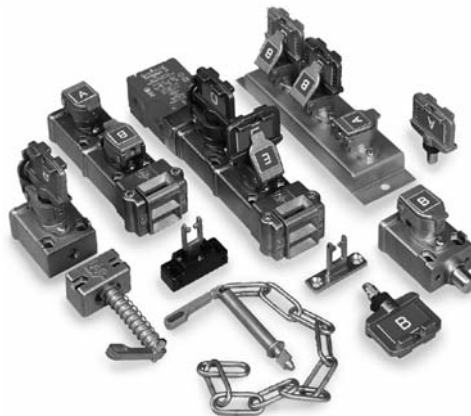




CNC precision cut keys



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?

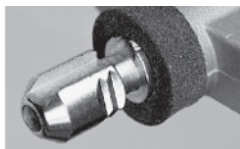
In order to derive the full benefits from a trapped key interlocking system its components must be totally practical, easily maintainable and readily available. Prosafe's unique key and code barrel gives the ability for even complicated interlocking systems and spare parts to be ordered from our worldwide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

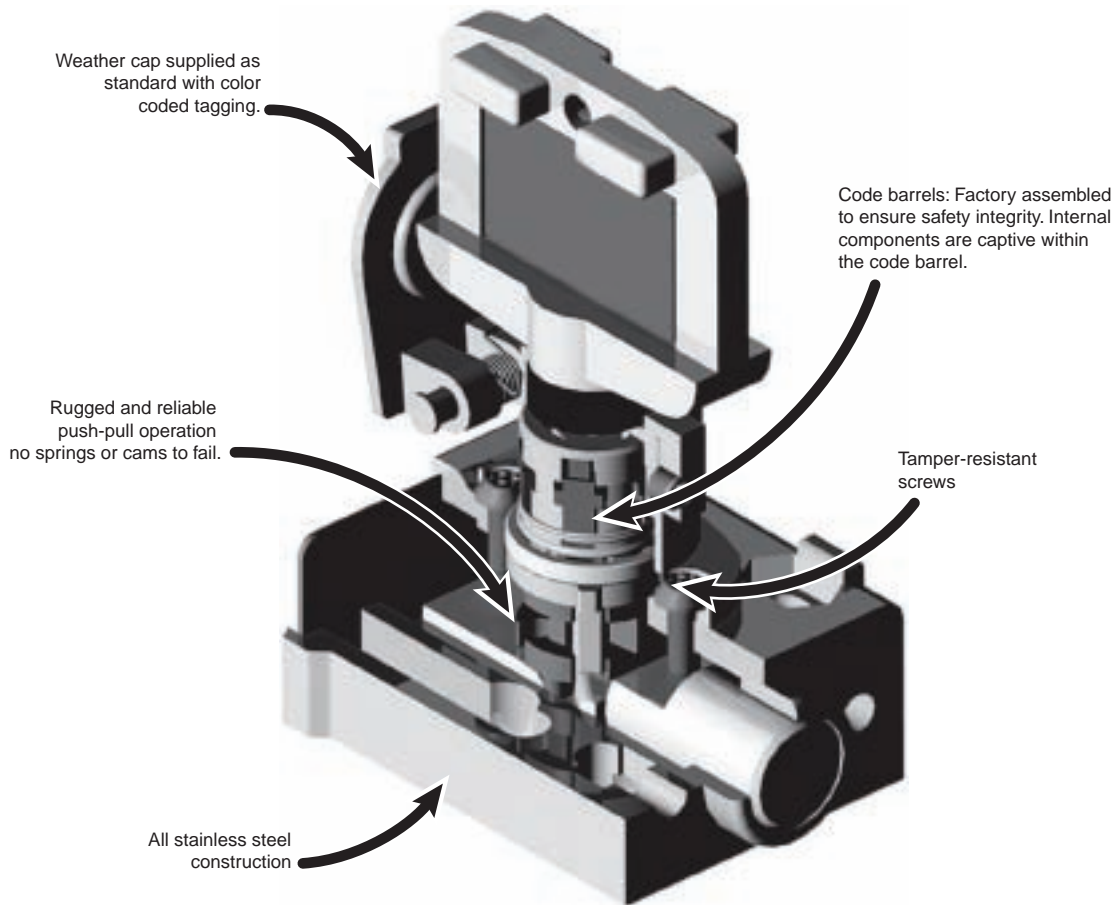
CE Marking—Tested and Approved

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

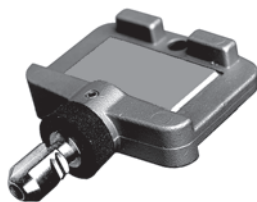
Prosafe products have been subjected to independent, exhaustive testing. With only a small amount of lubricant added infrequently, keys were inserted, rotated and removed at a rate of 12 times per minute. After 100,000 operations (at 10 operations a day this is equivalent to 27 years) the unit was functioning 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.



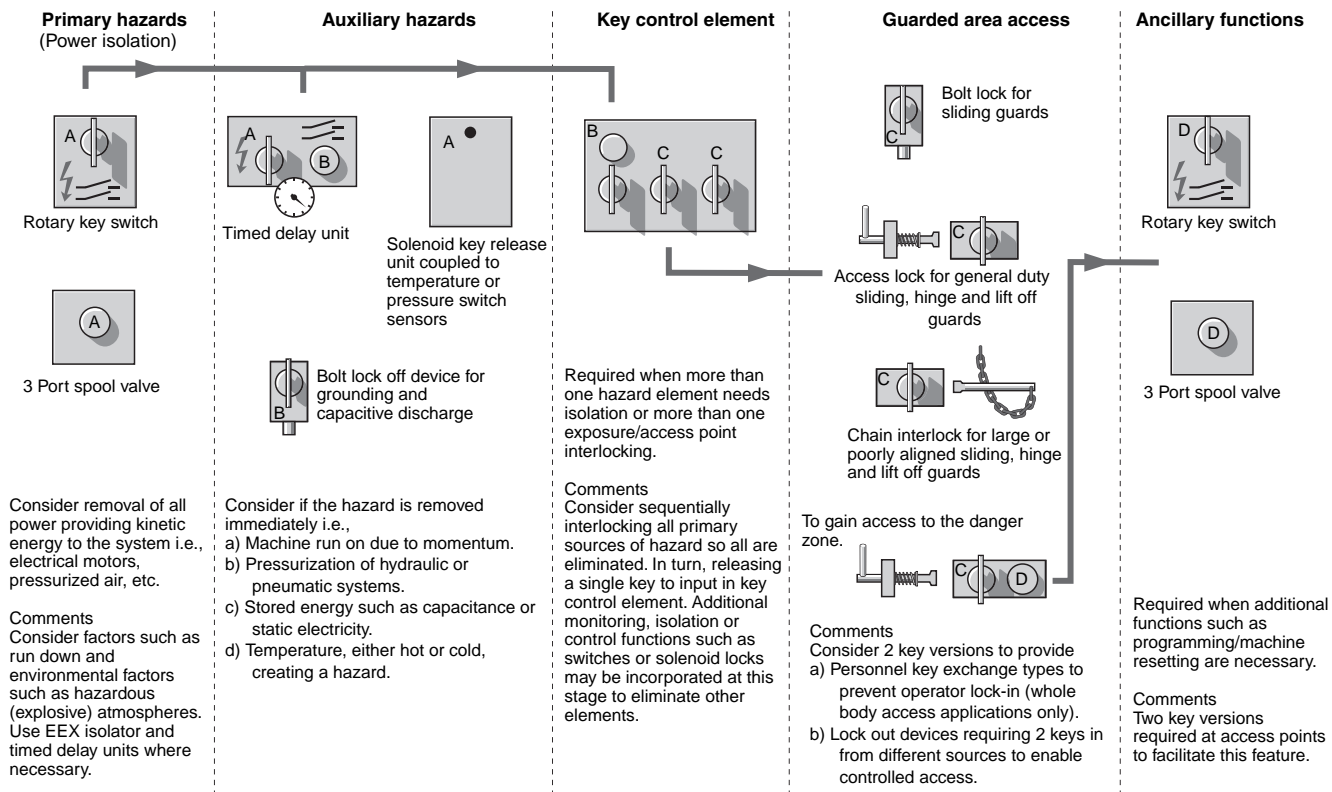
Safety Switches

Trapped Key Switches

Overview

Design Suggestions for an Interlocking System

Plant and Machinery Interlocking

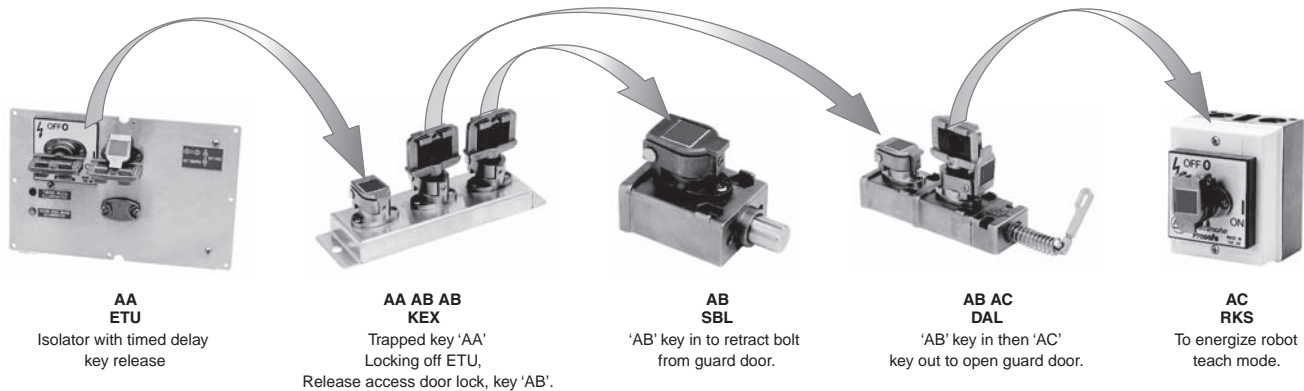


The Prosafe Advantage



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

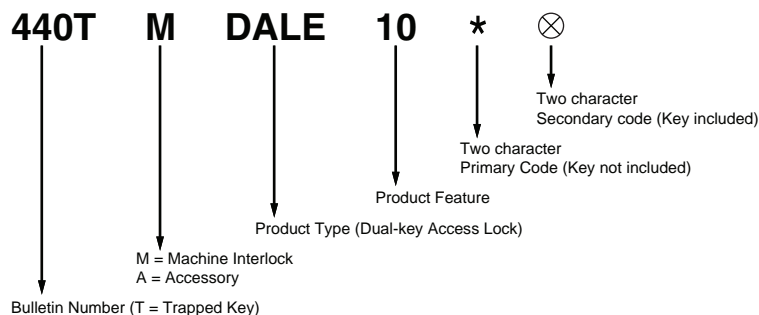
Overview

Code Selection

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

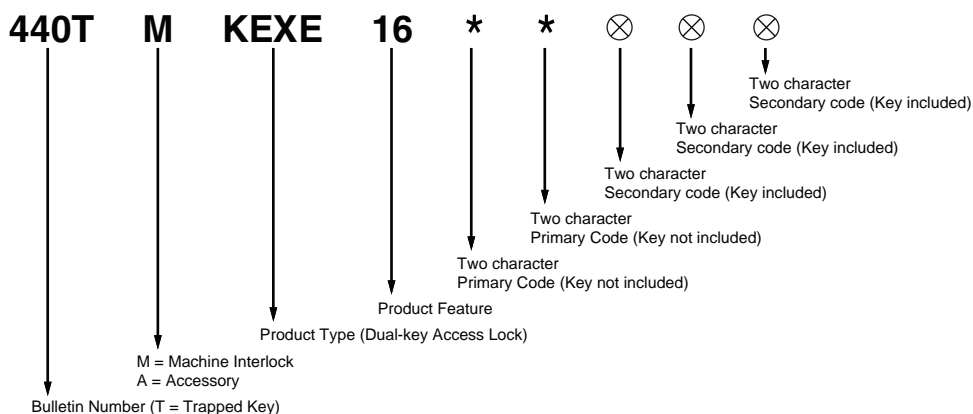
- The codes are added to the end of the cat. no.
- Each code must be two characters in length.
- The first code(s) is the primary code and the last code(s), if necessary, are the secondary code(s).
- Primary codes do not include the key. The key must be ordered separately or must come from a previous 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	

Safety Switches

Rotary Switches



Description

The rotary switches are used for electrical isolation of machinery to improve safe access and also as teach boxes in robot cells. Once the power has been turned off, the key can then be withdrawn and used in the next sequence of operation such as unlocking an access hatch or allowing valves to be operated.

The rotary switch can either be mounted in a panel or purchased in an enclosure. The rotary switch is available with 4 poles, either 4 N.O. or 2 N.C. and 2 N.O. The 100 A 4 N.O. switch has 3 contacts rated at 100 A and 1 contact rated at 20 A.

Features

- 316L stainless steel keys
- Direct drive operation—positively opens contacts
- Stainless steel dust cap included
- Up to 400 A isolation
- 4 N.O., 2 N.O. and 2 N.C., 3 N.O./1 N.C., 3 N.O., or 3 N.C. and neutral contacts
- Replaceable code barrel assembly

Specifications

Safety Ratings

Standards	EN1088, IEC/EN60204-1, IEC/EN60947-5-1, ISO12100-1&2, ISO14119, GS-ET-19, AS4024.1, UL508, CSA 22.2
Category	Cat. 1 per EN 954-1 (ISO 13849-1) Suitable for Cat. 2, 3, and 4 systems
Certifications	CE Marked for all applicable directives, BG, cULus on contact block; C-Tick not required

Operating Characteristics

Conduit Entry	4 x M20 (RKS only)
Mechanical Life	100,000 operations
Finger Protection	DIN 57106/VDE 0106 T.100

Environmental Characteristics

Operating Temperature [C (F)]	-10...+40 ° (14...104 °)
Relative Humidity	95%

Physical Characteristics

Shear Force to Key	15.1 k•N (3398 lbs), max.
Torque to Key	14 N•m (124 lb•in), max.

Specifications (continued)



Weight [g (lbs)]		RPSE	10, 11, 12, 13, 20:	500 (1.1)	14, 16:	1000 (2.2)
		RKSE	10, 11, 12, 13:	850 (1.9)	14, 16:	1250 (2.8)
Electrical Life			100,000 operations			
Climatic Test			Constant to DIN IEC 68 Part 2-3 Variable to DIN IEC 68 Part 2-30			
Ambient Temperature, Operation			Encased -25...40 °C (10...104 °F)			
(Ui) Rated Insulation Voltage			690V			
(Uimp) Rated Impulse withstand Voltage			6 kV			
S3 Intermittent Rating Duty Factor (VDE 0530, Part 1)			60/40/25% = 1, 3/1, 6/2 xlu			
Last two digits of Cat. No. (See Product Selection table)			10 11 16	12	13	14
Rated Uninterrupted Current (Iu)	IEC/EN/VDE	20A	32A	63A	100A	
	UL/CSA	16A	30A	60A	100A	
Rated Operational Voltage (Ue)	IEC/EN/VDE	690V	690V	690V	1000V	
	UL/CSA	600V	600V	600V	600V	
	Main Switch Isolation Voltage, Max.	750V	750V	750V	1000V	
Rated Operational Current (Ie)	AC-21A IEC/EN/VDE	20A	32A	63A	100A	
	AC-1 SEV	20A	32A	63A	100A	
Rated Operational Power at 50/60 Hz (AC-23A IEC/EN/VDE)	3-phase 220...240V	4 kW	5.5 kW	15 kW	22 kW	
	3-pole 380...440V	7.5 kW	11 kW	22 kW	37 kW	
	500...690V	7.5 kW	11 kW	22 kW	37 kW	
Rated Operational Power at 50/60 Hz (AC-3A IEC/EN/VDE)	3-phase 220...240V	3 kW	4 kW	11 kW	22 kW	
	3-pole 380...440V	5.5 kW	7.5 kW	18.5 kW	30 kW	
	500...690V	5.5 kW	7.5 kW	18.5 kW	30 kW	
DOL Rating (UL/CSA)	3-phase 140V	1 HP	2 HP	5 HP	10 HP	
	3-pole 240V	2 HP	5 HP	15 HP	25 HP	
	480V	5 HP	10 HP	30 HP	30 HP	
	600V	5 HP	10 HP	40 HP	30 HP	
Rated Breaking Capacity	AC-23/AC-3 220...240V	250A	330A	500A	600A	
	Motor Switch 380...440V	250A	330A	500A	600A	
	500...690V	150A	220A	270A	300A	
Fuse Rating (GI)		25 A, max.	35 A, max.	63/50 A, max.	100 A, max.	
Rated Fuse Short Circuit Current		15 kA	15 kA	15/20 kA	25 kA	
Terminal Cross Section		1...10		4...16	2.5...3.5	
		mm² single/multiple wire				
Conductor Size, mm² min...max		0.75 ...6		2.5...10	1.5...2.5	
		(stranded) with sleeve				
		8 AWG		6 AWG	2 AWG	

The Prosafe Advantage





Stainless steel construction.

Product Selection

Type	Contact Type	Current Accuracy	Cat. No.
 Enclosure Mounted (RKS only)	4 N.O.	20 A	440T-MRKSE10*
	2 N.O. & 2 N.C.	20 A	440T-MRKSE11*
	4 N.O.	32 A	440T-MRKSE12*
	4 N.O.	63 A	440T-MRKSE13*
	3 N.O. & 1 N.O.	3 N.O. 100 A and 1 N.O. 20 A	440T-MRKSE14*
	8 N.O.	20 A	440T-MRKSE16*
Mild Steel Enclosure Mounted (RKS only)	3 N.O. + Neutral	200 A	440T-MRKSE21*
	3 N.O.	400 A	440T-MRKSE22*
 Panel Mounted	4 N.O.	20 A	440T-MRPSE10*
	2 N.O. & 2 N.C.	20 A	440T-MRPSE11*
	4 N.O.	32 A	440T-MRPSE12*
	4 N.O.	63 A	440T-MRPSE13*
	3 N.O. & 1 N.O.	3 N.O. 100 A and 1 N.O. 20 A	440T-MRPSE14*
	8 N.O.	20 A	440T-MRPSE16*
	3 N.O. & 3 N.C.	20 A	440T-MRPSE18*
	4 N.O.	40 A	440T-MRPSE20*

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

Type	Number of Keys	Contact Type	Current Accuracy	Cat. No.
Isolator on First Key Out				
	Dual key isolator	2 keys out	4 N.O.	440T-MMRSE10**
			2 N.O. & 2 N.C.	440T-MMRSE11**
			4 N.O.	440T-MMRSE12**
			4 N.O.	440T-MMRSE13**
	Triple key isolator	3 keys out	4 N.O.	440T-MMRSE20***
			2 N.O. & 2 N.C.	440T-MMRSE21***
			4 N.O.	440T-MMRSE22***
			4 N.O.	440T-MMRSE23***
	Quad key isolator	4 keys out	4 N.O.	440T-MMRSE30****
			2 N.O. & 2 N.C.	440T-MMRSE31****
			4 N.O.	440T-MMRSE32****
			4 N.O.	440T-MMRSE33****
	Dual key exchange isolator	1 key in/ 1 key out	4 N.O.	440T-MMRXE10*⊗
			2 N.O. & 2 N.C.	440T-MMRXE11*⊗
			4 N.O.	440T-MMRXE12*⊗
			4 N.O.	440T-MMRXE13*⊗
	Triple key exchange isolator	1 key in/ 2 key out	4 N.O.	440T-MMRXE20*⊗⊗
			2 N.O. & 2 N.C.	440T-MMRXE21*⊗⊗
			4 N.O.	440T-MMRXE22*⊗⊗
			4 N.O.	440T-MMRXE23*⊗⊗
	Quad key exchange isolator	1 key in/ 3 key out	4 N.O.	440T-MMRXE30*⊗⊗⊗
			2 N.O. & 2 N.C.	440T-MMRXE31*⊗⊗⊗
			4 N.O.	440T-MMRXE32*⊗⊗⊗
			4 N.O.	440T-MMRXE33*⊗⊗⊗

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

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

Accessories

Description	Additional Information	Cat. No.
Stainless steel key		440T-AKEYE10*
Stainless steel replacement code barrel for products other than 100 A RPS/RKS units with dust cap	3-140	440T-ASCBE14*
Stainless steel replacement code barrel for 100 A unit rotary switch		440T-ASCBE11*
Stainless steel weatherproof replacement dust cap		440T-ASFC10*
Cable grip, M20 conduit, accommodates cable diameter 7...10.5 mm (0.27...0.41 in.)	3-53	440A-A09028
Adaptor, conduit, M20 to 1/2 inch NPT, plastic		440A-A09042
Supplemental Contact Block, 20 A, 1 N.O. Late Make, Early Break 1 N.C. Auxiliary	For use with RPSE12, RPSE20 (maximum 1 per switch)	440T-AACA10
Supplemental Contact Block, 20 A, 2 N.O. Late Make, Early Break	For use with RPSE12, RPSE20 (maximum 1 per switch)	440T-AACA11
Supplemental Contact Block, 20 A, 1 N.O., 1 N.C.	For use with RPSE13 & 14	440T-AACA20
Supplemental Contact Block, 20 A, 2 N.O.	For use with RPSE13 & 14	440T-AACA21
ABS plastic enclosure	For use with dual key, and dual key exchange, isolators	440T-AIPB10
Stainless steel enclosure (240x180x150 mm)	For use with >20 A RPSE units (not including RPSE21 or 22)	440T-AIPB25
Stainless steel enclosure (150x150x80 mm)	For use with RPSE10 & 11	440T-AIPB26
ABS plastic enclosure	For use with triple/quad key, and triple/quad key exchange, isolators	440T-AIPB50
Stainless steel enclosure	For use with triple/quad key, and triple/quad key exchange, isolators	440T-AIPB55

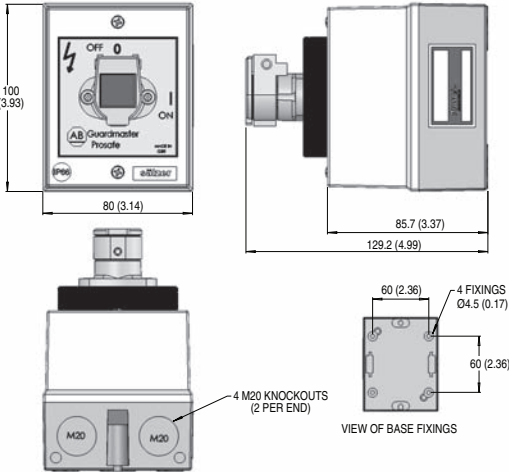
* Substitute the desired primary code for this symbol (key not included). See page 3-107.

Approximate Dimensions [mm (in.)]

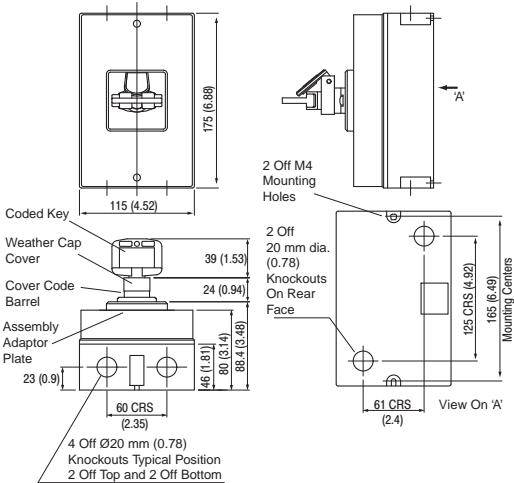
Dimensions are not intended to be used for installation purposes.

MRKSE10 and MRKSE11

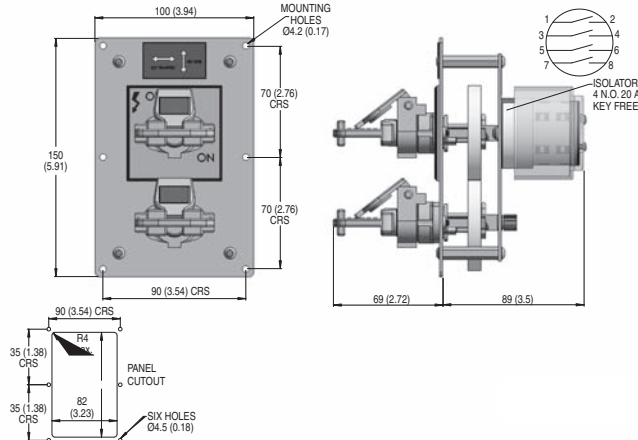
3-Trapped Key Switches



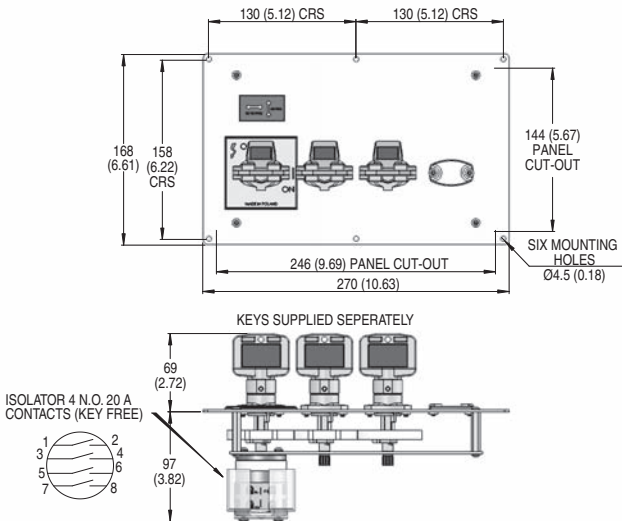
MRKSE12 and MRKSE13



MMRSE10

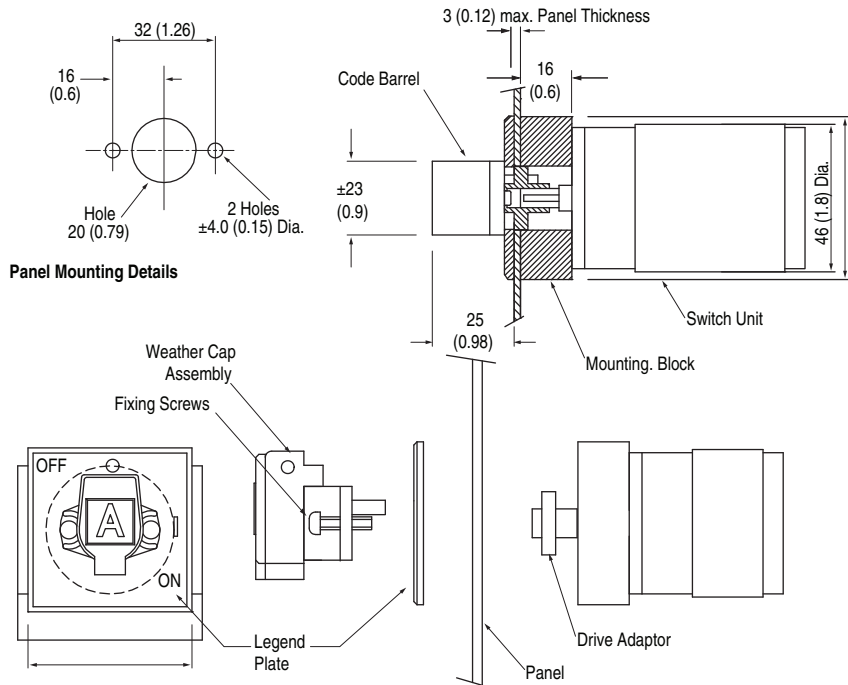


MMRSE20



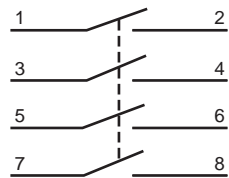
Approximate Dimensions [mm (in.)] (continued)

MRPSE16

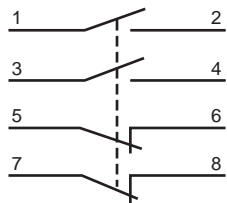


Typical Wiring

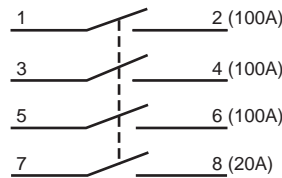
Diagrams Shown with Key Free



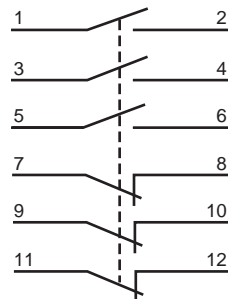
MRKSE10 and MRPSE10
MRKSE12 and MRPSE12
MRKSE13 and MRPSE13
----- and MRPSE20
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MMRSE12 and MMRXE12
MMRSE13 and MMRXE13
MMRSE20 and MMRXE20
MMRSE22 and MMRXE22
MMRSE23 and MMRXE23
MMRSE30 and MMRXE30
MMRSE32 and MMRXE32
MMRSE33 and MMRXE33



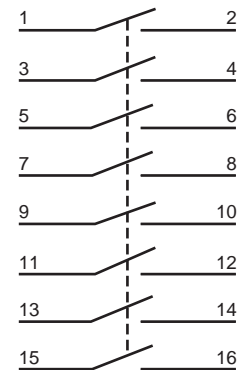
MRKSE11 and MRPSE11
MMRSE11 and MMRXE11
MMRSE21 and MMRXE21
MMRSE31 and MMRXE31



MRKSE14 and MRPSE14



MRKSE18 and MRPSE18



MRKSE16 and MRPSE16