

SERIES AZ15/16

Tamper-Resistant Movable Machine Guard Safety Interlock Switch



Features & Benefits

- **Highly tamper-resistant actuating mechanism** ... difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **Non-removable actuating head** ... heightens tamper-resistance.
- **Four optional key entry locations** ... provide installation flexibility.
- **Individually-coded actuator key option (15,000 codes)** ... provides extra security in high-risk applications. See AZ16zi.
- **“Positive-Break” NC contacts** ... assure circuit interruption upon actuator key removal.
- **High key-retention force (7 pounds)** ... eliminates inadvertent opening of guard due to shock/vibration.
- **Watertight design** ... meets IP67 washdown requirements.
- **High-strength, stainless-steel actuator key** ... tolerates mechanical abuse without damage.
- **Rugged, corrosion-resistant housing** ... tolerates the most hostile environments.
- **Wide selection of accessories** ... to meet diverse application requirements.
- **Padlockable key** ... for added security during equipment maintenance.
- **Meets rigid safety agency standards** ... BG, UL and CSA.
- **Explosion-proof model and M12x1 quick-connect (“ST”) available** (Please consult factory).

Description

The Series AZ15/16 is designed for use with movable machine guards/access gates which must be closed for operator safety. Their positive-opening NC contacts provide a significantly higher level of safety than conventional spring-driven switches whose contacts can weld or stick shut. And their tamper-resistant design prevents bypassing with simple tools, bent wires or other readily available means. Their IP67 rating makes them ideal for interlocking safety guards in hostile environments.

Operation

The AZ15/16 electromechanical safety interlock switch consists of a rugged switch mechanism and a geometrically-unique actuating key. The key is mounted to the movable guard. Upon opening of the guard the NC contact(s) are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. These positive-break NC contacts assure circuit interruption (and machine stoppage) upon removal of the actuator key. (The NO contact closes upon key removal.)

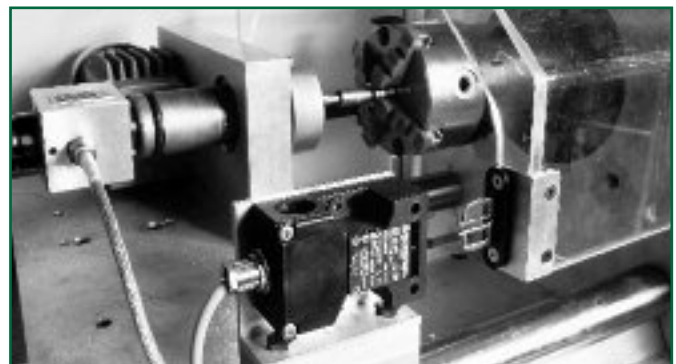
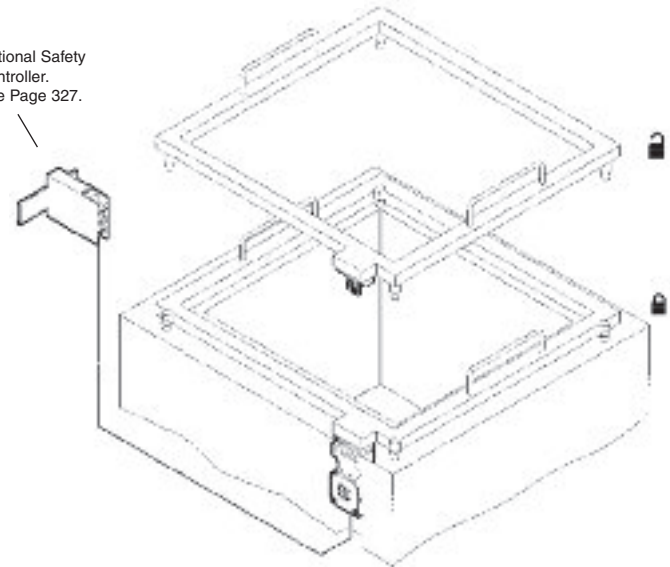
When the guard is closed, the actuating key forces the NC contacts to close and the NO contacts to re-open.

Typical Applications



The AZ15/16 is intended for use as a safety interlock switch on movable machine guards which, when open, expose the operator/maintenance personnel to machine hazards. Typical applications are the interlocking of protective gratings, access doors/gates, hinged covers, access panels and other movable guards.

Optional Safety Controller.
See Page 327.



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AZ15/16 AVAILABLE MODELS AND ACCESSORIES

AVAILABLE MODELS (Includes 1/2" NPT Plastic Adapter** Actuator Key Sold Separately)

Part Number	Contacts (with actuator key inserted)
AZ15-zvk (key spring returned)	1 NC
AZ15-zvrk (key maintained upon insertion)*	1 NC
AZ16-zvk (key spring returned)	1 NO & 1 NC
AZ16-zvrk (key maintained upon insertion)*	1 NO & 1 NC
AZ16-02zvkc (key spring returned)	2 NC
AZ16-02zvrkc (key maintained upon insertion)*	2 NC
AZ16-12zvkc (key spring returned)	1 NO & 2 NC
AZ16-12zvrkc (key maintained upon insertion)*	1 NO & 2 NC
AZ16-03zvkc (key spring returned)	3 NC
AZ16-03zvrkc (key maintained upon insertion)*	3 NC

*Feature 7 pound key retention force. For lighter key retention force (1-2 pounds) add suffix "2254".

**To order unit with cordgrip instead of 1/2" NPT adapter, add suffix "CG" to part number...eg. AZ15-zvk-CG.

Short-radius actuator keys available. See below.

ACTUATOR KEYS

Part Number	Description
AZ15/16-B1	Standard Key (5.9" minimum closing radius)
AZ15/16-B2	Small radius actuating key (1.8" minimum closing radius)
AZ15/16-B3	Small radius actuating key (1.3" minimum closing radius)
AZ15/16-B6	Flexible-movement actuating key
AZ15/16-B1-2177	Funnel entry adapter with elongated straight actuating key
AZ15/16-B6-2177	Funnel entry adapter with elongated flexible-movement actuating key
AZ15/16-B1-KRH	Key Removal Hand-Grip Assembly with Key Retention Chain (for use with AZ15...zvrk and AZ16...zvrk)

ACCESSORIES for AZ15/16 Keyed-Interlock Switches

Part Number	Description
AZ15/16-BI-2024	Gasketed key caps
AZ15/16-CAP	Key entry closure caps (for unused entry slots)
M20-CG	Cord grip (cable gland)
M20-1/2"P	Plastic 1/2" NPT adapter
M20-1/2"M	Metal 1/2" NPT adapter
AZ15/16-BI-1747	Door holding magnet kit (7 pound holding force) (for use with AZ16...zvr-2254 models)
AZ15/16-B2-1747	
AZ15/16-B3-1747	
PL-M20-24V	24VAC/DC pilot light kit
PL-M20-120V	120VAC/DC pilot light kit
Add suffix -1637 to basic part number when ordering	Gold contacts (for AZ15/16zvr)
AZ15/16-BI-2053 (for use with AZ16...zvrk)	Ball latch kit (Adjustable holding force up to 22 pounds)
#6-3/8"SPH (Package of 6)	#6-3/8" Spanner Pan Head Tamper-resistant sheet metal screws (for actuator key mounting or switch contact cover)
#10-32x1/2" OWOH (Package of 6)	#10-32 One-Way Oval Head Tamper-resistant machine screws
SZ16/335	Actuator Key Lockout Device (Accepts up to 6 padlocks)
AZ15/16-AP	Alignment Pins (Set of 2)
MS AZ 15/16-P (See illustration Page 19)	Adjustable mounting kit for parallel mounting
MS AZ 15/16-R/P (See illustration Page 19)	Adjustable mounting kit for parallel and perpendicular mounting
Suffix "-ST"	Optional M12x1 quick-connect (2 contact models only)

MS mounting kits require the use of the -B6 key



AZ15/16-2053 with ball catch
Holding force up to 22 pounds



AZ15/16-1747 with holding magnet
Holding force 7 pounds



Actuator Key Removal Handle
AZ15/16-B1-KRH



Lockout Device SZ16/335
(padlock not included)

AZ15/16 TECHNICAL DATA

MECHANICAL SPECIFICATIONS

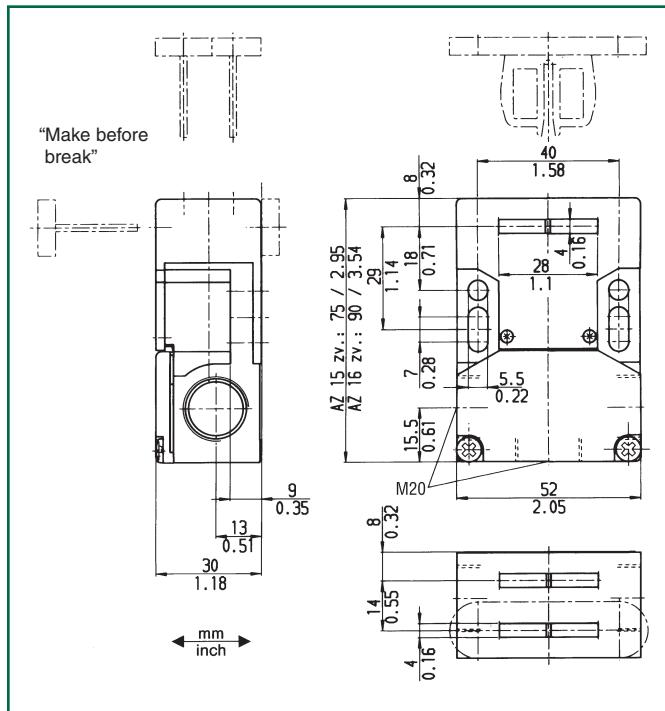
Housing	Glass-fibre reinforced, self-extinguishing thermoplastic
Actuator Key	Stainless steel (defeat-resistant design)
Degree of Protection	IP67
Travel for Positive-Break	8 mm (0.315 inches)
Key Ejection Force	"-zv" models: 3N (0.7 pounds)
Key Retention Force	"-zvr-2254 models: 5N (1.2 pounds) "-zvr" models: 30N (7 pounds)
Closing Force	Approx. 15N (3.4 pounds)
Operating Temperature	-22°F to +175°F
Mechanical Life	> 1 million operations
Conformity to Standards	IEC 947-5-1 EN 60947-5-1 DIN VDE 0660-200 BG-GS-ET-15 UL & CSA (A600, P300) TUV
Minimum Closing Radius	1.3" (with B3 actuator key) 1.8" (with B2 actuator key) 5.9" (with B1 actuator key)

ELECTRICAL SPECIFICATIONS

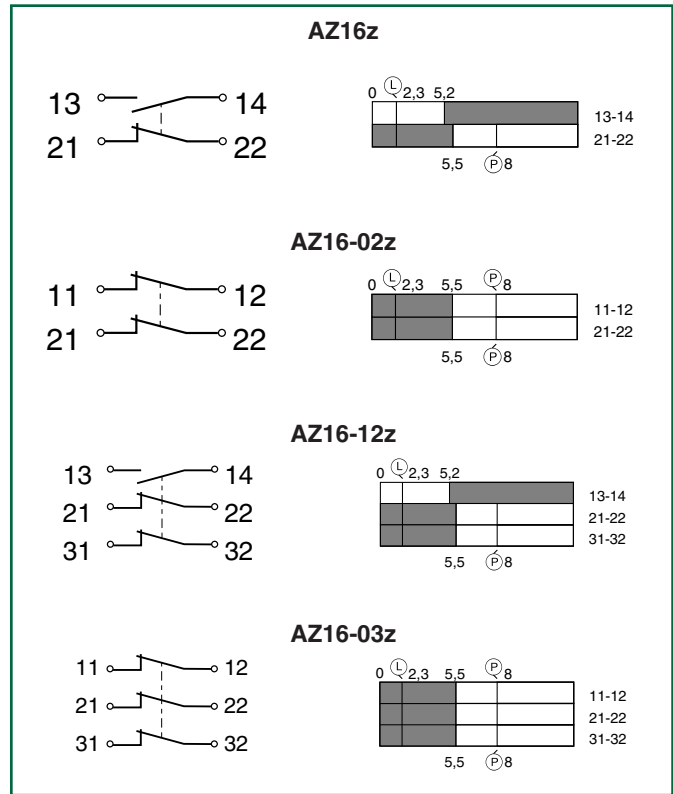
Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically separated contact bridges
Contact Gap	2x2mm (minimum)
Contact Rating	4A/230VAC (A600) 2.5A/230VAC (with M12x1 quick-connect)
Switching Action	Slow-action, positive-break NC contacts
Short Circuit Protection	Fuse 6A (time-delay)
Rated Isolation Voltage	500VAC
Rated Impulse Withstand Voltage	6kV
Type Terminals*	Screw terminals with self-lifting clamps for up to 13 AWG flexible stranded wire (2.5mm ²)

* Units available with M12x1 quick-connect.
(Please consult factory).

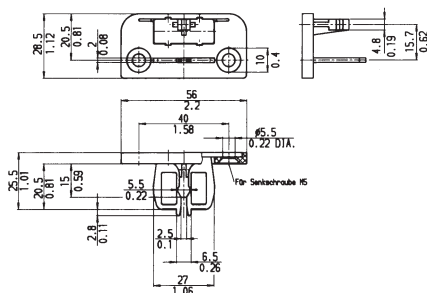
DIMENSIONS



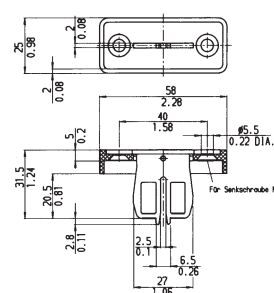
SWITCHING DIAGRAMS & CONTACT SCHEMATICS



AZ15/16-2053 Ball Latch Kit



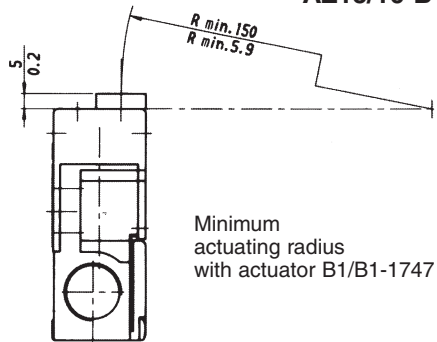
AZ15/16-2024 Gasketed Key Caps



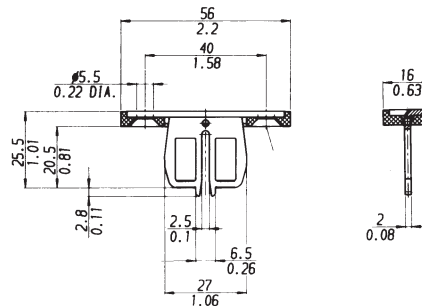
AZ15/16 ACTUATOR KEY SPECIFICATIONS

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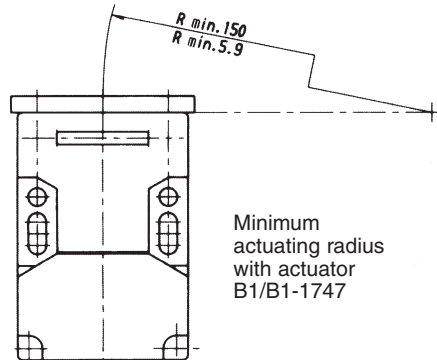
AZ15/16-B1 Actuator Key



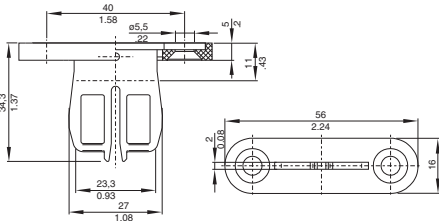
Minimum actuating radius with actuator B1/B1-1747



AZ15/16-B1-2177 Actuator Key

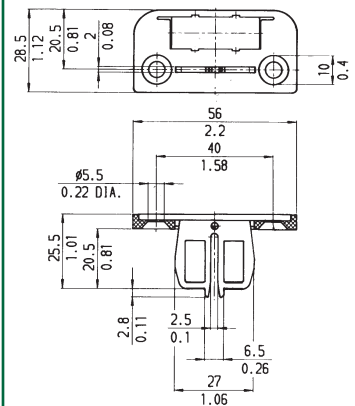


Minimum actuating radius with actuator B1/B1-1747



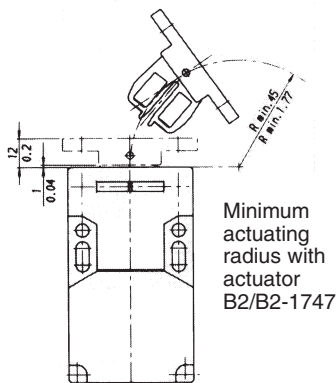
Actuator B1 is standard for AZ15/16; it allows a minimum actuating radius of 150 mm. **Please note that the center of rotation must be in the same plane as the upper edge of the safety switch.**

AZ15/16-B1 Actuator Key with AZ15/16-1747 Holding Magnet Kit



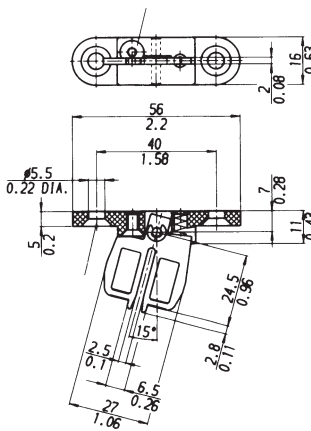
Ordering example: Switch, holding magnet and actuator: AZ16-zv/B1-1747

AZ15/16-B2 Actuator Key



Minimum actuating radius with actuator B2/B2-1747

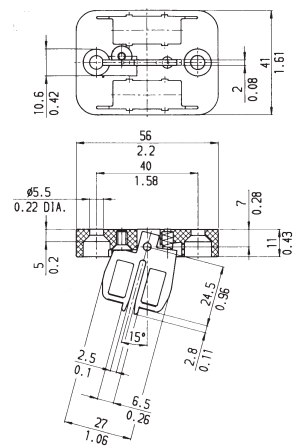
mm
inch



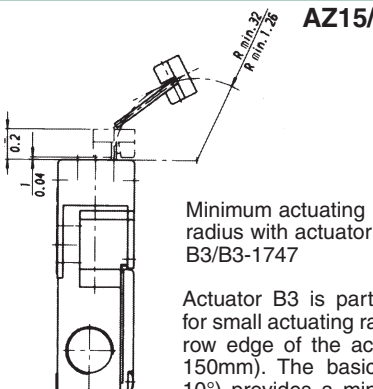
Actuator B2 is particularly suitable for **small actuating radii** over the wide edge of the actuator (R=45 to 150mm). The basic setting (angle 15°) provides a minimum radius of

45mm=1.8 in. For larger radii, the angle has to be adjusted correspondingly by turning the set screw counter-clockwise.

AZ15/16-B2 Actuator Key with AZ15/16-1747 Holding Magnet Kit

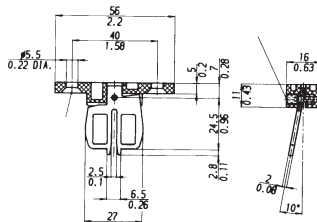


AZ15/16-B3 Actuator Key



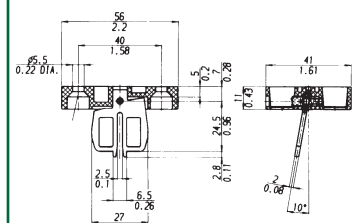
Minimum actuating radius with actuator B3/B3-1747

Actuator B3 is particularly suitable for small actuating radii over the narrow edge of the actuator (R=32 to 150mm). The basic setting (angle 10°) provides a minimum radius of



32mm=1.3in. For larger radii, the angle has to be adjusted correspondingly by turning the set screw clockwise.

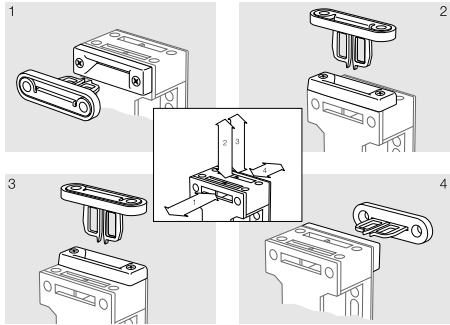
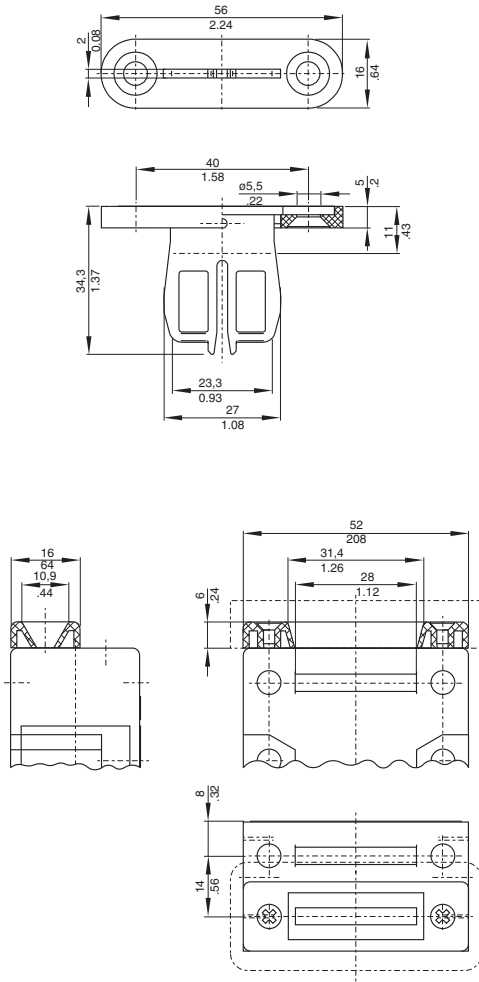
AZ15/16-B3 Actuator Key with AZ15/16-1747 Holding Magnet Kit



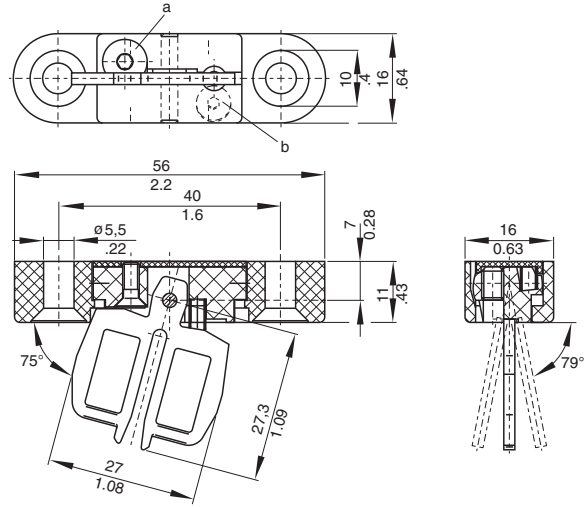
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AZ15/16 ACTUATOR KEY SPECIFICATIONS

**AZ15/16-B1-2177 Funnel Entry Adapter
(with straight actuating key)**



AZ15/16-B6 Flex Actuator Key

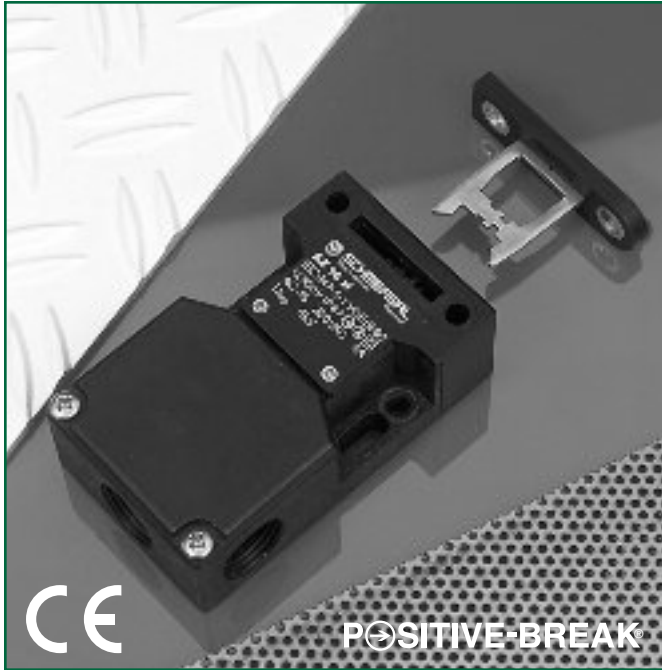




*Safer
by
Design*

SERIES AZ16zi

Individually-Coded Movable Machine Guard Safety Interlock Switch



Features & Benefits

- **Highly tamper-resistant actuating mechanism** ... difficult to defeat with simple tools, tape, bent wires, etc. Reduces liability exposure.
- **Individually-coded actuator key (15,000 codes)** ... provides extra security in high-risk applications.
- **Non-removable actuating head** ... heightens tamper-resistance.
- **Four optional key entry locations** ... provide installation flexibility.
- **“Positive-Break” NC contacts** ... assure circuit interruption upon actuator key removal.
- **Watertight design** ... meets IP67 washdown requirements.
- **High-strength, stainless-steel actuator key** ... tolerates mechanical abuse without damage.
- **Rugged, corrosion-resistant housing** ... tolerates the most hostile environments.
- **Tamper-resistant key mounting screws** ... deter bypassing.
- **Wide selection of accessories** ... to meet diverse application requirements.
- **Padlockable key** ... for added security during equipment maintenance.
- **Meets rigid safety agency standards** ... BG, UL and CSA.

Description

The Series AZ16zi are designed for use with movable machine guards which must be closed for operator safety. Their tamper-resistant design, and positive-opening NC contacts, provide a significantly higher level of safety than conventional spring-driven switches whose contacts can weld/stick shut. Their IP67 rating makes them ideal for interlocking safety guards in hostile environments.

Operation

The AZ16zi is a two-piece, electromechanical safety interlock switch. It consists of a rugged switch mechanism and an individually-coded, geometrically-unique actuating key. The key must be directly hard-mounted to the movable guard. Upon opening of the guard, the normally-closed (NC) contact(s) are forced to open through a direct (non-resilient) mechanical linkage with the actuating key. The positive-break NC contacts assure circuit interruption (and machine stoppage) upon removal of the actuator key. (The NO contacts close upon key removal.)

When the guard is closed, the actuating key forces the NC contacts to re-close, and any NO contacts to re-open. The tamper-resistant design prevents bypassing with simple tools, bent wires or other readily available means.

Typical Applications



The AZ16zi is intended for use as a safety interlock on movable machine guards which, when open, expose the operator/maintenance personnel to machine hazards. Typical applications are the interlocking of protective gratings, hinged covers, access panels and other movable guards.

AZ16zi
15,000
CODES



Patented geometrically-unique tumbler configuration

AZ16zi AVAILABLE MODELS AND ACCESSORIES

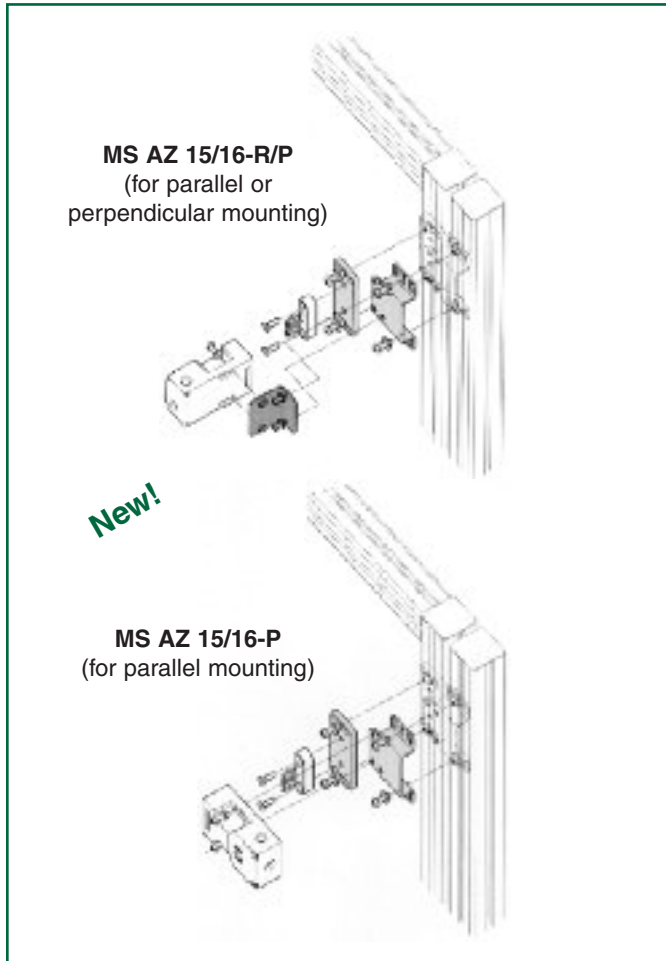
AVAILABLE MODELS (Includes Individually-Coded Actuator Key and 1/2" NPT Plastic Adapter)

Part Number	Description	Contacts (with actuator key inserted)
AZ16-12zi-B1	Standard unit	1 NO & 2 NC
AZ16-03zi-B1		3 NC
AZ16-12zi-B1-1747	Standard unit with built-in key actuator magnet latch	1 NO & 2 NC
AZ16-03zi-B1-1747		3 NC
AZ16-12zi-B1-2024	Standard unit with built-in slot rubber seals on key actuator	1 NO & 2 NC
AZ16-03zi-B1-2024		3 NC
AZ16-12zi-B1-2053	Standard unit with built-in ball-latched key actuator	1 NO & 2 NC
AZ16-03zi-B1-2053		3 NC

AVAILABLE ACCESSORIES

Part Number	Description
M20-CG	Cord grip (cable gland)
M20-1/2"P	Spare Plastic 1/2" NPT adapter (One supplied with each unit)
M20-1/2"M	Metal 1/2" NPT adapter (optional)
AZ15/16-CAP (3 per kit)	Key entry closure caps (for unused entry slots)
#6-3/8 SPH (package of 6)	#6-3/8 Spanner Pan Head Tamper-Resistant Sheet Metal Screws (For use on AZ16zi housing terminal cover)
#10-32 x 1/2" OWOH (package of 6)	#10-32 One-Way Oval Head Tamper-Resistant Machine Screws (For use in mounting actuator key)
SZ16/335	AZ16zi Lockout Device (accepts up to 6 padlocks)
PL-M20-24V	24VAC/DC LED Pilot Light Kit
PL-M20-120V	110VAC/DC Pilot Light Kit
MS AZ 15/16-P	Adjustable mounting kit for parallel mounting
MS AZ 15/16-R/P	Adjustable mounting kit for parallel or perpendicular mounting
Suffix "-2177"	Funnel entry adapter (Must be ordered with base switch for factory assembly...see page 20)

MS AZ 15/16 ADJUSTABLE MOUNTING KIT (Eases installation and facilitates adjustments due to guard misalignment)



TYPICAL INDIVIDUALLY-CODED KEYS

EXAMPLE OF INDIVIDUALLY-CODED KEYS
15,000 codes provide extra security in high-risk applications

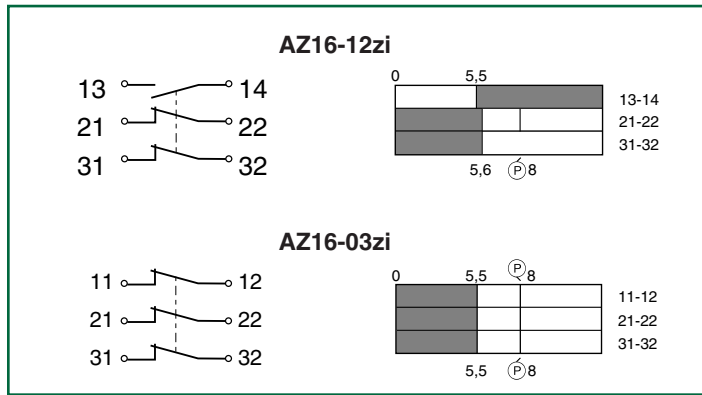


AZ16zi TECHNICAL DATA

Housing	Glass-fibre reinforced, self-extinguishing plastic
Actuator Key	Stainless steel
Degree of Protection	IP67
Travel for Positive-Break	0.315 inches (8 mm)
Key Ejection Force	3 N (0.7 pounds)
Insertion Force	Approx. 15N (3.3 pounds)
Operating Temperature	-22°F to +175°F
Mechanical Life	1 million operations
Conformity to Standards	UL & CSA, BG A600, P300
Key Withdrawal Speed	2 meters/second (maximum)
Minimum Closing Radius	9.8" (250mm)

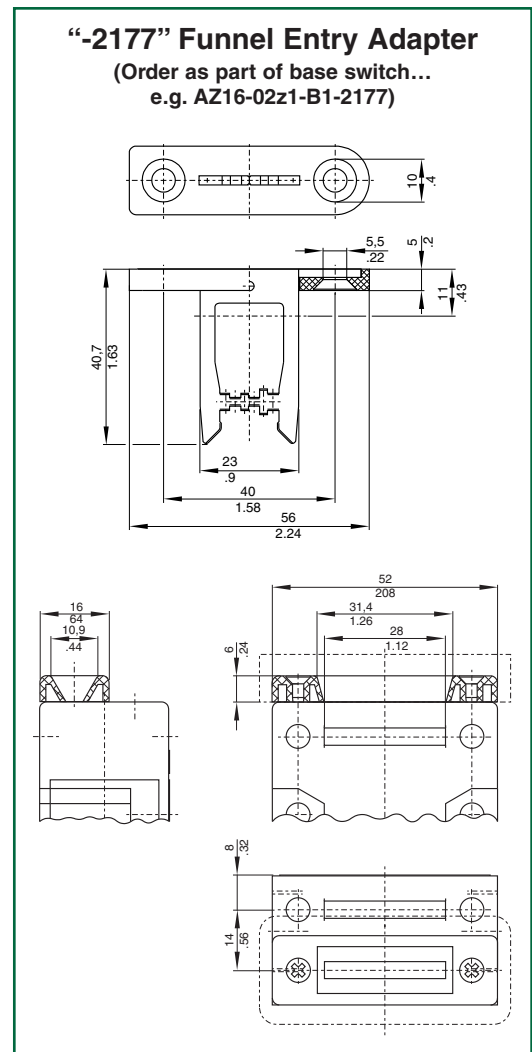
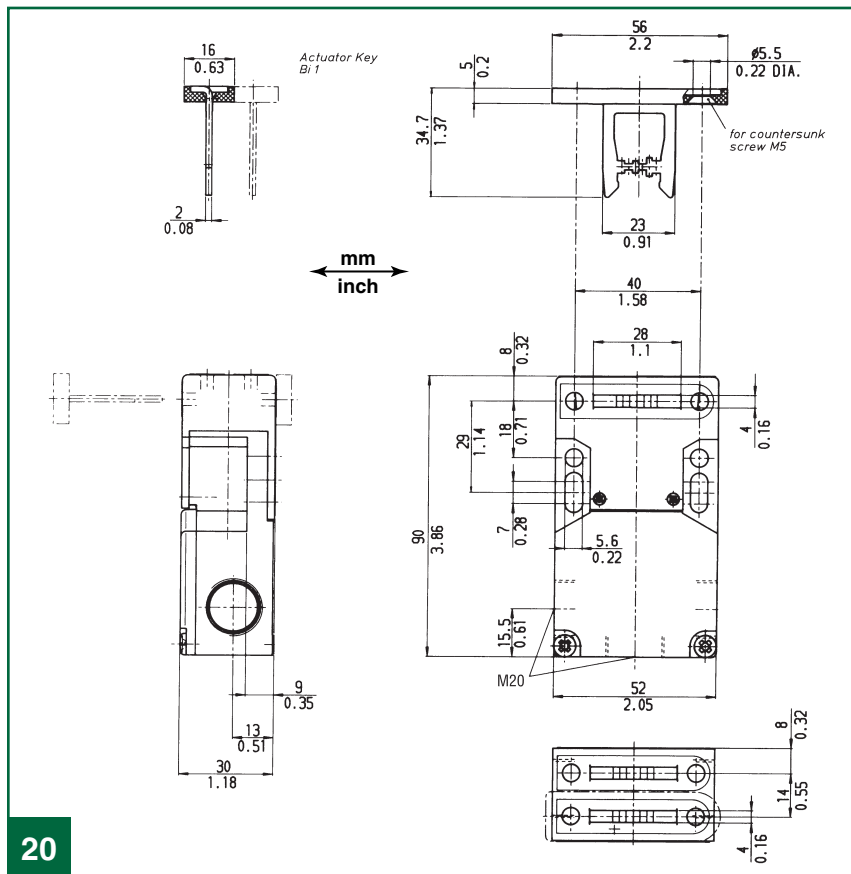
Contacts	Fine silver
Contact Configuration	Double-pole, double-break with electrically-separated contact bridges
Contact Gap	2 x 2 mm
Switching Action	Slow-action, positive-break NC contacts
Contact Rating	A600
Rated Insulation Voltage	500VAC
Thermal Current Rating	10A (300VAC)
Current Rating	6A @ 120VAC 4A @ 230VAC 2.5V/230VAC (with M12x1 quick-connect)
Rated Impulse Withstand Voltage	6kV
Short Circuit Protection	Fuse 6A (slow-blow)
Type Terminals*	Screw terminals with self-lifting clamps for up to 2.5 mm ² (AWG13) wire

SWITCHING DIAGRAMS & CONTACT SCHEMATICS



*Optional plug-in M12x1 quick-connect available. Please consult factory.

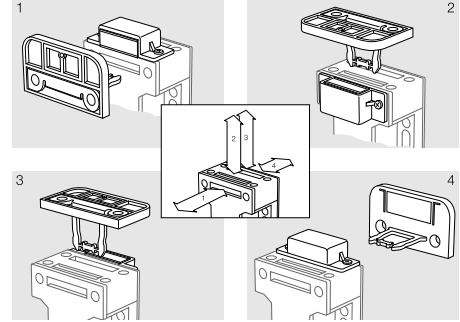
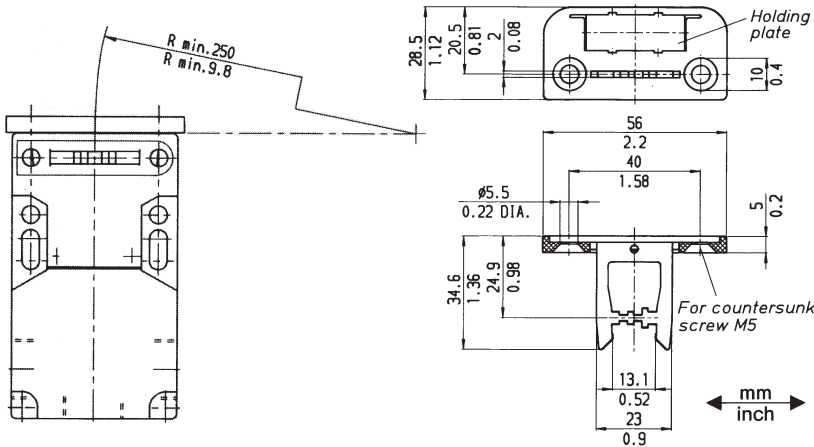
DIMENSIONS



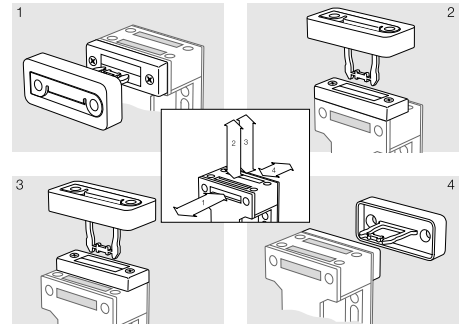
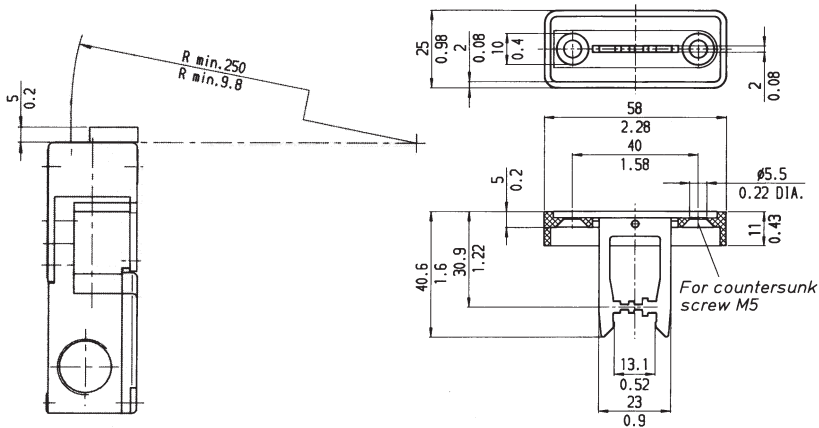
AZ16zi INDIVIDUALLY-CODED ACTUATOR KEY SPECIFICATIONS

1

-1747 (for holding magnet)

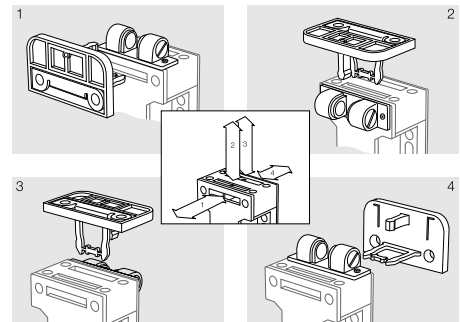
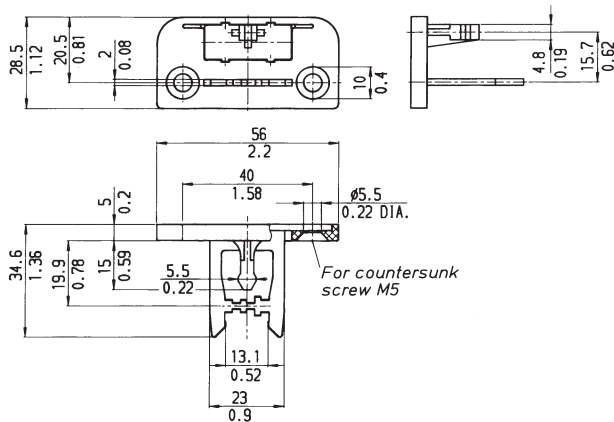


-2024 (for slot rubber seals)



Applications: harsh environments
(coarse dirt, chips, flour...)

-2053 (for ball catch)



For holding light to medium-weight guards closed

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