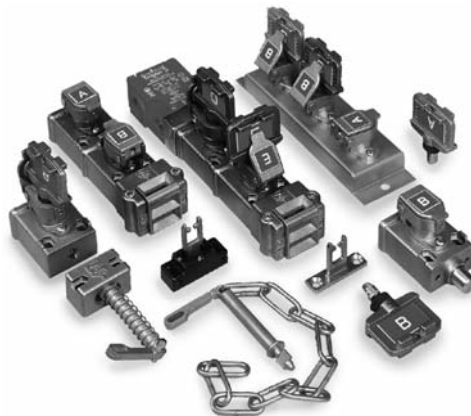




CNC precision cut keys



Interlocking and Control Solutions

Trapped Key Interlocks—Why Use Them?

Based upon the premise that no one key can be in two places at once, key interlock systems can be configured to provide that a predetermined sequence of events takes place or that hazards have been reduced before operators can become exposed to them.

It is a mechanical system and is therefore widely used in applications including those where the location of plant, environment or explosive atmospheres make the use of electrical interlock systems unsuitable or expensive to install. In addition, unique coding can be provided, leading to a greater degree of security and tamper-resistance.

Why Prosafe?

In order to derive the full benefits from a trapped key interlocking system its components must be totally practical, easily maintainable and readily available. Prosafe's unique key and code barrel gives the ability for even complicated interlocking systems and spare parts to be ordered from our worldwide network of distributors—fast! A first for trapped key interlocks.

Five Unique Prosafe Benefits

Compare the following to other trapped key manufacturers:

1. All stainless interlocking and coded parts—including the code barrel and internal components at no extra cost.
2. Weather cap as standard—no extra charge for dust caps and seals.
3. Standard red color-coded key and ID tags—at no extra charge.
4. Custom color/text keys and ID tags—nominal extra charge.
5. A complete range of isolators, key exchange, miniature valve interlocks and gate interlocks—all using the same key principle.

The Prosafe Advantage



Stainless steel construction.

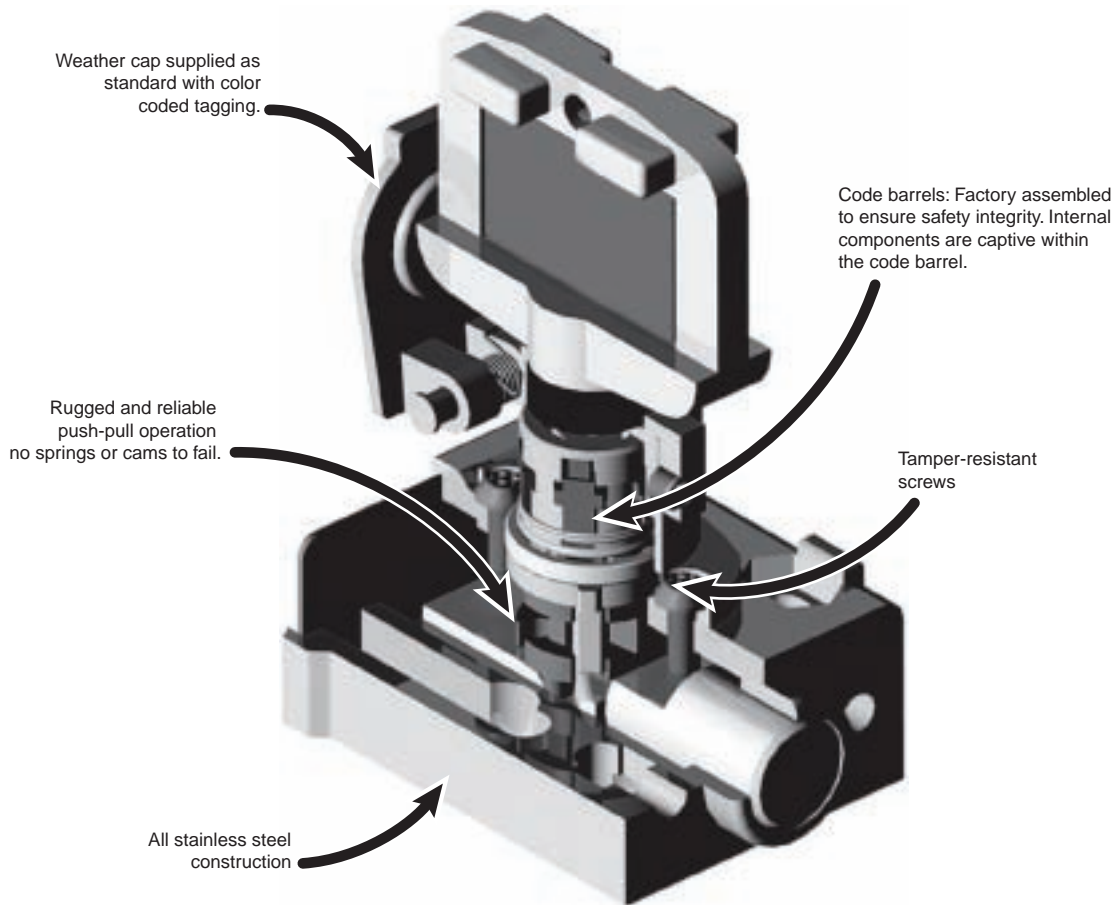
CE Marking—Tested and Approved

Only Prosafe products carry the prestigious BG mark. A sign of safety, independently tested by the German Berufsgenossenschaftliches Institut für Arbeitssicherheit, "BIA." Additional tests for valve interlocks include Lloyds Certificate for fire test and salt-mist resistance.

Over 100,000 Operations

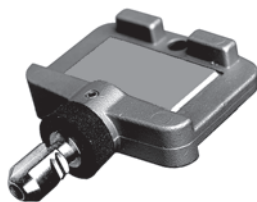
Prosafe products have been subjected to independent, exhaustive testing. With only a small amount of lubricant added infrequently, keys were inserted, rotated and removed at a rate of 12 times per minute. After 100,000 operations (at 10 operations a day this is equivalent to 27 years) the unit was functioning satisfactorily and most importantly would "pass" only the original or equivalent new key. No incorrect keys could operate the lock, underlining the unit's integrity as well as longevity.

The Advantage



Prosafe Keys

Compact, solid and sturdy keys supplied with dust seals and coded tagging. Optional colors/text are available.



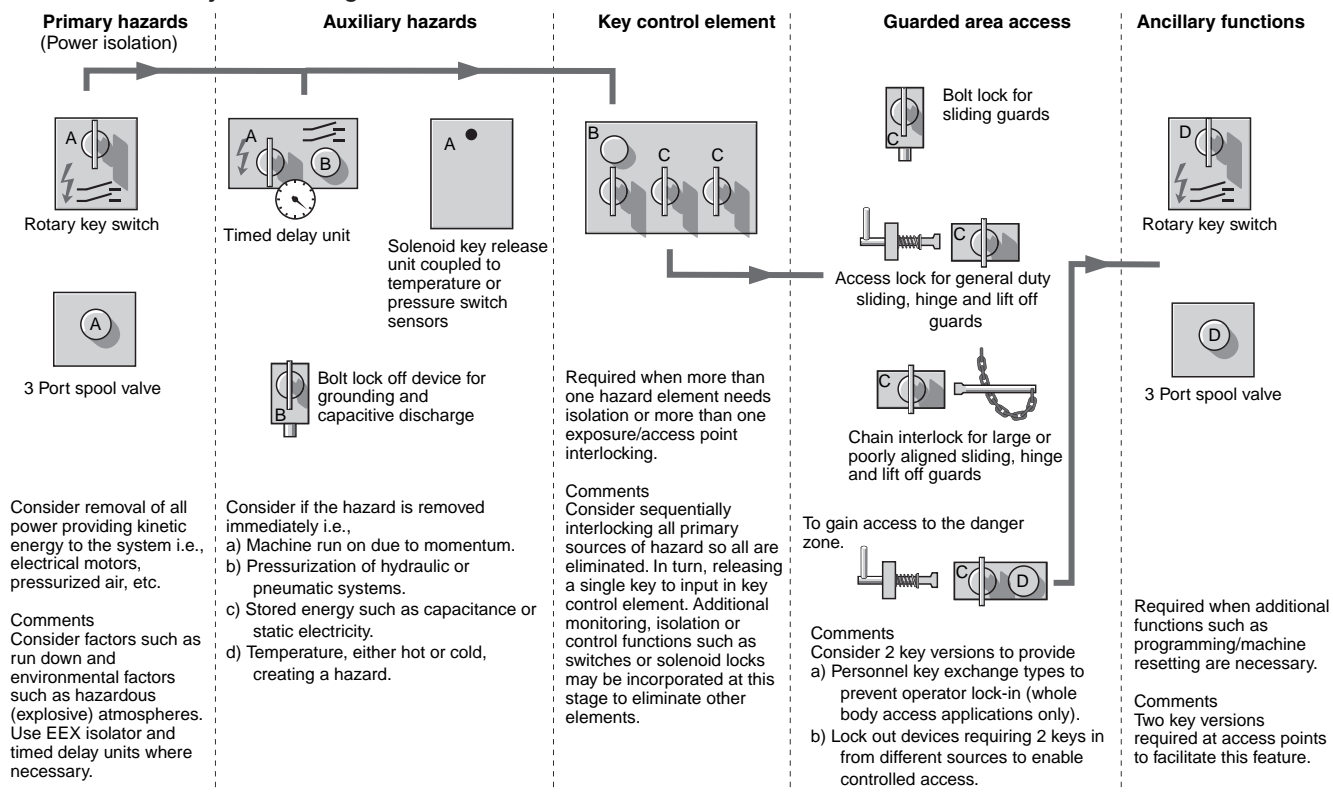
Safety Switches

Trapped Key Switches

Overview

Design Suggestions for an Interlocking System

Plant and Machinery Interlocking

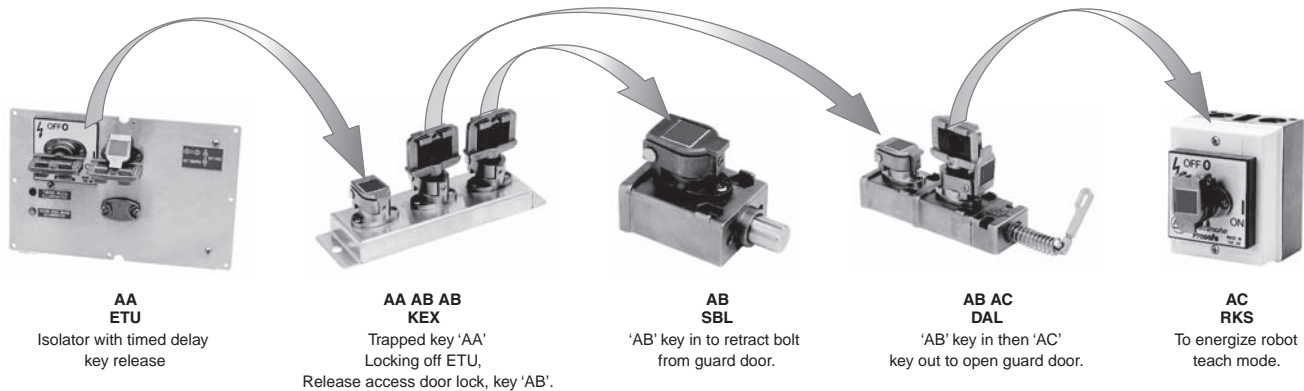


The Prosafe Advantage



Stainless steel construction.

Illustrated Principles of Trapped Key Interlocking



Sequence of Operation

1. The ETU isolator has two keys. One is a nonremovable key. The other key (a "AA" coded key) can be removed after a timed duration, which is set by a potentiometer inside the ETU isolator. Turn the nonremovable key to turn the hazardous machine motion off and start the timer. When the time expires, the Key Free LED turns ON. Remove the "AA" key.
2. Insert the "AA" key into the Key Exchange Unit (KEX) and turn it 90°.
3. Turn one of the "AB" keys 90° and remove it from the KEX. This traps the "AA" key in the KEX and prevents the restarting of the machine.
4. Insert the "AB" key into the Single-key Bolt Lock (SBL) and turn it 90° to gain partial body access to the machine.
5. Turn the second "AB" key 90° and remove it from the KEX. Removal of this key also traps the "A" key in the KEX and prevents the restarting of the machine.
6. Insert the "AB" key into the Dual-key Access Lock (DAL) and turn it 90°.
7. Turn the "AC" key 90° and remove the "C" key. Rotate the access handle to allow full body entry into the hazard zone.
8. Take the "AC" key into the hazard zone, insert it into the rotary key switch (RKSE) and turn it 90° to send a signal to the machine control system, to allow the machine to operate in a slow or teach mode.
9. Reverse the process to return the machine to full operational mode.

Bill of Materials

Item	Quantity	Description	Cat. No.
1	1	Single Key Time Delayed with an AA Primary Key	440T-MSTUE11AA
2	1	Key Exchange Unit, AB Primary Key, Two B Secondary Keys Trapped (included)	440T-MKEXE11AAABAB
3	1	Single Bolt Lock, AB Primary Key	440T-MSBLE10AB
4	1	Dual Access Lock, AB Primary Key, C Secondary Key Trapped (included)	440T-MDALE10ABAC
5	1	Rotary Key Switch, AC Primary Code Barrel	440T-MRKSE10AC
6	1	AA Key	440T-AKEYE10AA

Note: Primary keys must be ordered separately, when not provided for by a previous sequential trapped key. In the example above, only one primary key must be ordered separately. The remaining primary keys are provided by a previous sequential secondary (trapped) key.

Safety Switches

Trapped Key Switches

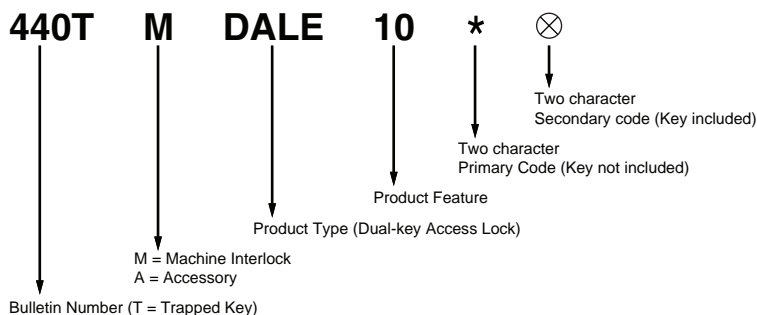
Overview

Code Selection

Ordering Prosafe trapped key products requires codes to be included in the cat. no.

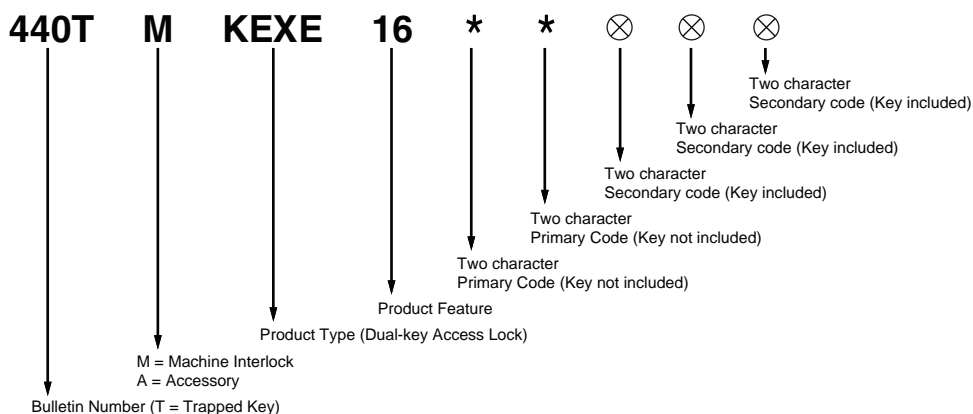
- The codes are added to the end of the cat. no.
- Each code must be two characters in length.
- The first code(s) is the primary code and the last code(s), if necessary, are the secondary code(s).
- Primary codes do not include the key. The key must be ordered separately or must come from a previous operation.
- Secondary codes come complete with a key, as the key is trapped in the code barrel.
- Use the tables on page 3-107 to select and track codes.

Ordering Example 1



Order Cat. No. 440TMDALE100AAAB to get a Dual key Access Lock with an "AA" primary code and a "AB" secondary code, with a "AB" key included.

Ordering Example 2



Order Cat. No. 440TMKEXE16AAABACACAC to get a key exchange unit with "AA" and "AB" primary codes and three "AC" secondary codes. The "AA" and "AB" keys are not included. The three "AC" keys, which are trapped in the secondary code barrels, are included.

The Prosafe Advantage



Stainless steel construction.

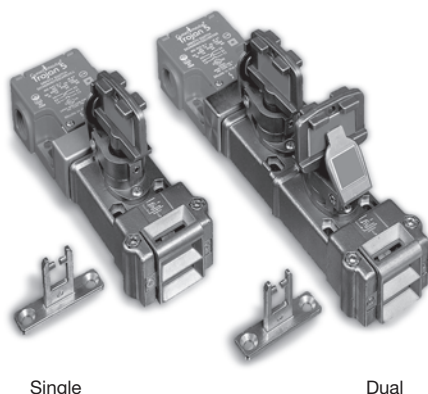
Key Coding

Below is an example reference guide that is useful in selecting and tracking codes. Start down the Aa column as the lower codes (typically Aa to Za) are stocked. The chart continues on to Zz. Note that there are only 24 letters used—O & Q are not used.

Codes are ordered with upper case letters. Labels with two letter codes will show the first letter in the upper case and the second letter in lower case.

	Code	Application & Date	Code	Application & Date	Code	Appli & Da
Start Down ↓	Aa	granulator machine #472 24/3/01 ine 67	Ab		Ac	
	Ba		Bb		Bc	
	Ca		Cb		Cc	
	Da		Db		Dc	

Code	Application & Date	Code	Application & Date	Code	Application & Date	Code	Application & Date	Code	Application & Date	Code	Application & Date
Aa		Ab		Ac		Ad		Ae		Af	
Ba		Bb		Bc		Bd		Be		Bf	
Ca		Cb		Cc		Cd		Ce		Cf	
Da		Db		Dc		Dd		De		Df	
Ea		Eb		Ec		Ed		Ee		Ef	
Fa		Fb		Fc		Fd		Fe		Ff	
Ga		Gb		Gc		Gd		Ge		Gf	
Ha		Hb		Hc		Hd		He		Hf	
Ia		Ib		Ic		Id		Ie		If	
Ja		Jb		Jc		Jd		Je		Jf	
Ka		Kb		Kc		Kd		Ke		Kf	
La		Lb		Lc		Ld		Le		Lf	
Ma		Mb		Mc		Md		Me		Mf	
Na		Nb		Nc		Nd		Ne		Nf	
Pa		Pb		Pc		Pd		Pe		Pf	
Ra		Rb		Rc		Rd		Re		Rf	
Sa		Sb		Sc		Sd		Se		Sf	
Ta		Tb		Tc		Td		Te		Tf	
Ua		Ub		Uc		Ud		Ue		Uf	
Va		Vb		Vc		Vd		Ve		Vf	
Wa		Wb		Wc		Wd		We		Wf	
Xa		Xb		Xc		Xd		Xe		Xf	
Ya		Yb		Yc		Yd		Ye		Yf	
Za		Zb		Zc		Zd		Ze		Zf	



Single

Dual

Description

The Prosafe Slamlock with electrical isolation combines the features of trapped key tongue actuated interlocks while also providing sets of electrical safety and auxiliary contacts. When the actuator is inserted into the lock and the key is removed the actuator is trapped in the unit thus locking closed the guard door. In this state the safety contacts are closed and the auxiliary contacts are open. To open the guard door the key must be inserted and rotated 90°, opening the safety contacts, closing the auxiliary contacts and enabling the actuator to be released thus unlocking the guard door. While the guard door is open the key is trapped in the unit.

Slamlocks with electrical isolation offer the features of electrical safety interlock switches with the benefits of a trapped key/enforced sequence systems. They allow a combination of both approaches for safeguarding machinery and processes to be used.

The Single-key Slamlock (SSS) is used to interlock hatches, guards and doors where full body access is not required. The single key locks the actuator and operates the switch in the same action.

Dual-key Slamlock (DSS) is similar to the single key version but has a secondary key to allow "two key in" or "key exchange" conditions. The key exchange version may be used where whole body access is required, as the secondary key can be used as a personnel key.

Features

- Electrical safety contacts combined with trapped key/enforced sequence feature
- Most of unit constructed from 316L stainless steel
- Selection of actuator types available
- Single or dual key versions available
- Direct drive operation
- Replaceable code barrel assembly
- Weatherproof stainless steel dust cap as standard
- Solenoid versions

The Prosafe Advantage



Stainless steel construction.

Specifications

Safety Ratings

Standards	EN1088, IEC/EN60947-5-1, GS-ET-19, ISO12100-1&2, ISO14119, AS4024.1
Category	Cat. 1 per EN 954-1 (ISO 13849-1) Suitable for Cat. 2, 3, or 4 systems
Certifications	CE Marked for all applicable directives and BG; C-Tick not required

Outputs

Safety Contacts	2 N.C. positive break
Switching Current @ Voltage, Max.	500V/500V A
Thermal Current (Ith)	10 A
Current, Min.	5 mA @ 5V DC
Safety Contact Gap	>2 x 2 mm (0.07 in.)
Rated Insulation Voltage	(Ui) 500V
Rated Impulse withstand Voltage	(Uimp) 2500V
Auxiliary Contacts	1 N.O.

Operating Characteristics

Break Contact Force, Min.	12 N (2.7 lbs)
Actuation Speed, Max.	1 ms
Actuation Frequency, Max.	2 cycle/s

Utilization Category

AC 15	(Ue)	500V	250V	100V
	(Ie)	1 A	2 A	5 A
DC		250V	0.5 A, 24V	2 A

Environmental Characteristics

Enclosure Type Rating	IP67
Operating Temperature [C (F)]	Electrical: -20...+80 ° (-4...+176°) Solenoid: -20...+60 ° (-4...+140 °)
Relative Humidity	95%

Physical Characteristics

Actuator Travel for Positive Opening	5 mm (0.19 in.)
Operating Radius, Min.	175 mm (6.88 in.) [60 mm (2.36 in.) with flexible actuator]
Actuator Holding Force, Max.	2000 N (450 lbs)
Releasable Load, Max.	100 N (22.5 lbs)
Case Material	UL Approved glass-filled polyester & 316L stainless steel
Actuator Material	Stainless steel
Conduit Entry	3 x M20
Mounting	SSS: 4 x M5 counterbored from top or 4 x M5 from underside with nuts DSS: 6 x M5 counterbored from top or 6 x M5 from underside with nuts
Mechanical Life	100,000 operations
Electrical Life	1,000,000 operations
Weight [g (lbs)]	SSE: 1160 (2.6) DSSE: 1700 (3.7)
Color	Red/Stainless
Shear Force to Key	15.1 k•N (3398 lbs), max.
Pollution Degree	3
Torque to Key	14 N•m (124 lb•in), max.

Note: The safety contacts of the Guardmaster switches are described as normally closed (N.C.), i.e. with the guard closed, actuator in place (where relevant) and the machine able to be started.

Product Selection - Electrical

Contact Type	Type	Trapped Key Condition	Actuator Type	Cat. No.
2 N.C. + 1 N.O. Break before make	Single key	Key trapped to release actuator	Standard	440T-MSSSE10*
			Flexible	440T-MSSSE11*
			Flat	440T-MSSSE12*
		Key free to release actuator	Standard	440T-MSSSE20*
			Flexible	440T-MSSSE22*
			Flat	440T-MSSSE23*
	Dual key	Primary key trapped, secondary key free to release actuator	Standard	440T-MDSSE10*⊗
		Primary key trapped, secondary key eject to release actuator		440T-MDSSJ10*⊗
		Primary key trapped, secondary key free to release actuator	Flexible	440T-MDSSE11*⊗
		Primary key trapped, secondary key eject to release actuator		440T-MDSSJ11*⊗
		Primary key trapped, secondary key free to release actuator	Flat	440T-MDSSE12*⊗
		Primary key trapped, secondary key eject to release actuator		440T-MDSSJ12*⊗
		Both keys free to release actuator	Standard	440T-MDSSE20**
			Flexible	440T-MDSSE22**
			Flat	440T-MDSSE23**
2 N.C. + 2 N.O. Break before make	Single key	Key free to release actuator	Standard	440T-MSSSE26*
			Flexible	440T-MSSSE27*
			Flat	440T-MSSSE25*

* Substitute the desired primary code for this symbol (key not included). See 3-107 for code selection.

⊗ Substitute the desired secondary code for this symbol (key included). See 3-107 for code selection.

Product Selection - Solenoid

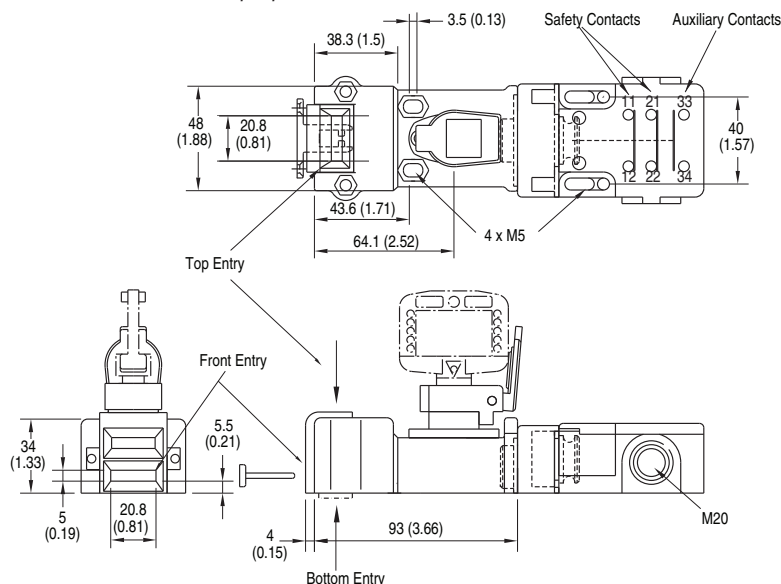
Contact Type	Type	Trapped Key Condition	Solenoid Voltage	Actuator Type	Cat. No.
2 N.C. & 1 N.O. Break before make	Single key	Key free to release actuator	24V DC	Standard	440T-MSSUE20*
				Flexible	440T-MSSUE22*
				Flat	440T-MSSUE23*
	Dual key	Primary key trapped, secondary key free to release actuator	24V DC	Standard	440T-MDSUE10*
				Flexible	440T-MDSUE11*
				Flat	440T-MSSUE12*
	Single key	Key free to release actuator	110V AC	Standard	440T-MSSUE50*

* Substitute the desired primary code for this symbol (key not included). See 3-107 for code selection.

Approximate Dimensions [mm (in.)]

Dimensions are not intended to be used for installation purposes.

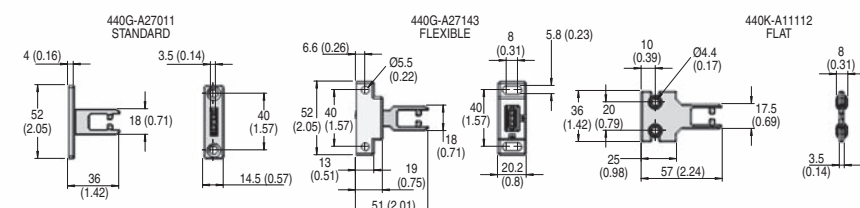
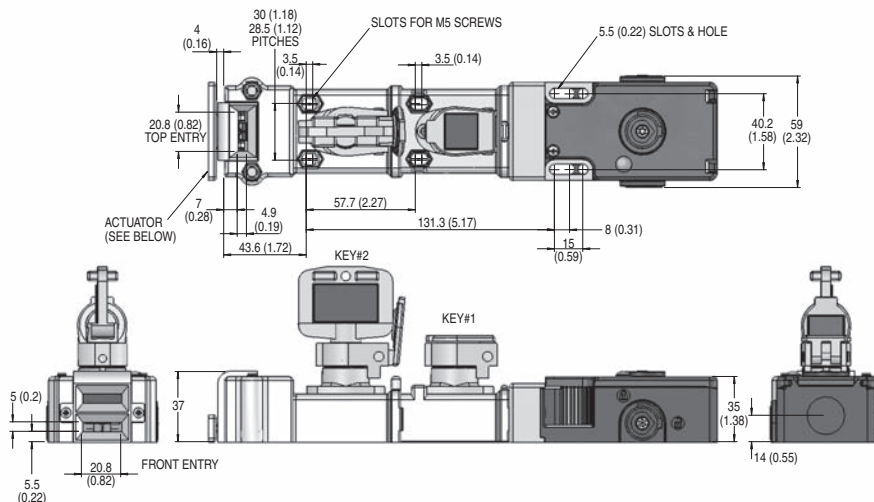
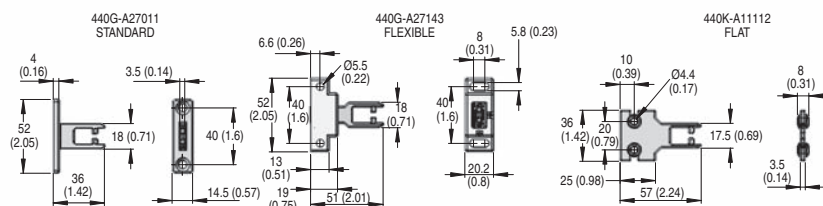
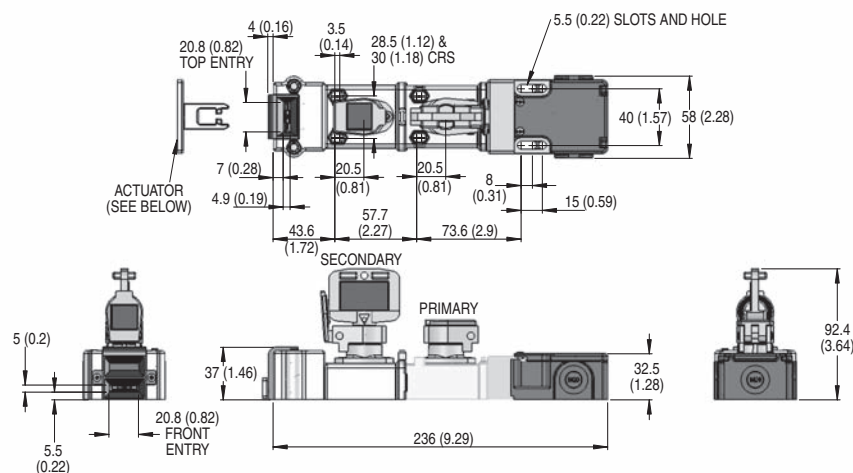
Single Key Slamlock




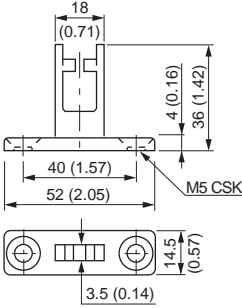

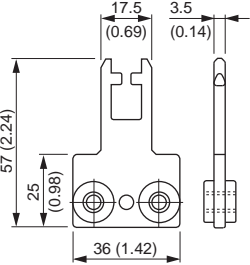

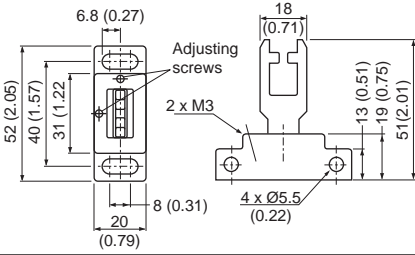



Approximate Dimensions [mm (in.)] (continued)

Dimensions are not intended to be used for installation purposes.

Dual Key Slamlock



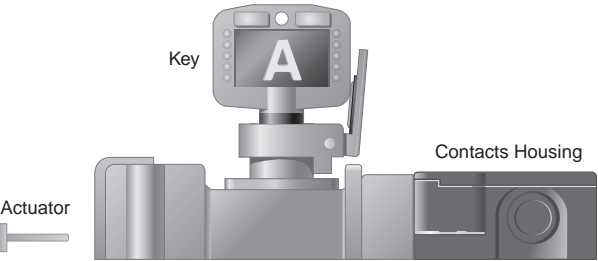
Accessories

Description		Approximate Dimensions [mm (in.)]	Cat. No.
	GD2 standard actuator		440G-A27011
	GD2 flat actuator		440K-A11112
	Fully flex actuator		440G-A27143
	Stainless steel key	page 3-140	440T-AKEYE10⊗
	Stainless steel replacement code barrel with dust cap		440T-ASCBE14*
	Stainless steel weatherproof replacement dust cap		440T-ASFC10⊗

* Substitute the desired primary code for this symbol (key not included). See 3-107 for code selection.
⊗ Substitute the desired code for this symbol. See 3-107 for code selection.

Typical Applications

Actuator out, key trapped, safety contacts open, auxiliary contact closed.



Locking force = 2000 N (450 lb)