

### 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.
- **Meets rigid safety agency standards** ... BG, UL, CSA.
- **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)		

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

**Note 1: Use of this 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
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)
AZS2305	Fail-to-Safe Timer (Please see page 74)
FWS1205B	Fail-to-Safe Standstill Monitor (Page 76)

# SERIES TKF/TKM TECHNICAL DATA

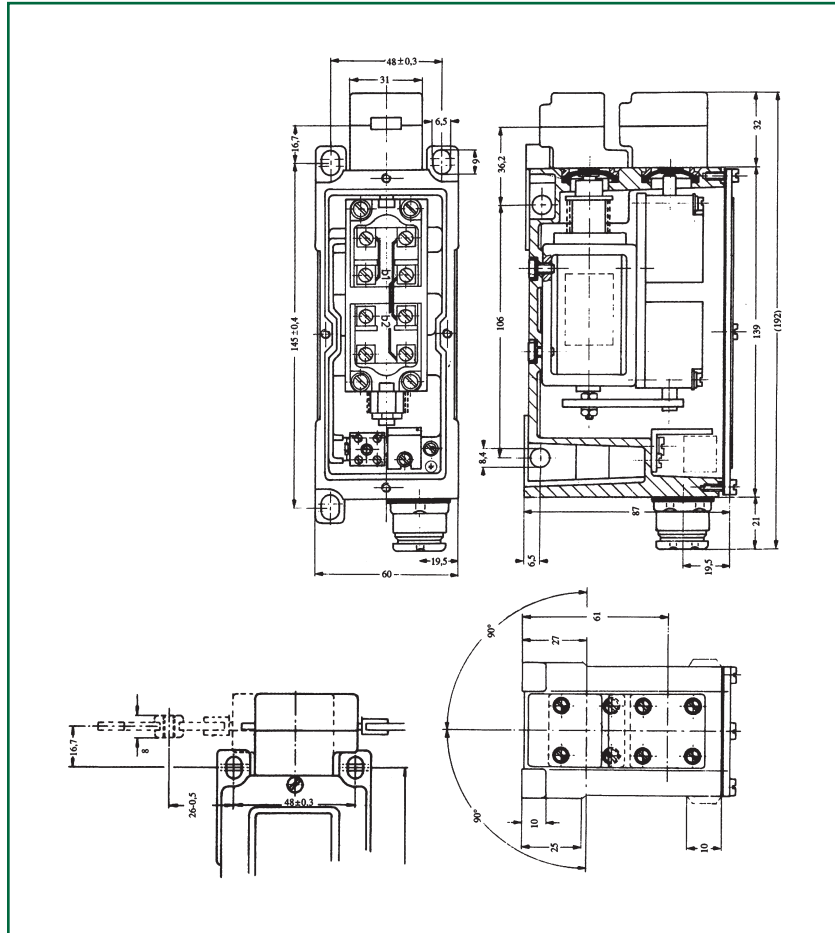
## MECHANICAL SPECIFICATIONS

<b>Housing</b>	Cast aluminum, enamel finish
<b>Actuator Key &amp; Locking Bolt</b>	Steel, chromated (defeat-resistant design)
<b>Degree of Protection</b>	IP67
<b>Unlocked Holding Force</b>	5N (1.2 pounds)
<b>Travel for Positive-Break</b>	72 mm ("Series" actuator) 38 mm ("Parallel" actuator)
<b>Force to Reach Positive-Break</b>	5N (Approx. 1.2 pounds)
<b>Closing Force</b>	Approx. 10 N (2.4 pounds)
<b>Operating Temperature</b>	32°F to 120°F
<b>Mechanical Life</b>	1 million operations (minimum)
<b>Shock Resistance</b>	30g / 18ms
<b>Vibration Resistance</b>	20g / 2...100Hz
<b>Conformity to Standards</b>	IEC 947-5-1 EN 60947-5-1 DIN VDE 0660-100 BG-GS-ET-15 UL CSA
<b>Solenoid Locking Force</b>	2,000N (450 pounds)
<b>Minimum Closing Radius</b>	250mm ("Parallel" actuator)

## ELECTRICAL SPECIFICATIONS

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

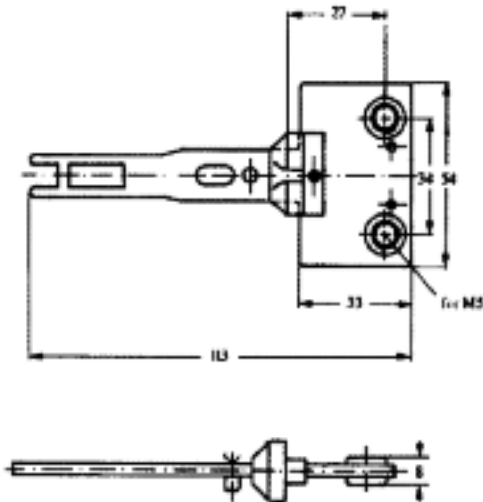
## DIMENSIONS



# SERIES TKF/TKM ACTUATOR KEY SPECIFICATIONS

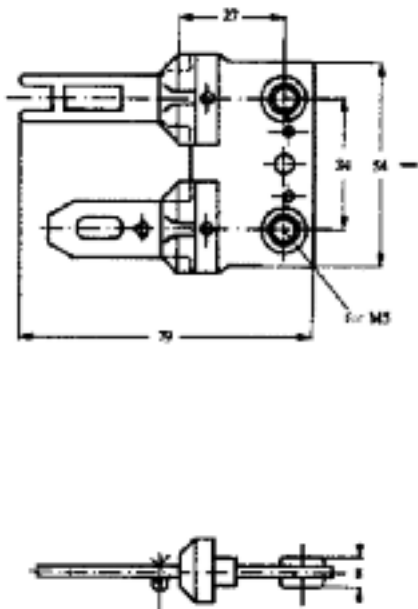
## ACTUATOR KEYS

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

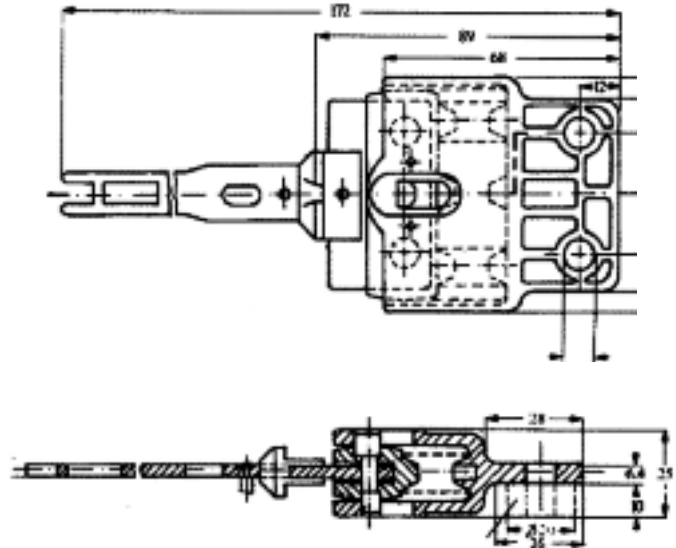


(For sliding guards only)

“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)

