.5mm ²) wire
Available Solenoid Voltages	24VDC 115VAC/230VAC
Solenoid Power Consumption	12.0W (maximum)
Solenoid Duty Cycle	100%

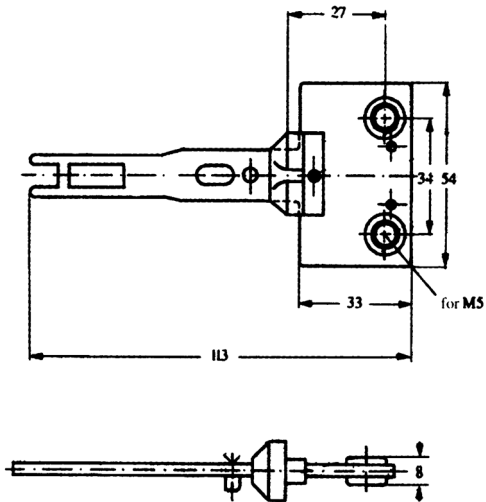
DIMENSIONS



SERIES TKF/TKM ACTUATOR KEY SPECIFICATIONS

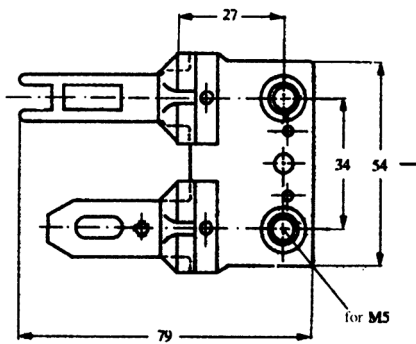
ACTUATOR KEYS

“Series” TK/R/90
(For sliding guards only)

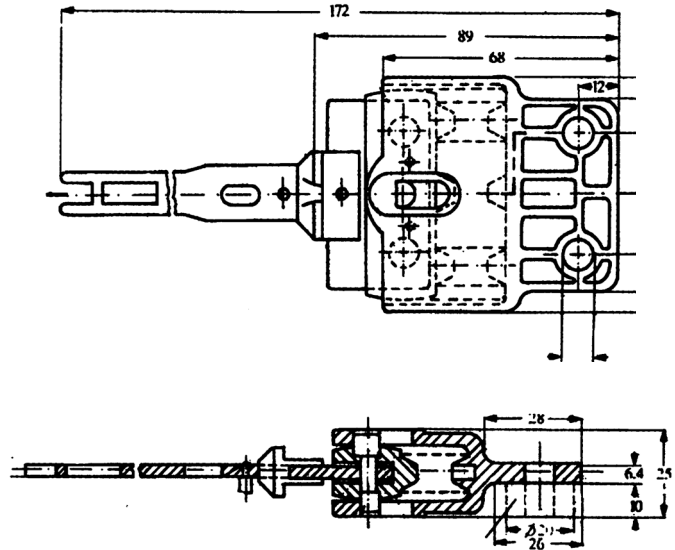


(For sliding guards only)

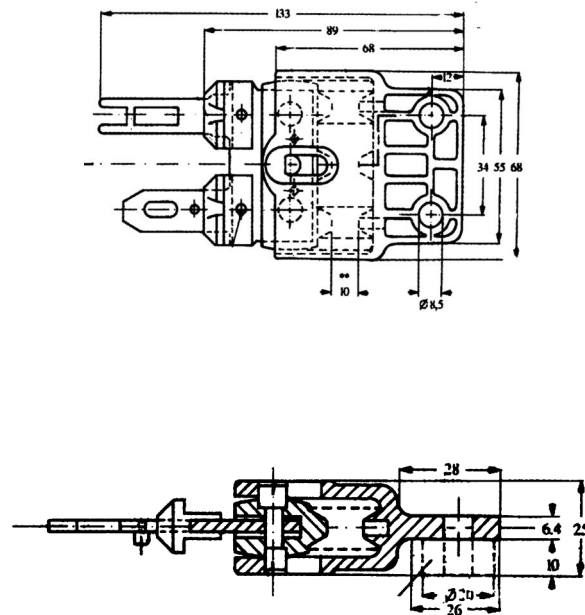
“Parallel” Actuator Key TK/P/90



“Series” TK/RF/90 (With telescopic section)
(For sliding guards only)

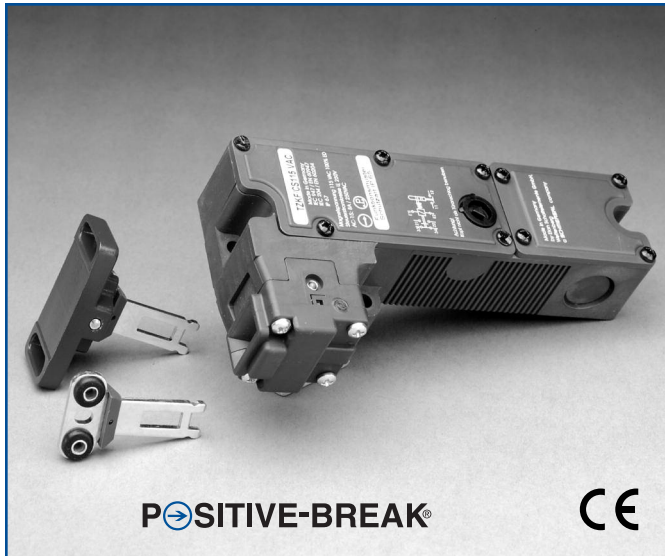


“Parallel” Actuator Key TK/PF/90 (With telescopic section)



SERIES TZKF/TZKM

Heavy-Duty Solenoid-Latching Safety Interlock Switch



Features & Benefits

- **Solenoid-locking design** ... controls access to hazardous areas until safe conditions exist.
- **Highly tamper-resistant** ... difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **“Positive-break” NC contacts** ... ensure circuit interruption upon key removal.
- **Watertight design** ... meets IP67 environmental sealing requirements.
- **Positive locking** ... integral mechanical interlock prevents solenoid latching until actuating key is fully inserted.
- **High-strength steel actuator key** ... tolerates mechanical abuse without damage.
- **Rugged, corrosion-resistant housing** ... tolerates the most hostile environments.
- **Available in “solenoid-locking” and “solenoid-unlocking” models** ... for application versatility.
- **Optional “floating” actuator key** ... tolerates up to 5mm of guard misalignment without damage.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**
- **Rotatable actuating head** ... four user-selectable 90° positions for installation flexibility.
- **Funnel entry** ... forgiving of minor guard misalignment.
- **Optional spring-loaded actuator keys** ... tolerates axial misalignment of guard.
- **Built-in key entry dust cover** ... prevents ingress of dirt and dust when key is removed.

Description

The TZK Series is designed for machines/work cells where access to a hazardous work area must be controlled until safe conditions exist. Their solenoid-latching feature permits locking a machine guard until dangerous conditions, which may exist immediately after removal of power, have abated. Solenoid-latching may be controlled by a time delay, motion detector, position sensor or other suitable component.

The unit's contact arrangement permits the prevention of a machine restart until the guard is closed and in the locked position.

Each unit is supplied with a ½" NPT conduit adapter.

Operation

The TZK Series electromechanical safety interlock switch consists of a rugged switch with a solenoid-latching mechanism and a geometrically-unique actuating key. The switch actuating key is typically mounted to a movable machine guard.

When the guard is closed, the actuating key is held in position by the solenoid-latching mechanism. The guard may only be opened by energizing or de-energizing (depending upon model) the solenoid-latching mechanism.

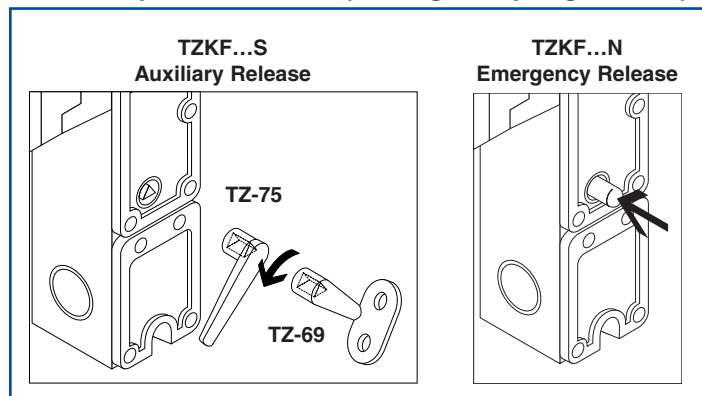
Upon opening of the guard, the switch's "positive-break" NC contacts are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. The NO contacts close upon key removal.

Typical Applications



The TZK Series is intended for use as a safety interlock switch on movable machine guards which must not be opened until dangerous conditions, that may exist after the removal of power, have abated. Such conditions are flywheel overrun, spindle momentum, unstable rest positions, etc. Typical applications are textile machines, stamping presses, articulating robot arms, mixing machines, heavy working equipment, printing presses and packaging machinery.

Release Options for TZKF (locking via spring models)



SERIES TZKF/TZKM AVAILABLE MODELS AND ACCESSORIES

AVAILABLE STANDARD MODELS
(Includes 1/2" NPT Adapter.
Order desired actuator key separately.)

Part Number	Contacts (Key/Solenoid)
Spring lock, Power to unlock	
TZKF/BS*	1 NC / 2 NC
TZKF/CS*	1 NC / 1 NO & 1 NC
TZKF/ES*	1 NO / 2 NC
TZKF/HS	2 NC / 2 NC
TZKF/KS	2 NC / 1 NO & 1 NC
TZKF/MS	1 NO & 1 NC / 1 NO & 1 NC
TZKF/PS	1 NO & 1 NC / 2 NC
Power to lock, spring unlock (see Note 1 below)	
TZKM/B*	1 NC / 2 NC
TZKM/C*	1 NC / 1 NO & 1 NC
TZKM/E*	1 NO / 2 NC
TZKM/H	2 NC / 2 NC
TZKM/K	2 NC / 1 NO & 1 NC
TZKM/M	1 NO & 1 NC / 1 NO & 1 NC
TZKM/P	1 NO & 1 NC / 2 NC

*Please indicate desired operation voltage:

Voltage:	Suffix:
24VDC	no suffix
115VAC	-115
230VAC	-230

Example: TZKF/CS-115

For Spring to Lock (TZKF) models:

For a manual emergency release, change "S" to "N" in the part number (TZKF/BN)

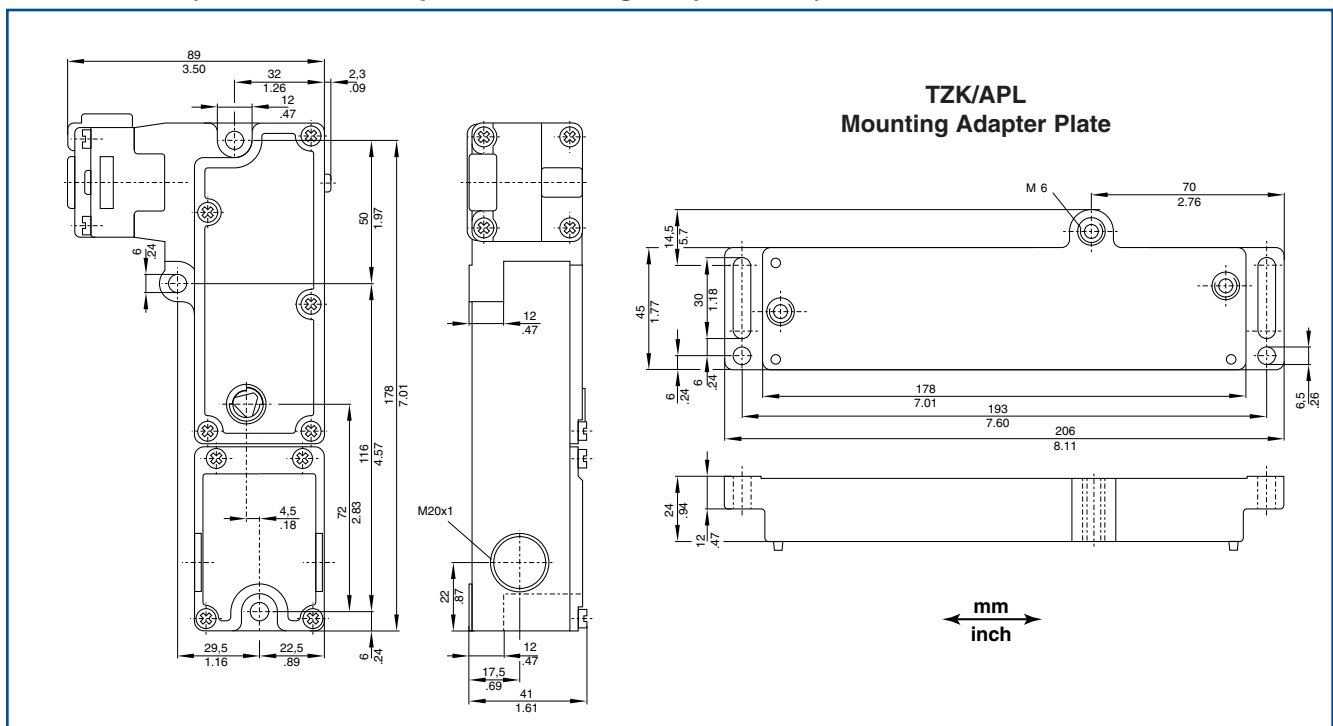
ACTUATOR KEYS & ACCESSORIES

Part Number	Description
TZK/CO	Standard straight actuating key
TZK/CW	Standard right-angle actuating key
TZK/COF	Spring-loaded actuator key tolerates axial movement of +7.5°/-15° or -7.5°/+15° depending upon mounting orientation
TZK/CORF/7.5	Pre-tensioned, spring-loaded actuator key tolerates axial movement of +7.5° or -7.5° depending upon mounting orientation
TZK/CORF/15	Pre-tensioned, spring-loaded actuator key tolerates axial movement of +15° or -15° depending upon mounting orientation
TZK/APL	Mounting adapter plate facilitates easy alignment between actuating key and interlock
TZ-69	Standard straight auxiliary release key (for TZKF models)
TZ-75	Right-angle auxiliary release key (for TZKF models)

2

Note 1: Use of power-to-lock model permits the guard to be opened in the event of a power failure. Generally accepted safety standards/practices suggest this model only be used after conducting a thorough risk evaluation in the context of the application.

DIMENSIONS (Basic Switch & Optional Mounting Adapter Plate)



SERIES TZKF/TZKM TECHNICAL DATA

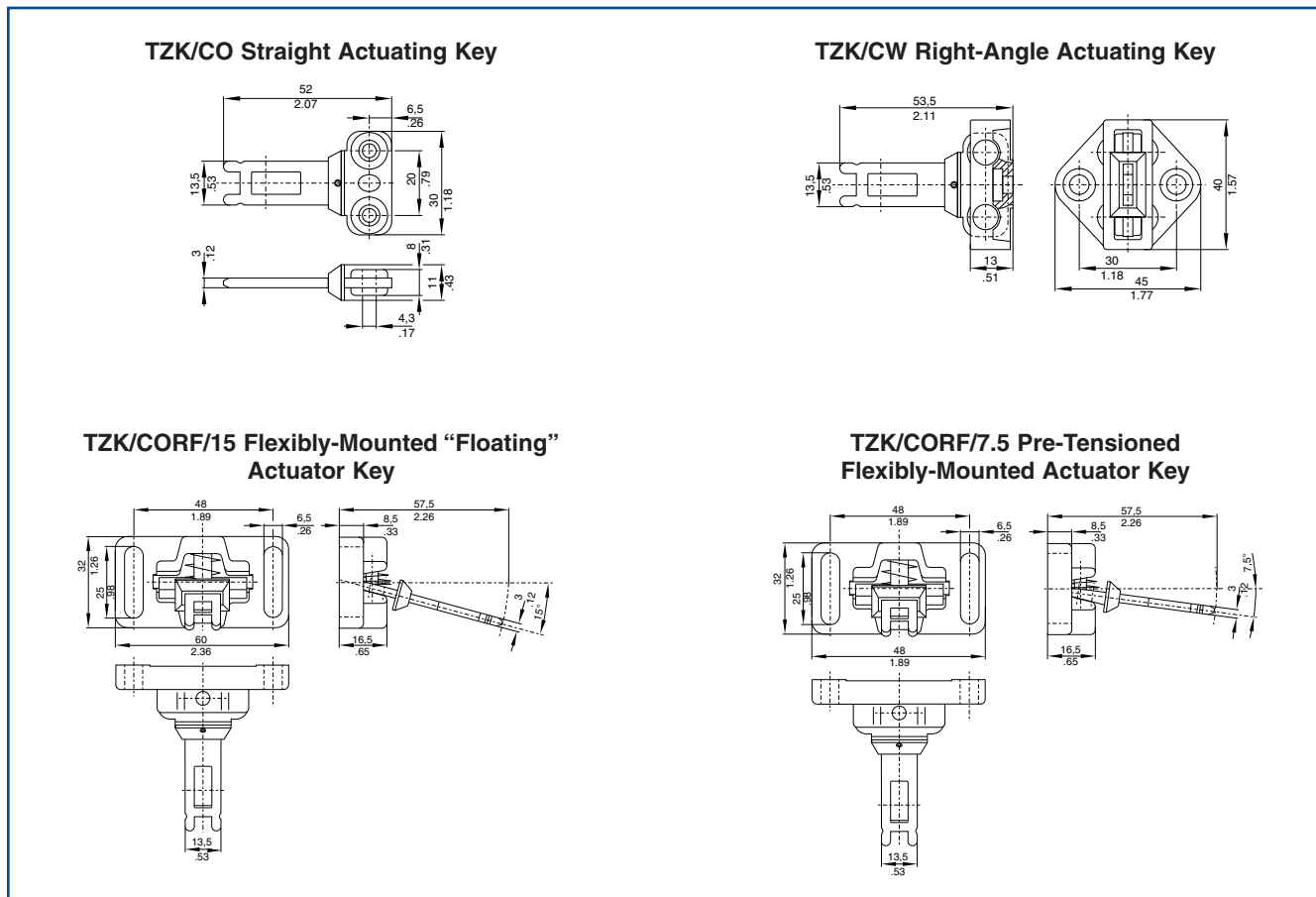
MECHANICAL SPECIFICATIONS

Housing	Glass-fibre reinforced, self-extinguishing thermoplastic
Actuator Key	Galvanized steel
Degree of Protection	IP67
Travel for Positive-Break	2.3mm
Key Insertion Force	10 N (2.2 pounds)
Key Holding Force (without solenoid-latching)	20 N (4.4 pounds)
Solenoid Locking Force	2,000N (440 pounds)
Operating Temperature	+32°F to +122°F (0°C to +50°C)
Mechanical Life	2 x 10 ⁶ Operations (minimum)
Mounting Orientation	Any position
Solenoid Override	Manual release from front surface
Slack Resistance	30g / 11ms
Vibration Resistance	20g / 10-55Hz
Switching Frequency	120 cycles/hour (maximum)
Conformity to Standards	IEC 947 CE EN 60947 UL EN ISO 13849-1 CSA EN 954-1 BG-GS-ET-19
Minimum Closing Radius	6.9" (175mm) for CO and CORF actuating key 9.8" (250mm) for CW actuating key 5.9" (150mm) for COF actuating key

ELECTRICAL SPECIFICATIONS

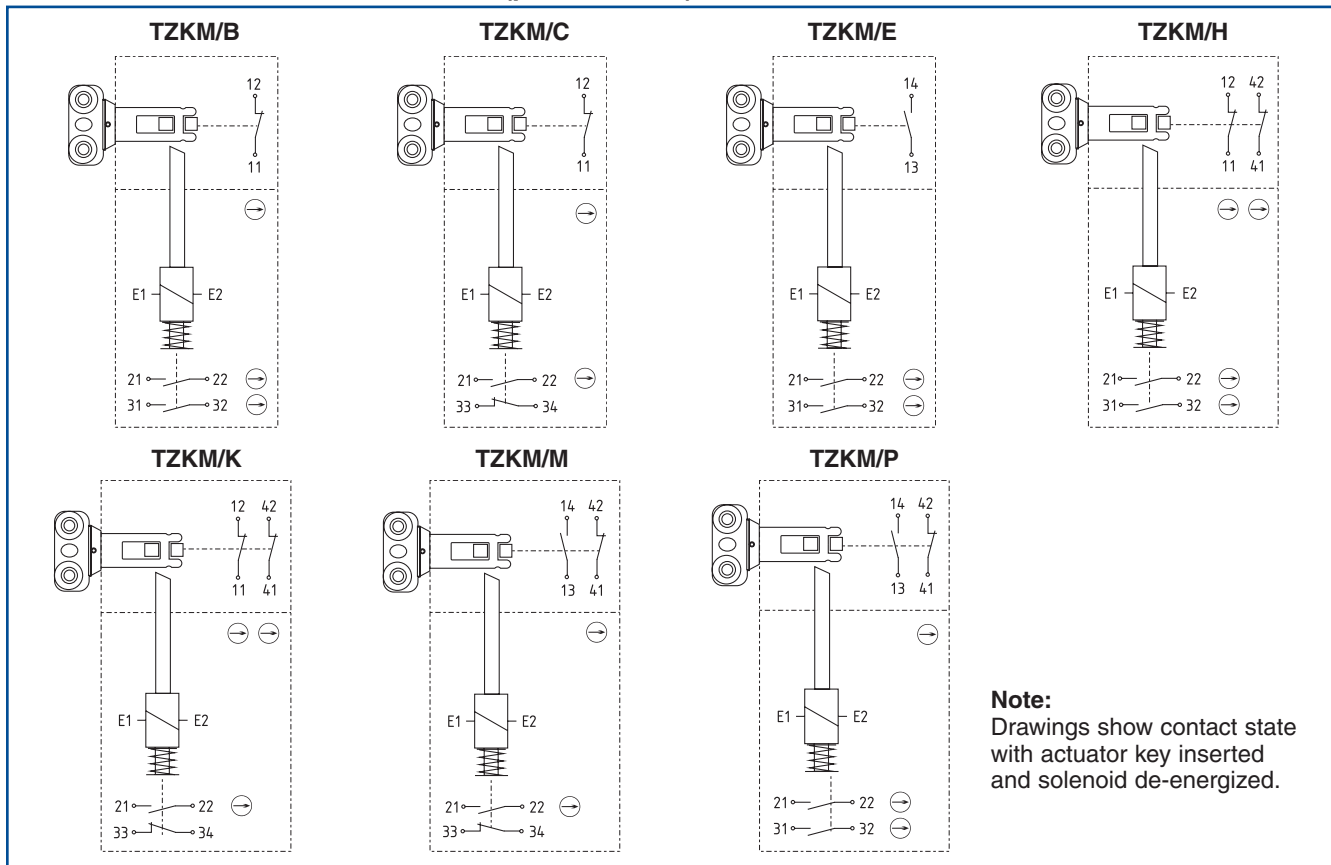
Contacts	Silver-plated, gold
Contact Configuration	Double-pole, double-break, electrically-separated contact bridges
Contact Rating	8A/250VAC (AC 15) 13A/24VDC (DC13)
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	10A
Rated Insulation Voltage	250VAC
Rated Impulse Withstand Voltage	2.5 KV
Type Terminals	Screw terminals with self-lifting cable clamps for up to 13AWG flexible stranded wire (1.5mm ²)
Available Solenoid Voltages	24VDC 115VAC/50-60 Hz 230VAC/50-60 Hz
Solenoid Power Consumption	10W (maximum)
Solenoid Duty Cycle	100%

ACTUATOR KEY DIMENSIONS



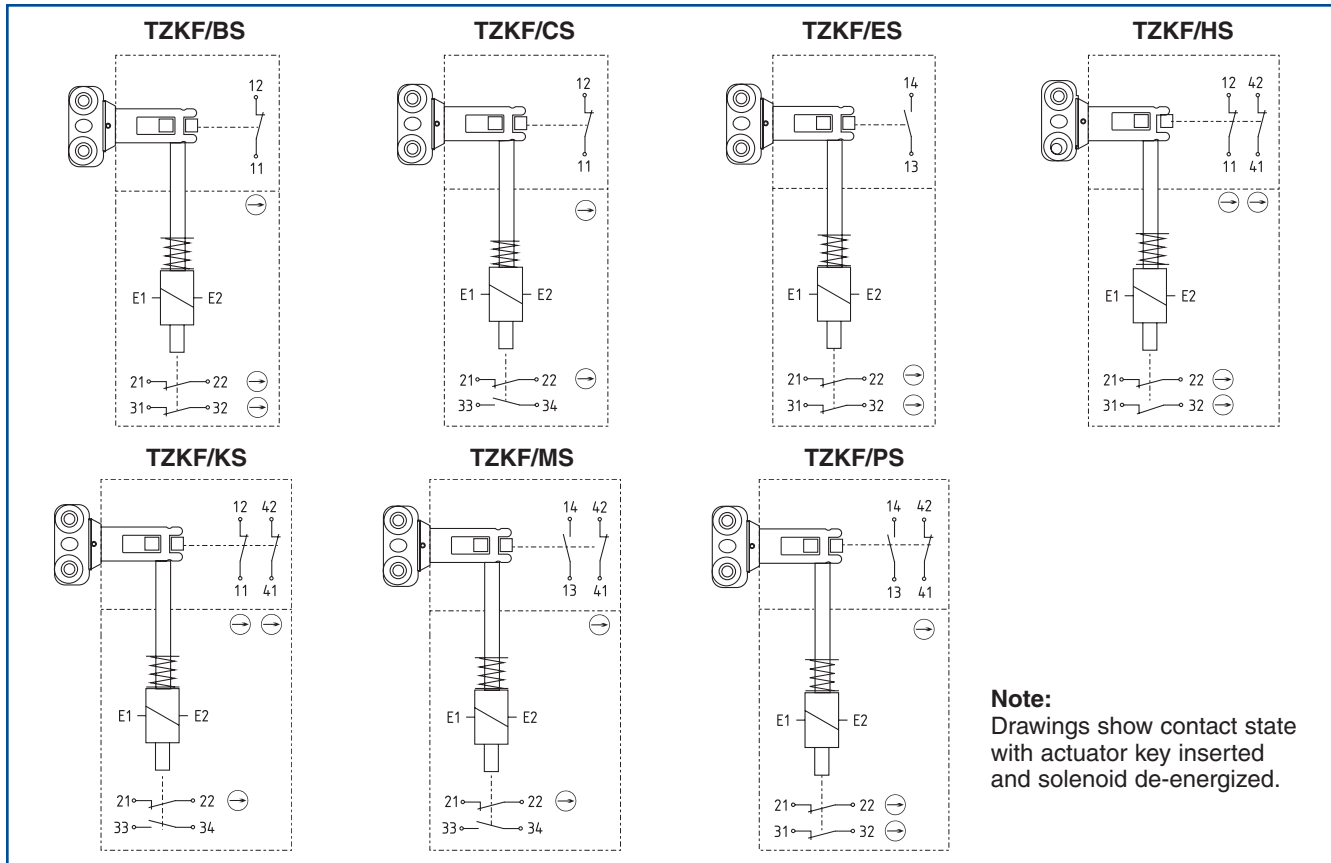
SERIES TZKF/TZKM TECHNICAL DATA

CONTACT CONFIGURATIONS — TZKM (power-to-lock) models



2

CONTACT CONFIGURATIONS — TZKF (spring lock/power to unlock) models



SERIES AZM415

Heavy-Duty Solenoid-Latching Safety Interlock Switch



Description

The AZM415 Series is designed for movable machine guards where access to a hazardous work area must be controlled until safe conditions exist. Their solenoid-latching feature permits locking a machine guard until dangerous conditions, which may exist immediately after removal of power, have abated. Solenoid-latching may be controlled by a time-delay, motion detector, position sensor or other suitable component.

Latching may occur upon energizing or de-energizing the solenoid — depending upon model. In addition the AZM415 features “positive-break” NC contacts, and an adjustable-force ball latch which maintains a holding force on the guard when the key is in the unlocked state.

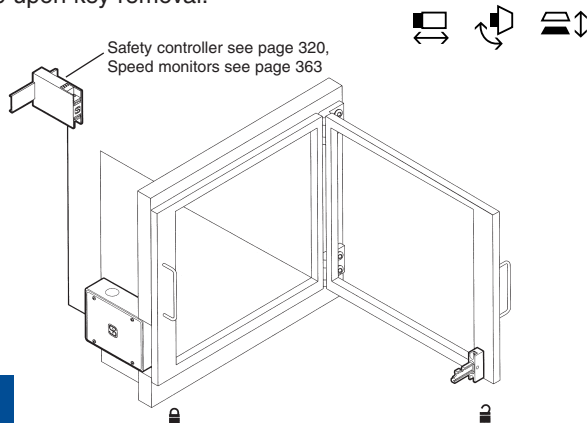
A two-key model is also available for guards which may be open in two directions (Model AZM415-33zpdk).

Operation

The AZM415 two-piece electromechanical safety interlock switch consists of a rugged switch and solenoid-latching mechanism and a geometrically-unique actuating key. The switch actuating key is typically mounted to a movable machine guard.

When the guard is closed, the actuator key is locked in position by a toggle-lever system. The guard may only be opened by energizing or de-energizing (depending upon model) the solenoid-latching mechanism.

Upon opening of the guard the switch’s “positive-break” NC contacts are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. The NO contacts close upon key removal.



Features & Benefits

- **Solenoid-locking design** ... controls access to hazardous areas until safe conditions exist.
- **Highly tamper-resistant** ... difficult to defeat.
- **“Positive-break” NC contacts** ... assure circuit interruption upon actuator key removal.
- **Watertight design** ... meets IP67 washdown requirements.
- **High-strength, metal actuator key** ... tolerates mechanical abuse without damage.
- **Rugged, enamel-coated metal housing** ... tolerates the most hostile environments.
- **Adjustable actuator key holding force up to 110 pounds** ... permits use of switch as door latch.
- **Available in “solenoid-locking” and “solenoid-unlocking” models** ... for application versatility.
- **Designed to meet Performance Level requirements of EN ISO 13849-1 and Safety Control Categories of EN 954-1.**
- ***Increased locking force** ... up to 560 pounds.
- **Patented toggle-lever locking system** ... facilitates easy unlocking of (even heavily misaligned) guards.
- **Two-key model** ... for double-sided guards (AZM415-33zpdk).
- **Optional B4 Actuator Key** ... prevents unintentional guard closure.

AVAILABLE STANDARD MODELS (Actuator key ordered separately)

Part Number	Contacts (solenoid/key)
Spring to Lock	
AZM415-02/02ZPK-*	2 NC / 2 NC
AZM415-02/11ZPK-*	2 NC / 1 NO & 1 NC
AZM415-02/20ZPK-*	2 NC / 2 NO
AZM415-11/02ZPK-*	1 NO & 1 NC / 2 NC
AZM415-11/11ZPK-*	1 NO & 1 NC / 1 NO & 1 NC
AZM415-11/20ZPK-*	1 NO & 1 NC / 2 NO
Spring to Lock, with manual release	
AZM415-02/02ZPKT-24VAC/DC	2 NC / 2 NC
AZM415-02/11ZPKT 24VAC/DC	2 NC / 1 NO & 1 NC
AZM415-02/20ZPKT 24VAC/DC	2 NC / 2 NO
AZM415-11/02ZPKT 24VAC/DC	1 NO & 1 NC / 2 NC
AZM415-11/11ZPKT 24VAC/DC	1 NO & 1 NC / 1 NO & 1 NC
AZM415-11/20ZPKT 24VAC/DC	1 NO & 1 NC / 2 NO
Power to Lock (see Note 1 below)	
AZM415-02/02ZPKA-*	2 NC / 2 NC
AZM415-02/11ZPKA-*	2 NC / 1 NO & 1 NC
AZM415-02/20-ZPKA-*	2 NC / 2 NO
AZM415-11/02-ZPKA-*	1 NO & 1 NC / 2 NC
AZM415-11/11ZPKA-*	1 NO & 1 NC / 1 NO & 1 NC
AZM415-11/20ZPKA-*	1 NO & 1 NC / 2 NO

*Please specify solenoid operating voltage via addition of one of the following suffix codes:

-24VAC/DC -110VAC -230VAC

ACTUATING KEYS

Part Number	Description
AZ/AZM415-B1	Linear entry actuator key (For sliding lift-off guards)
AZ/AZM415-B2	Small radius (250mm) x-axis entry actuator key (For hinged guards)
AZ/AZM415-B3	Small radius (250mm) y-radius entry actuator key (For hinged guards)
AZ/AZM415-B4PS	Slide bolt actuator key (For sliding guards)
AZM415-ST30...	STS door handle systems. See page 77 for details and selection guide.

POSITIVE-BREAK is a trademark of SCHMERSAL

AZM415 TECHNICAL DATA

MECHANICAL SPECIFICATIONS

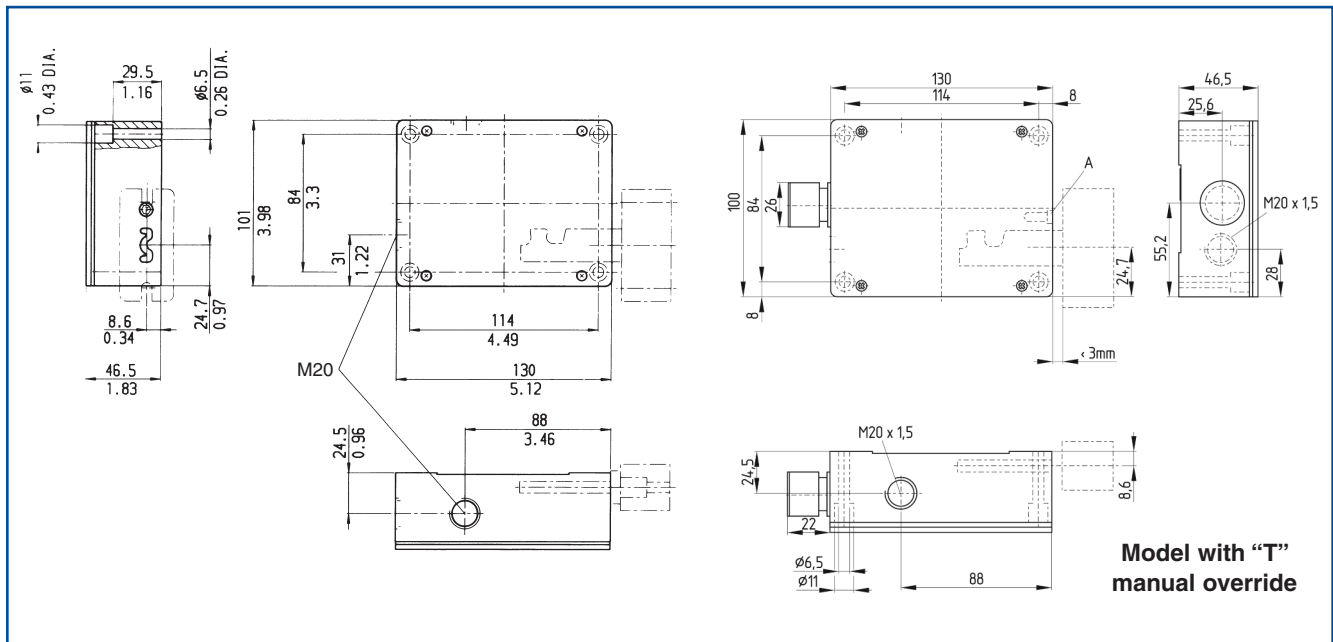
Housing	Die-cast aluminum with blue enamel finish
Actuator Key	key shaft: Zinc coated brass mounting block: Zinc coated steel
Degree of Protection	IP67
Travel for Positive-Break	5mm (0.2 inches)
Force to Reach Positive-Break	Depending upon ball catch setting (3.5 pounds minimum)
Solenoid Locking Force	560 pounds
Actuator Key Holding Force	Adjustable, 80 to 400 N
Operating Temperature	-13°F to +175°F
Mechanical Life	1 million operations
Conformity to Standards	IEC 947-5-1 UL BG-GS-ET-19 CSA EN ISO 13849-1 EN 954-1 CE
Minimum Closing Radius	9.8" (250mm)

ELECTRICAL SPECIFICATIONS

Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically separated contact bridges
Contact Gap	2mm x 2mm
Contact Rating	4A (230VAC)
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	Fuse 6A (slow-blow)
Rated Insulation Voltage	250VAC
Rated Impulse Withstand	4kV
Type Terminals	Screw terminals with self-lifting clamps for up to 13AWG flexible stranded wire (1.5 mm ²)
Available Solenoid Supply Voltages (Vs)	24VAC/DC 115VAC/60Hz 230VAC/50Hz
Solenoid Power Consumption	10W (maximum)
Solenoid Duty Cycle	100%

2

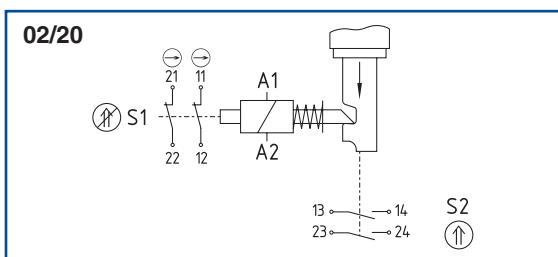
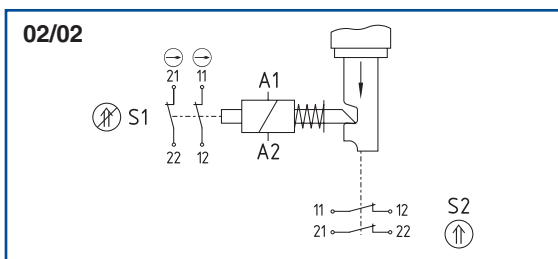
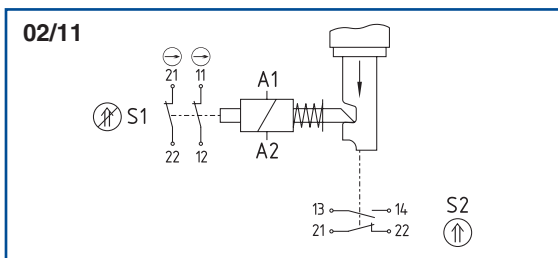
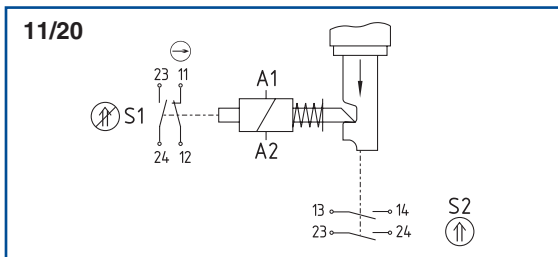
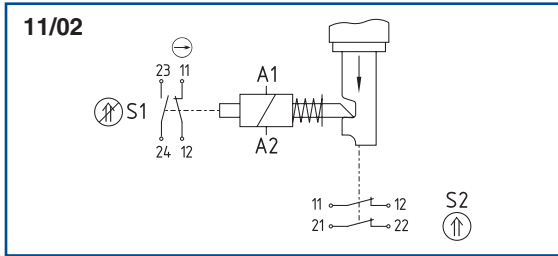
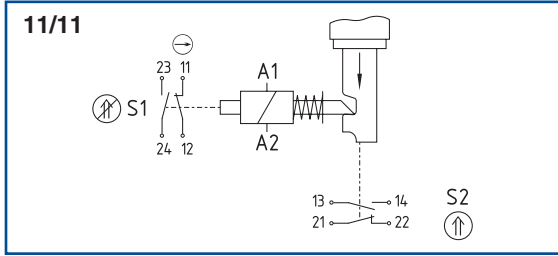
DIMENSIONS



AZM415 TECHNICAL DATA

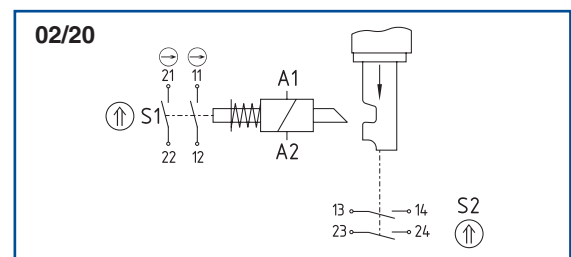
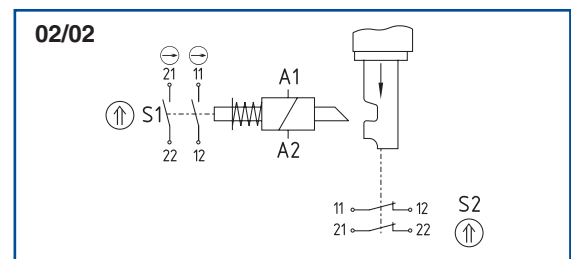
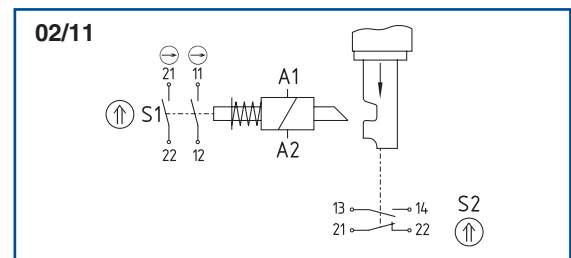
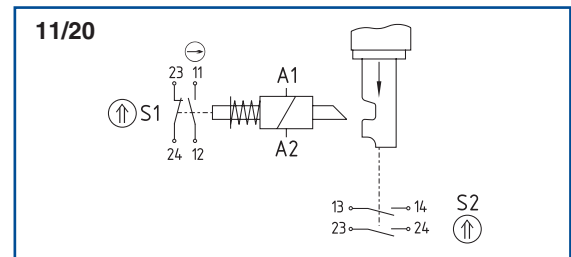
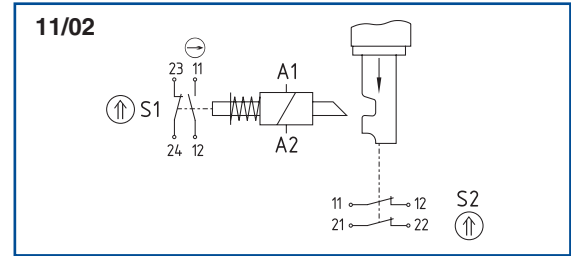
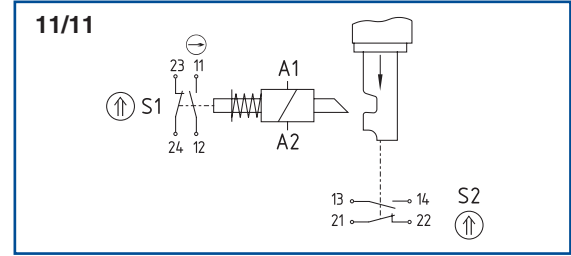
WIRING SCHEMATICS

AZM415xx/yyZPK (Power-to-unlock)



WIRING SCHEMATICS

AZM415xx/yyZPKA (Power-to-lock)



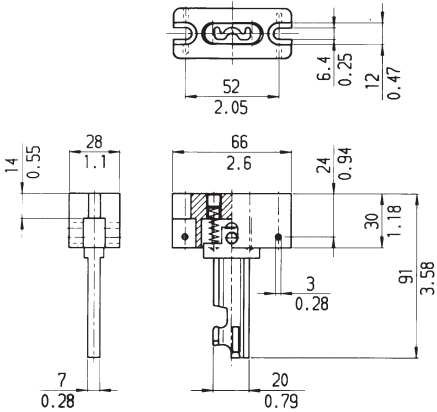
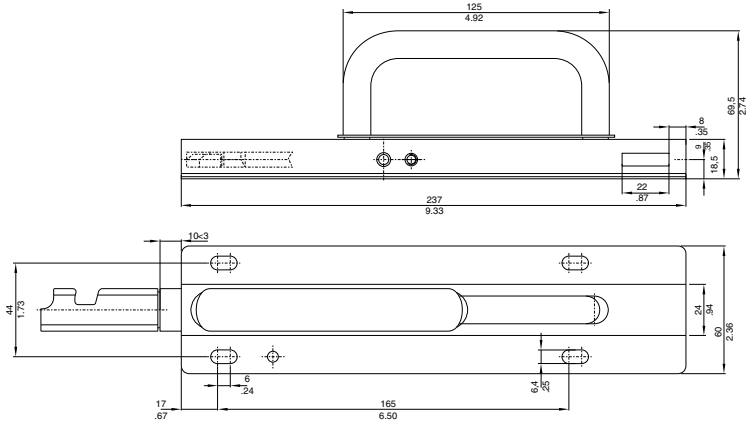
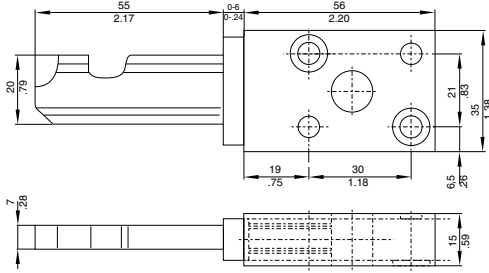
AZM415 TECHNICAL DATA

ACTUATOR KEY DIMENSIONS

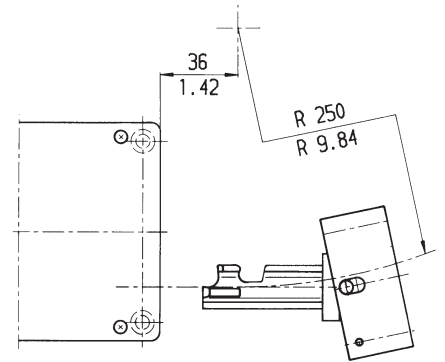
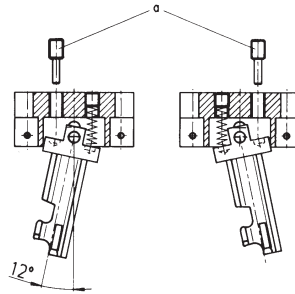
2

B4pS Actuator for Hand Operated Locking

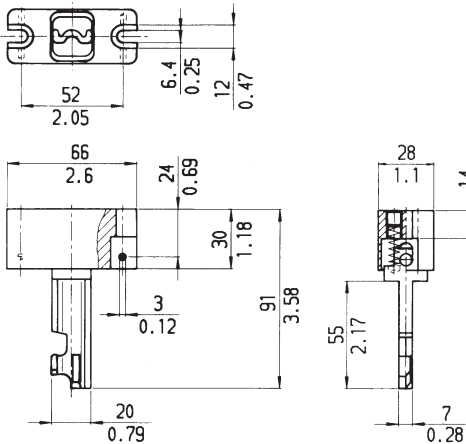
B1 Actuator



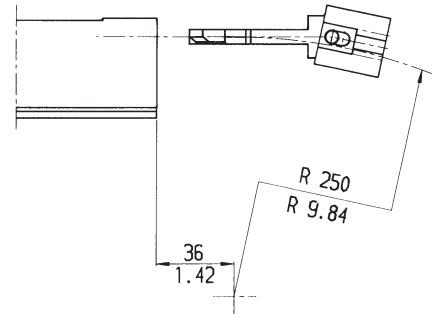
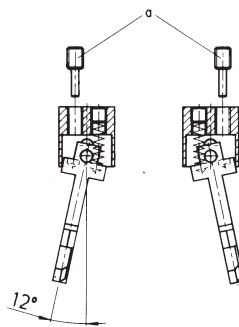
B2 Actuator



B2 Actuating radii
For hinged doors over the wide edge of the actuator



B3 Actuator



B3 Actuating radii
For hinged doors over the small edge of the actuator

Dowel holes are also provided in the actuator body. With the use of dowel pins the removal of the actuator can be prevented.

By turning the adjusting screw "a," the actuator can be brought into any desired position.

Both actuators can also be used on sliding doors.



*Safer
by
Design*