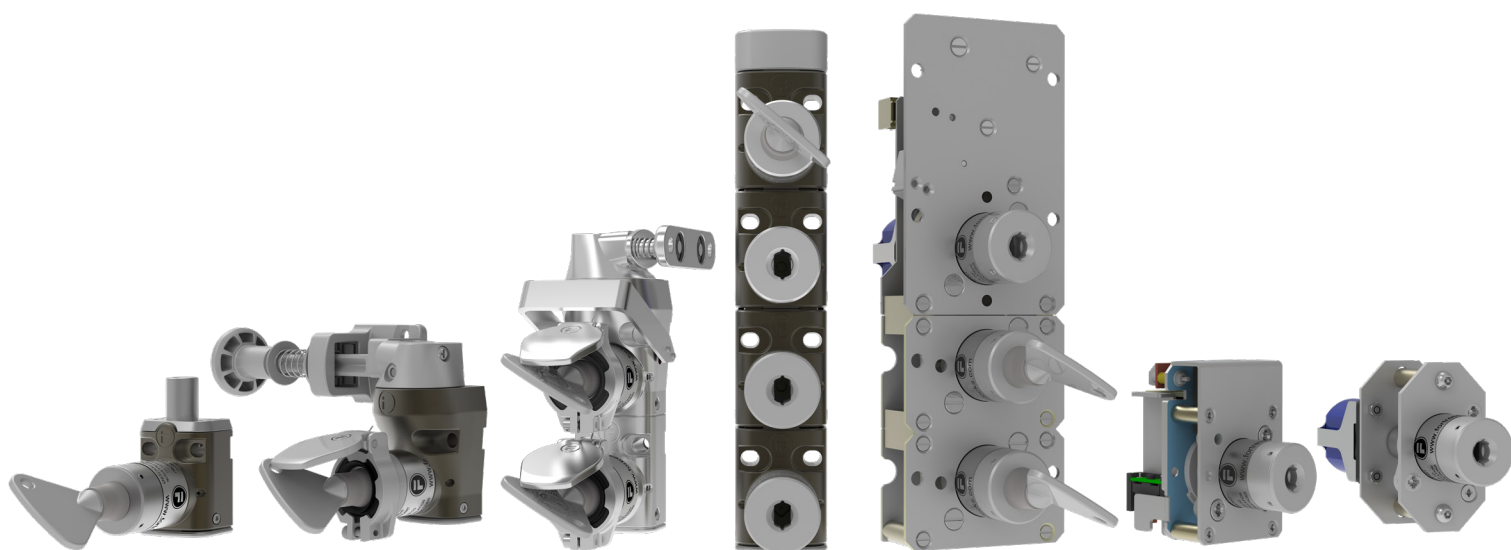


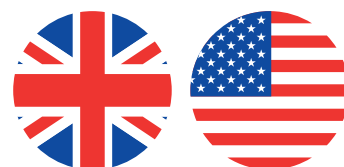
Mechanical Trapped Key Interlocks Certified to PLe



C



US



Introduction to Fortress:

Fortress designs and manufactures customised safety equipment, protecting lives in hazardous workplaces. Our reputation is as a global provider of robust safety specifications for manufacturing environments.

Why Interlocks? Interlocking is a method of controlling two or more interdependent operations which must take place in a predetermined sequence, if necessary remotely controlled or time delayed. The need for this sequence may be safety to personnel and equipment, or it may be to control processes and productivity.

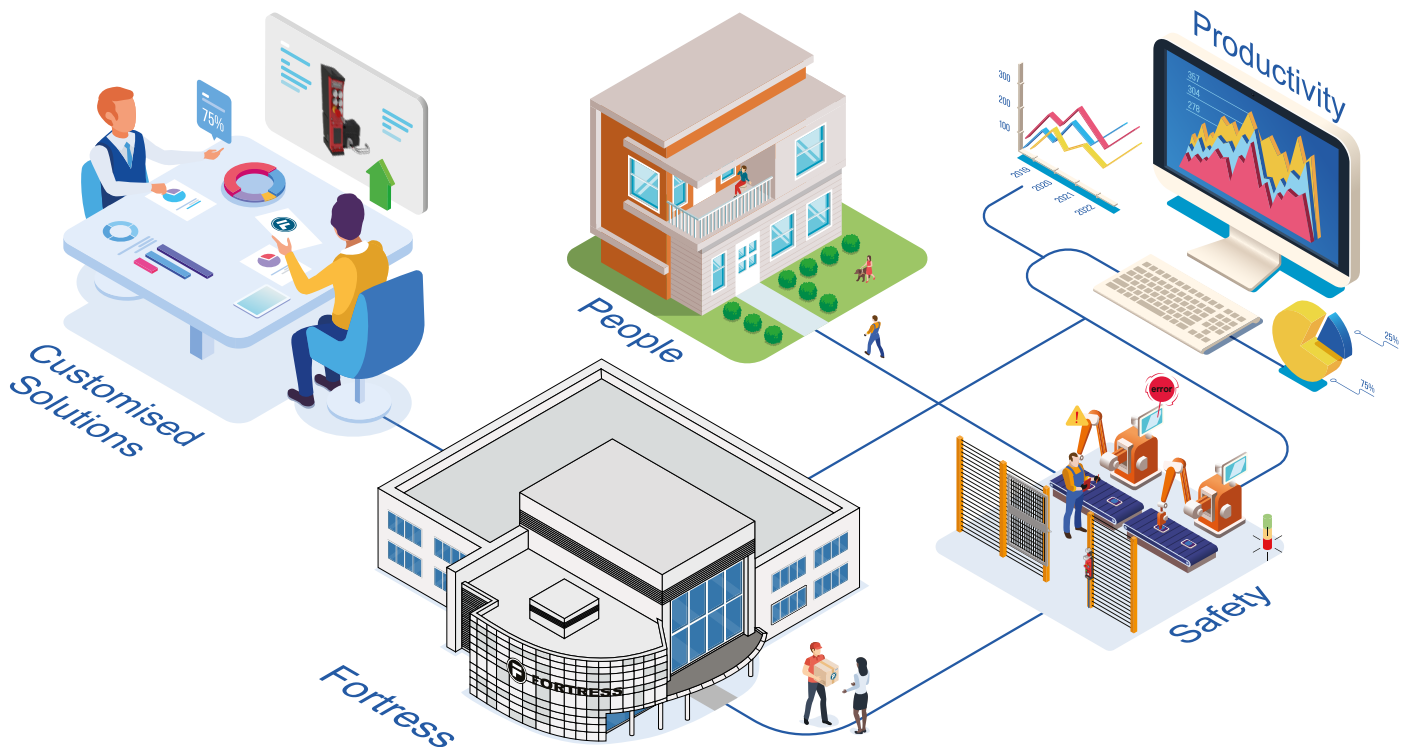
Over the last 40 years, Fortress has become well known in the industry for innovative design, robust engineering and reliability. Headquarters are in Wolverhampton (UK), with supporting offices and manufacturing facilities in the USA, Netherlands, Australia and China, further supported by a global network of trusted distributors and channel partners.

Fortress' current product portfolio includes:

-  **mGard** - The only range of mechanical interlocks independently certified to PLe
-  **amGardpro** - Heavy duty safety gate switches with connectivity and trapped key integration certified to PLe
-  **amGardS40** - Stainless steel IP69K safety gate switches independently certified to PLe
-  **tGard** - Medium duty interlocks with configurable built-in control functionality independently certified to PLd
-  **ncGard** - A range of safety switches with non-contact technology



"Safeguarding Your People & Enhancing Productivity With Customised Solutions"



Why Interlocks?

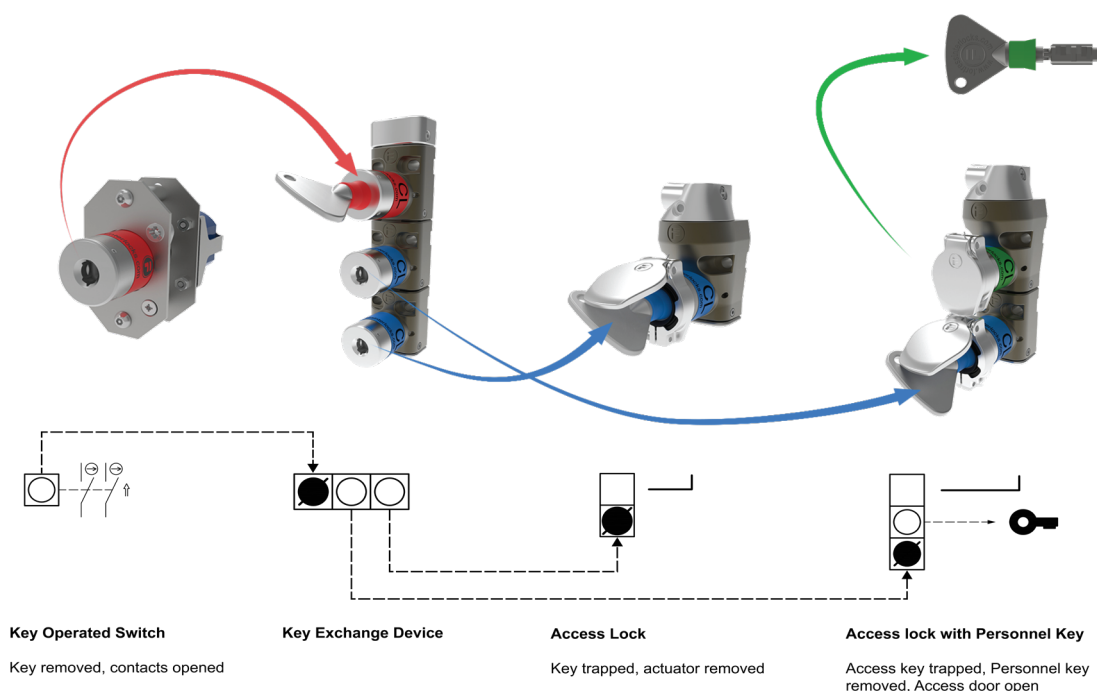
Interlocking is a method of controlling two or more interdependent operations which must take place in a predetermined sequence, if necessary remotely controlled or time delayed. The need for this sequence may be safety to personnel and equipment, or it may be to control processes and productivity.

For Reference-

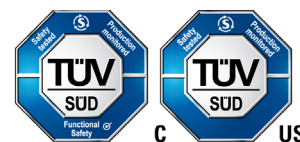
- ISO 14119 is the interlocking standard that forms part of the machinery directive.
- ISO/TS 19837:2018 is the technical specification relevant to trapped key interlocking.

Why Mechanical?

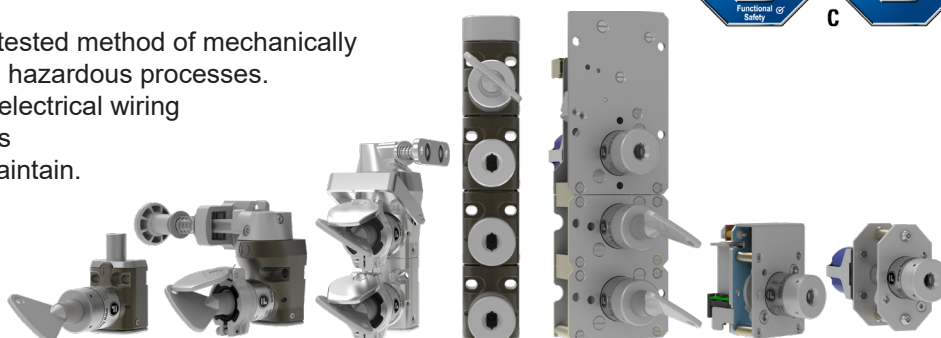
- One power isolator can be used for multiple doors through the use of a key exchange unit.
- This reduces any fault masking risks and wiring installation required.
- In addition mechanical interlocking is the only method of safeguarding solutions for multiple energy sources.
- Personnel keys can be used to prevent unexpected start up of machinery as per ISO 14118, removing the necessity for escape functions.



mGard is the only range of trapped key interlocks 3rd party approved as being capable of meeting PLe and is perfect for heavy duty applications. Fortress' mGard is suitable for use up to SIL3 (EN/IEC 62061), Category 4 and PLe (EN/ISO 13849-1).



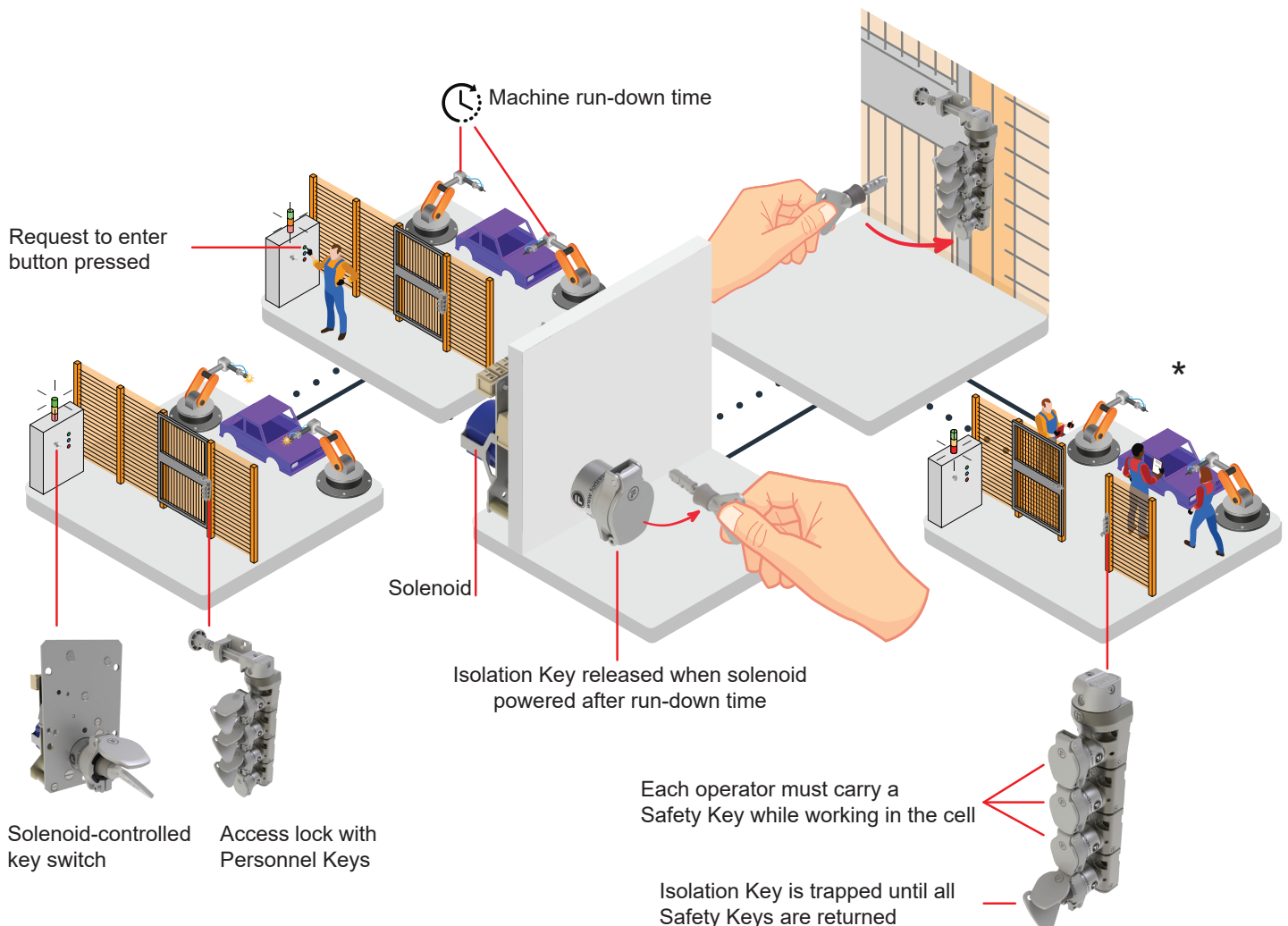
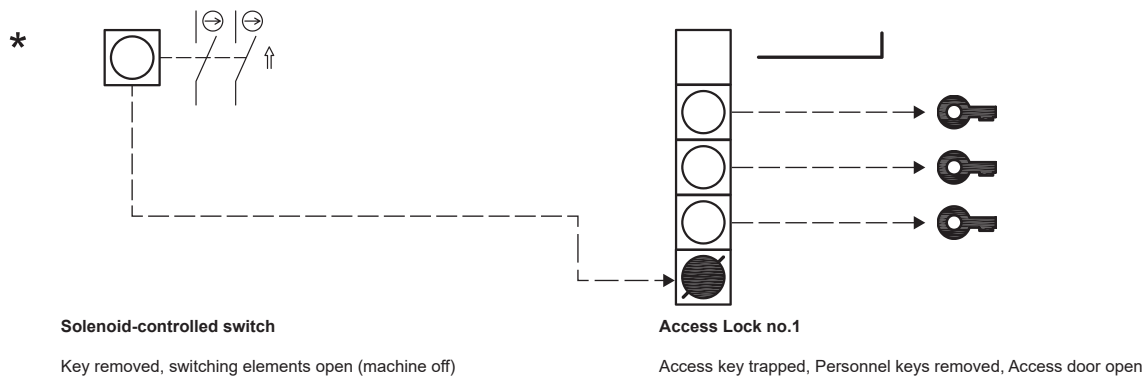
Trapped key interlocking is a tried and tested method of mechanically safeguarding dangerous machines and hazardous processes. Mechanical keys eliminate most of the electrical wiring associated with other types of interlocks making it cost effective to install and maintain.



Robot Welding Cell

Application Requirement:

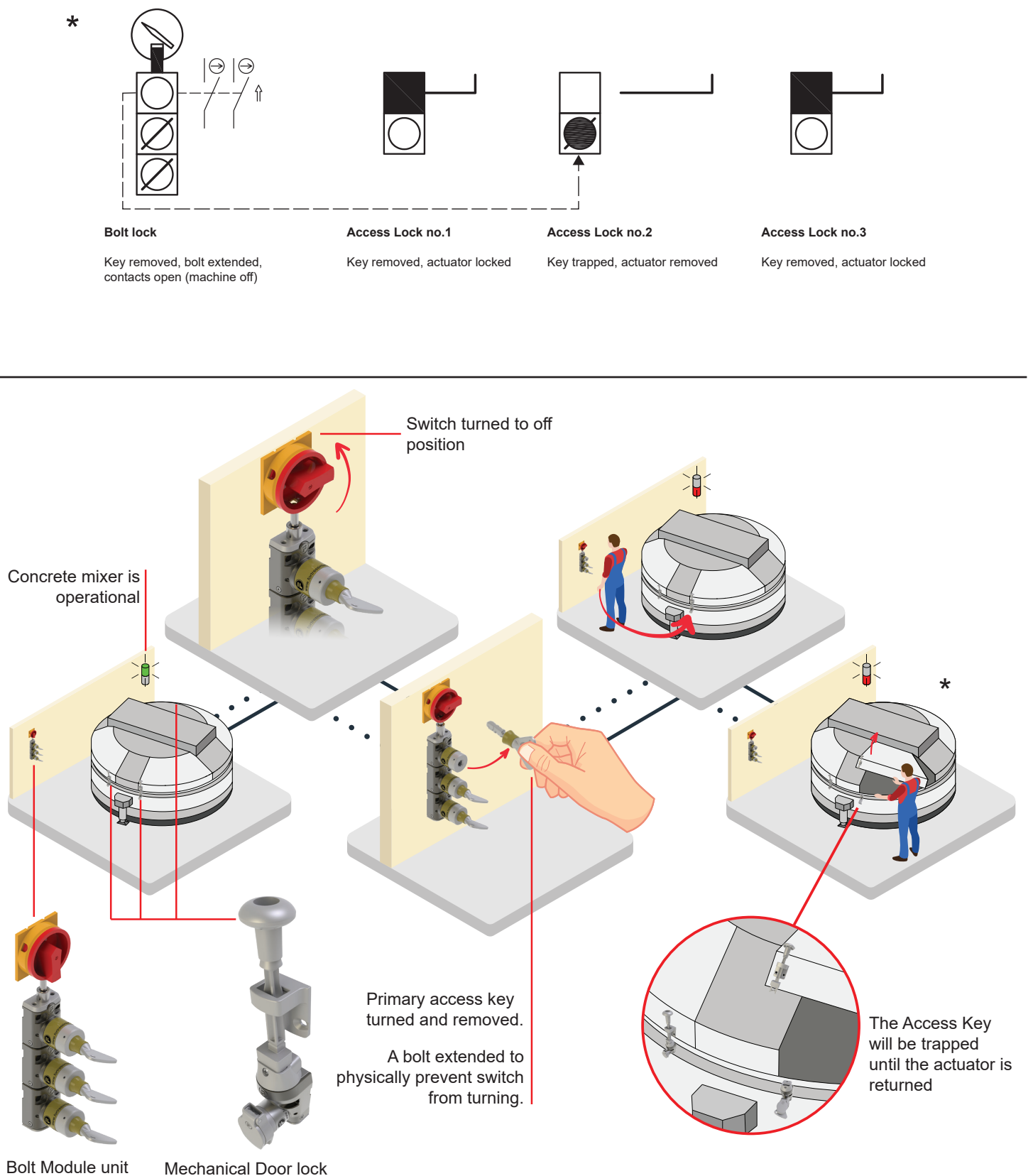
This robot welding cell's safety system must only allow operators to enter the cells when power to the cell has been isolated and the machinery has come to a controlled stop after a defined run-down time. After access, the system prevents unexpected start up when multiple operators are performing maintenance, via Personnel Keys.



Concrete Mixer

Application Requirement:

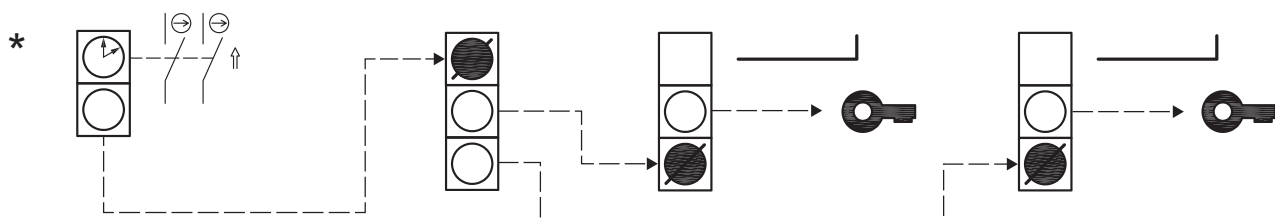
Industrial concrete mixers have multiple access hatches that are safeguarded by mechanical interlocks. These access hatches are opened for scheduled cleaning under the protection of the installed safety system. Access is only allowed once the power switch to the mixer has been mechanically isolated.



Double Backer

Application Requirement:

The double backer machines enclosed in two cells requires extensive safeguarding. A safety system for the cells should ensure operators and maintenance personnel can only enter the areas once power to all of the machinery has been isolated and has come to a controlled stop.



Time delay device

Key removed,
switching elements open (machine off).

Key exchange device

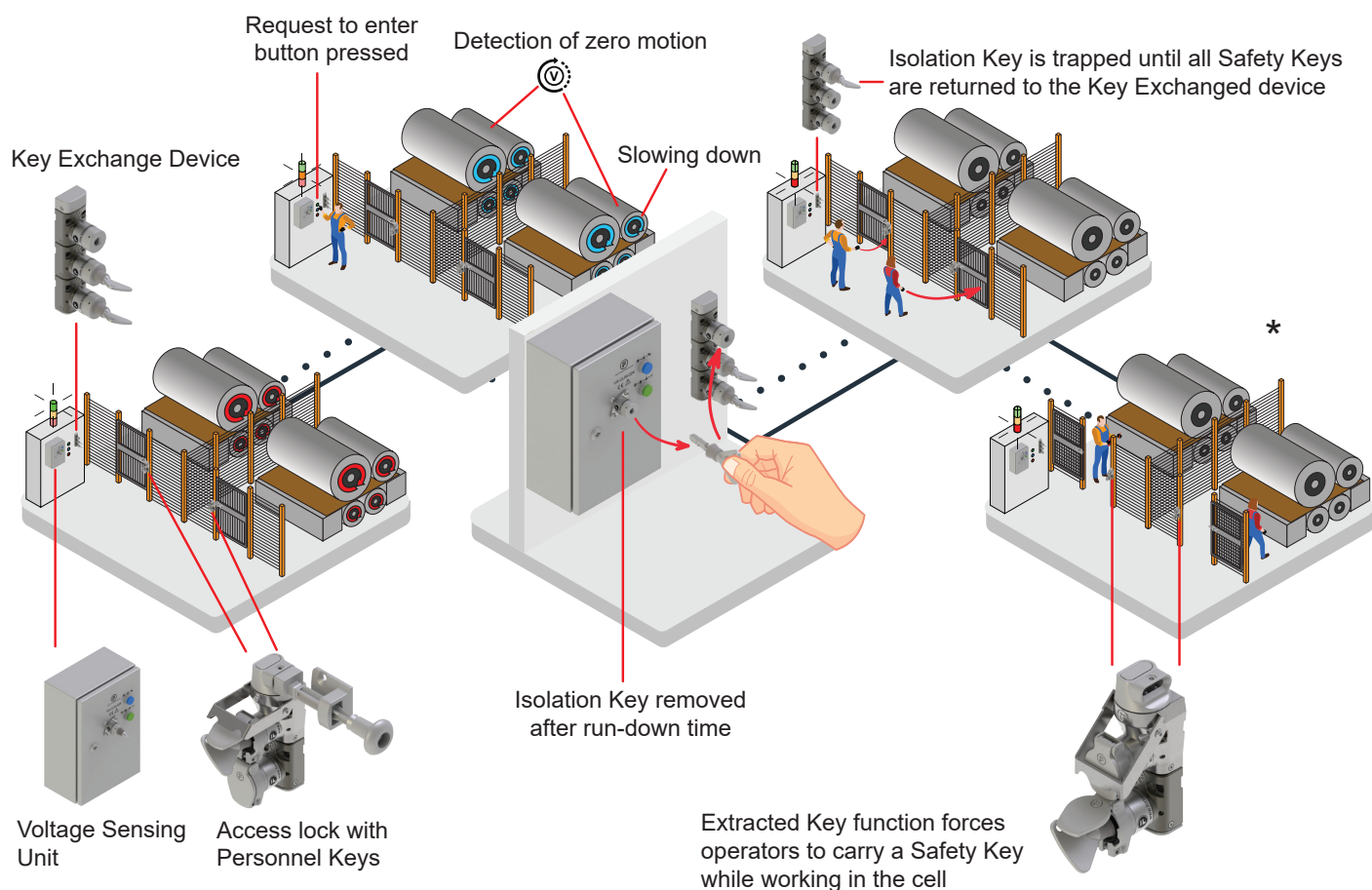
Isolation key trapped,
Access keys removed.

**Access Lock with Personnel key
no.1**

Access key trapped,
Personnel key removed,
Access door open.

**Access Lock with Personnel key
no.2**

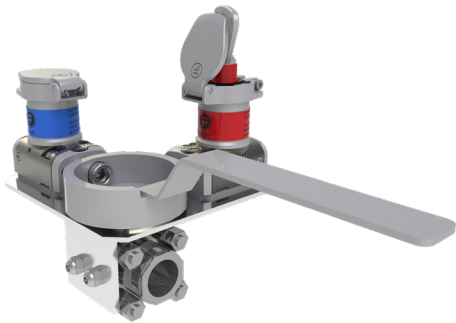
Access key trapped,
Personnel key removed,
Access door open.



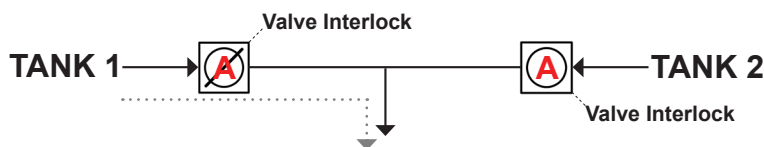
Valves & Specials

Valves & Pneumatic Interlocks

Fortress supplies a range of interlocks suitable for valve applications and for pneumatic isolation. With the incorporation of a mechanical module and key to a valve, Fortress has created a simplified solution for controlling the position of the valve and isolating the valve movement without the need of levers or hand-wheels in other forms of valve interlocking/lockout.

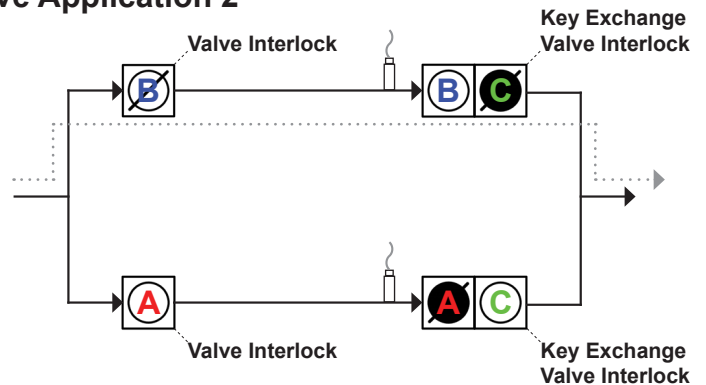


Valve Application 1



In this application, only one of the tanks can feed into the supply at once. The use of Valve Interlocks insures only one of the lines can be open because the two interlocks share a single key. Each valve can only be opened while a key is trapped to the locked position in the interlock.

Valve Application 2

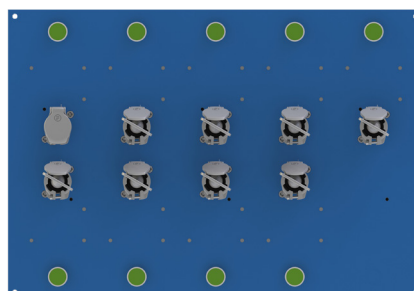


In this application, at least one pressure release line must be open at all times. The use of the Valve Interlocks insures at least one line will always be open because the independent interlocks A and B require their corresponding key to be turned to the locked position to close the valve. The two Key Exchange Interlocks share one key for the two locks marked C. The key for the two C locks is transferred between the units to always trap either the A or B key.

Specials and Custom Units for Applications

Over the years, Fortress has produced many special-purpose units designed to meet the specific needs of its customers and applications within their industries. Some of these units include: standalone time delay/voltage sensing, ATEX rated switches/solenoids and elaborate key sequencing exchange boxes. Some of these units have been added to the mGard range as their popularity in applications has grown throughout the years, but are considered non-standard or specials solutions due to the extended lead time required to design and manufacture.

Fortress has also helped customers create completely custom units that were specific to one individual application. These units were created in collaboration with engineers between both parties to better understand the needs and constraints of the application. Fortress is pleased to offer advice and assist without obligation; although a more simple solution may be proposed through standard mGard units or the other ranges Fortress has to offer.



Power Isolation

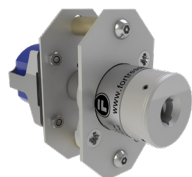
Control Interlocking

Panel Mounted

Panel Mounted Weatherproof

In Enclosure

Key Switch(es)



Knob Operated Switch Control Unit

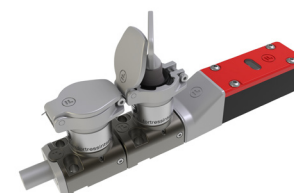


Power Interlocking

Mechanical Bolt Interlock



Bolt Interlock with Limit Switch



Mini Solenoid Controlled Key Switch(es)



Key Operated Switch Control Unit



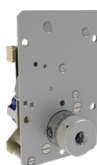
Bolt Interlock with Switch



Circuit Breakers



Solenoid Controlled Key Switch(es)



Electronic Time Delay Unit



Valve & Pneumatic Interlocks



ATEX Solenoid Controlled Key Switch



ATEX Key Switch



Voltage Sensing Unit



Key Exchange

Modular Key Exchange Unit



Modular Key Unit with Switch(es)



Door Locks

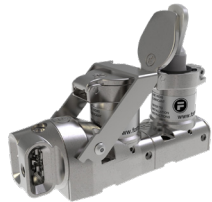
Single Door Interlock



Multiple Modular Door Interlock



Forced Safety Key Door Interlock

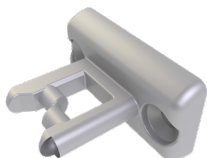


All in One Door Interlocks

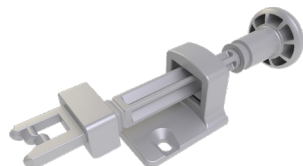


Actuators

Fixed Actuator



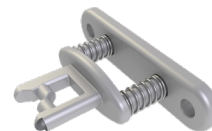
Handle Operated Actuator



Spring Released Handle Operated Actuator



Compressible Actuator



Self Aligning Actuator



Keys & Locks

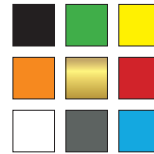
Standard



Masterable



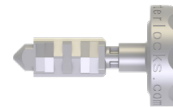
Colours available for key seal and lock label.



Colours available for key bow and dustcovers.

3 lines of 10 characters available for engravings.

Low Profile



Accessories

Extension Module



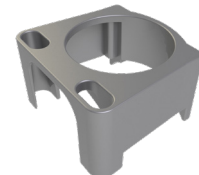
Dustcovers (Available as Standard & Padlockable)



Lockout Hasps (For 3x Padlocks)

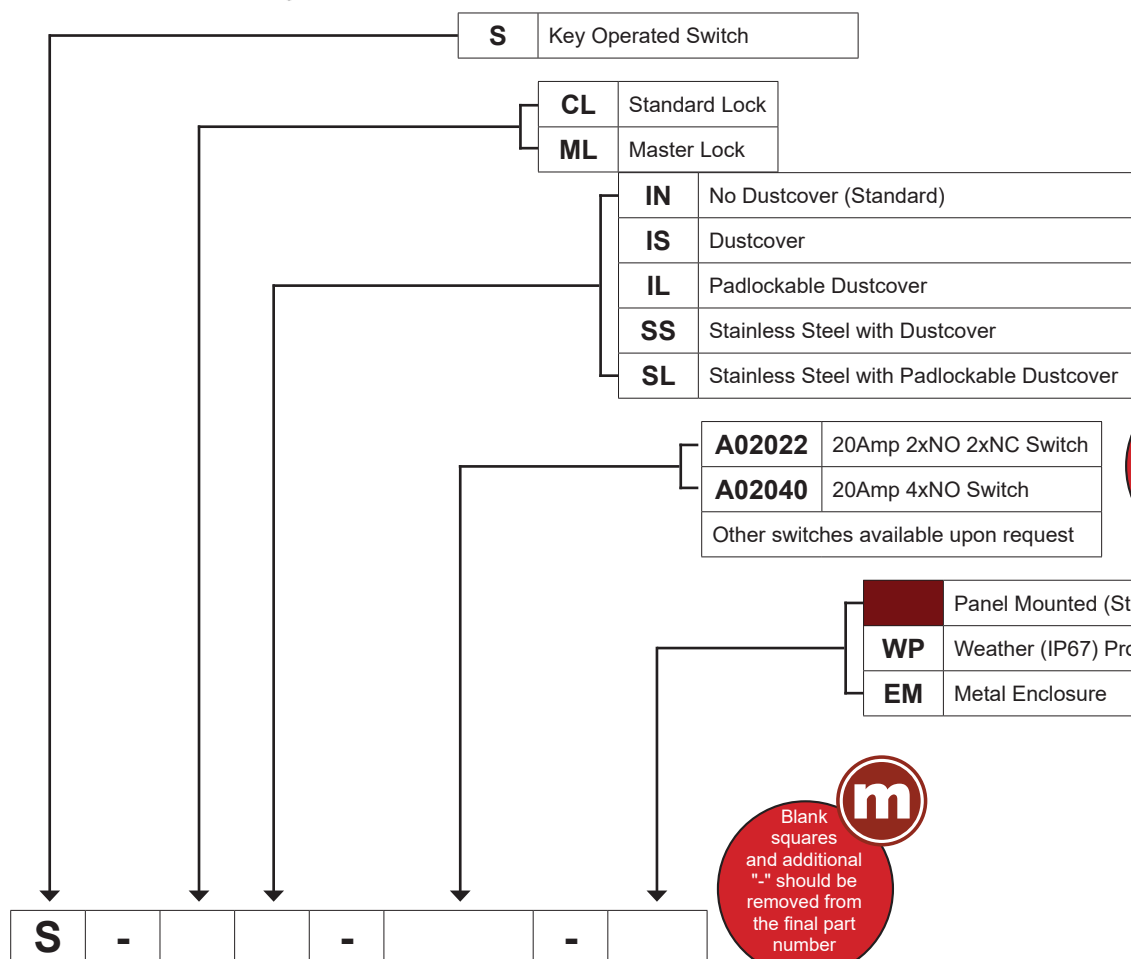


Back of Board Mounting Kit





S Unit



Blank squares and additional "-" should be removed from the final part number

S-WP Unit



The lock on a S-WP must be comprised of either SS or SL

S-EM Unit



The lock used in the switch determines the enclosure. IN, IS and IL for Zinc Alloy or Mild Steel. SS and SL for Stainless Steel

Larger switches will be in a larger enclosure

SS1-B



Add-on lock modules are fitted to the solenoid if multiple keys are released by the solenoid

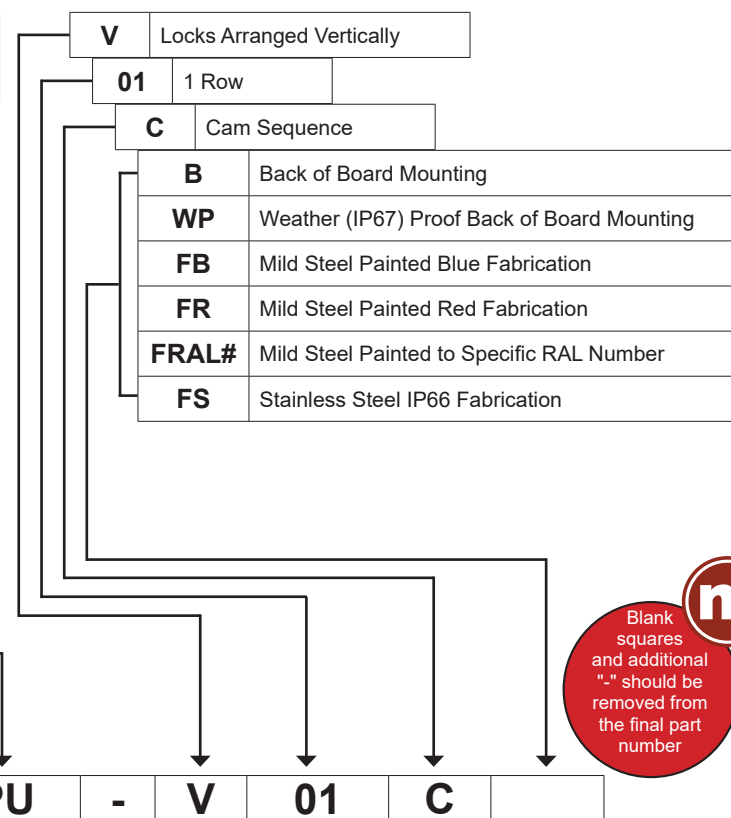
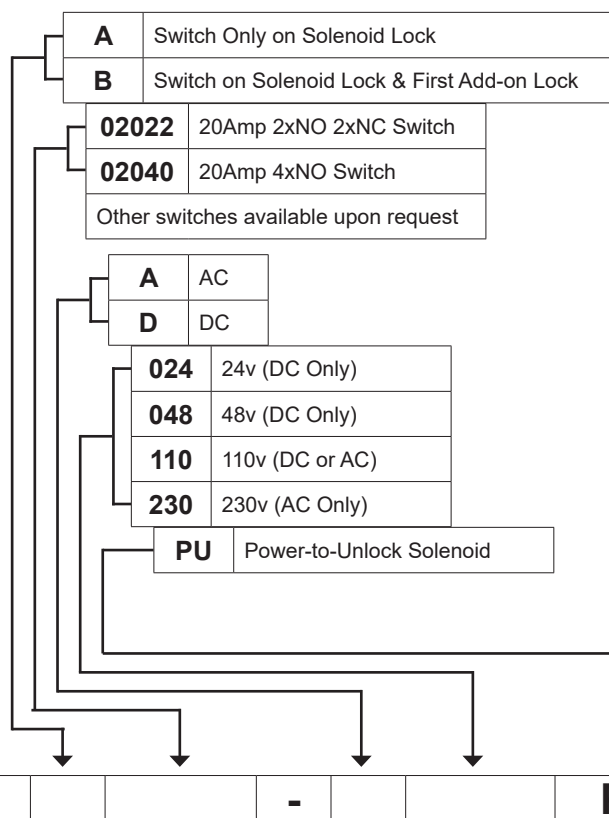
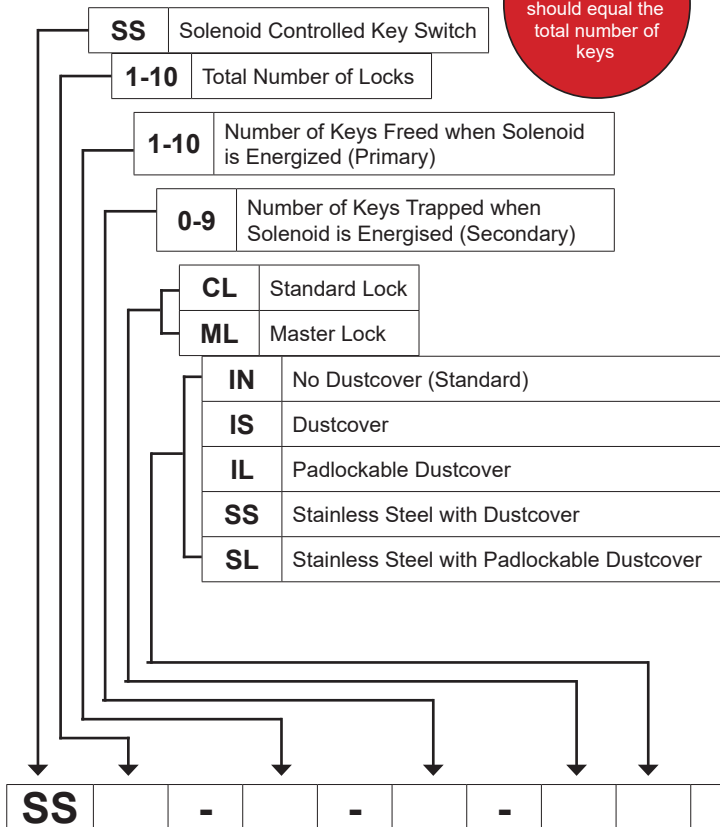
SS1-WP



SS1-F



The sum of Primary and Secondary keys should equal the total number of keys



Blank squares and additional "-" should be removed from the final part number

MSS Unit



MSS Solenoid Controlled Key Switch

1 One Key Freed when Solenoid is Energized

0 Zero Keys Trapped when Solenoid is Energized

CL Standard Lock

ML Master Lock

IN No Dustcover (Standard)

IS Dustcover

IL Padlockable Dustcover

SS Stainless Steel with Dustcover

SL Stainless Steel with Padlockable Dustcover

A00302 3Amp 2xNC Switch

A AC

D DC

024 24v (DC Only)

048 48v (DC Only)

110 110v (DC or AC)

230 230v (AC Only)

PU Power-to-Unlock Solenoid

Panel Mounted (Standard)

WP Weather (IP67) Proof Back of Board Mounting

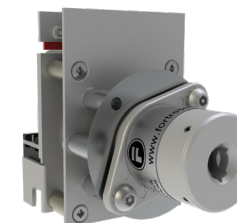
EM Metal Enclosure (Option Pod), 24v DC Solenoid Only

The contact block in the Mini Solenoid Controlled Key Switch are only available as a 3Amp 2xNC Switch

MSS-EM Unit



MSS-WP Unit

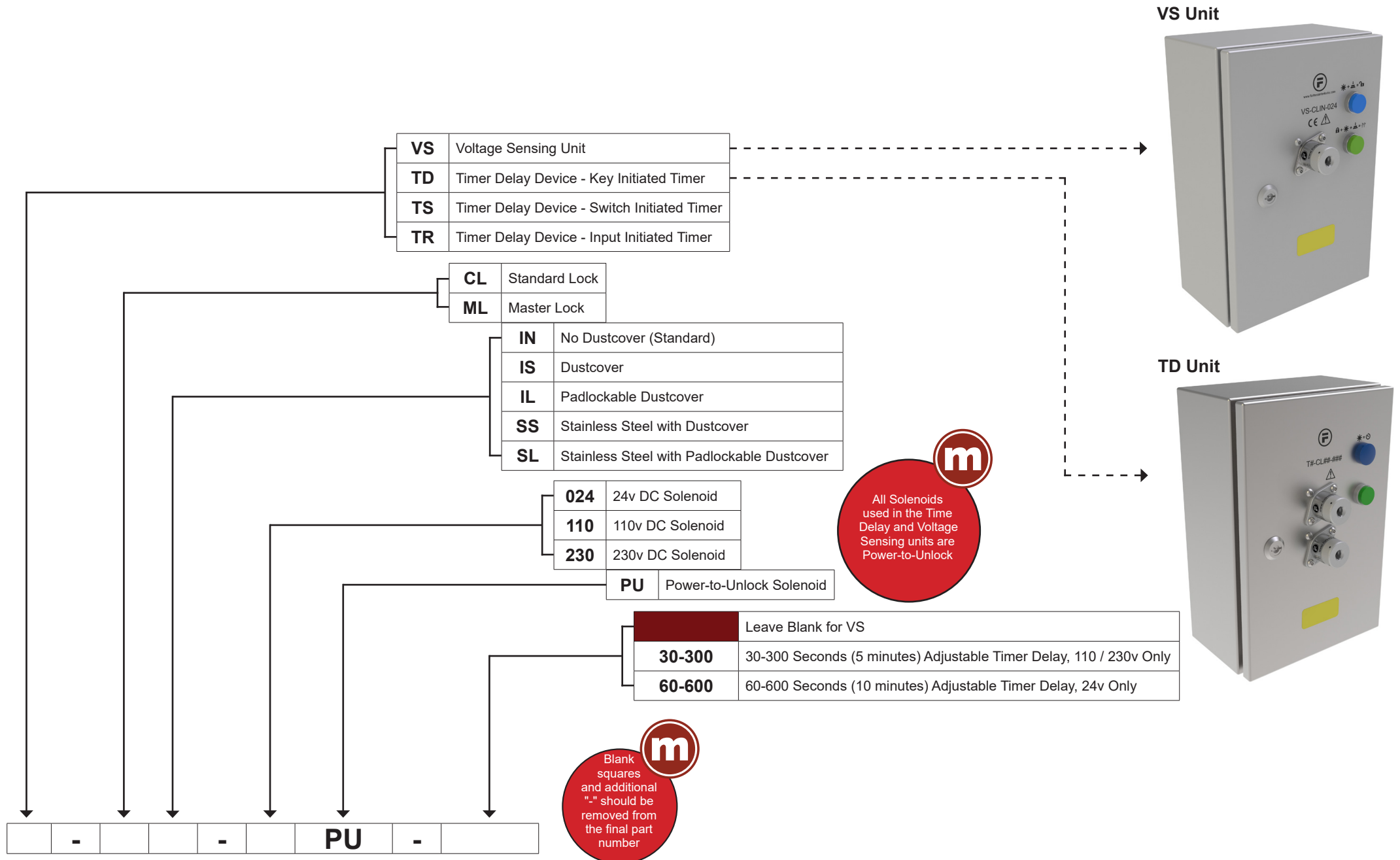


The Solenoid used in the Mini Solenoid Controlled Key Switch are all Power-to-Unlock

MSS-WP Panel thickness must be 1.5 - 3.5 mm

Blank squares and additional "-" should be removed from the final part number

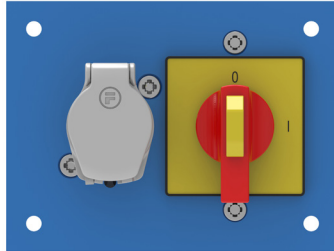
MSS - 1 - 0 - A00302 - PU -



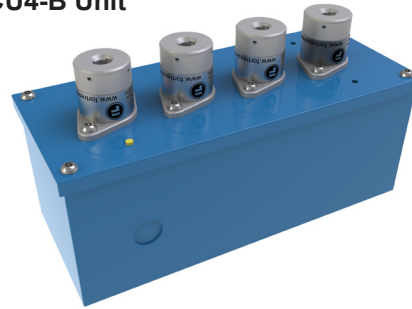
Power Isolation: Control Interlocking

Solenoid Controlled Key Switch

SCU1-B Unit



LCU4-B Unit



The sum of Primary and Secondary keys should equal the total number of keys

SCU	Knob Operated Switch Control
LCU	Lock Operated Switch Control
1-7	Total Number of Locks for SCU
2-8	Total Number of Locks for LCU
0	Number of Keys Trapped in a SCU (Control)
1-7	Number of Keys Trapped in a LCU (Control)
1-7	Number of Keys Freed in a SCU/LCU (Access)
CL	Standard Lock
ML	Master Lock
IN	No Dustcover (Standard)
IS	Dustcover
IL	Padlockable Dustcover
SS	Stainless Steel with Dustcover
SL	Stainless Steel with Padlockable Dustcover

A	Switch Only on Control Lock/Knob
B	Switch on Control Lock/Knob and First Access Locks
02022	20Amp 2xNO 2xNC Switch
02040	20Amp 4xNO Switch
Other switches available upon request	

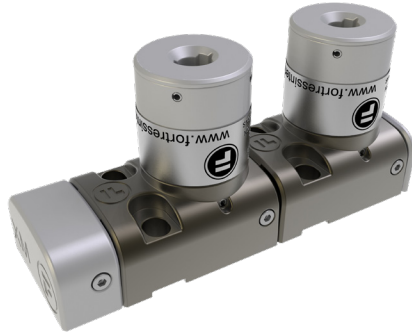
H	Locks Arranged Horizontally
V	Locks Arranged Vertically
01	1 Row (Standard)

C	Cam Sequence, Not Available on 2 Row Units
R	Runner Bar Sequence

B	Back of Board Mounting
FB	Mild Steel Painted Blue Fabrication
FR	Mild Steel Painted Red Fabrication
FRAL#	Mild Steel Painted to Specific RAL Number
FS	Stainless Steel IP66 Fabrication

Blank squares and additional "-" should be removed from the final part number

XM2 Unit



XMR2 Unit



XML2 Unit

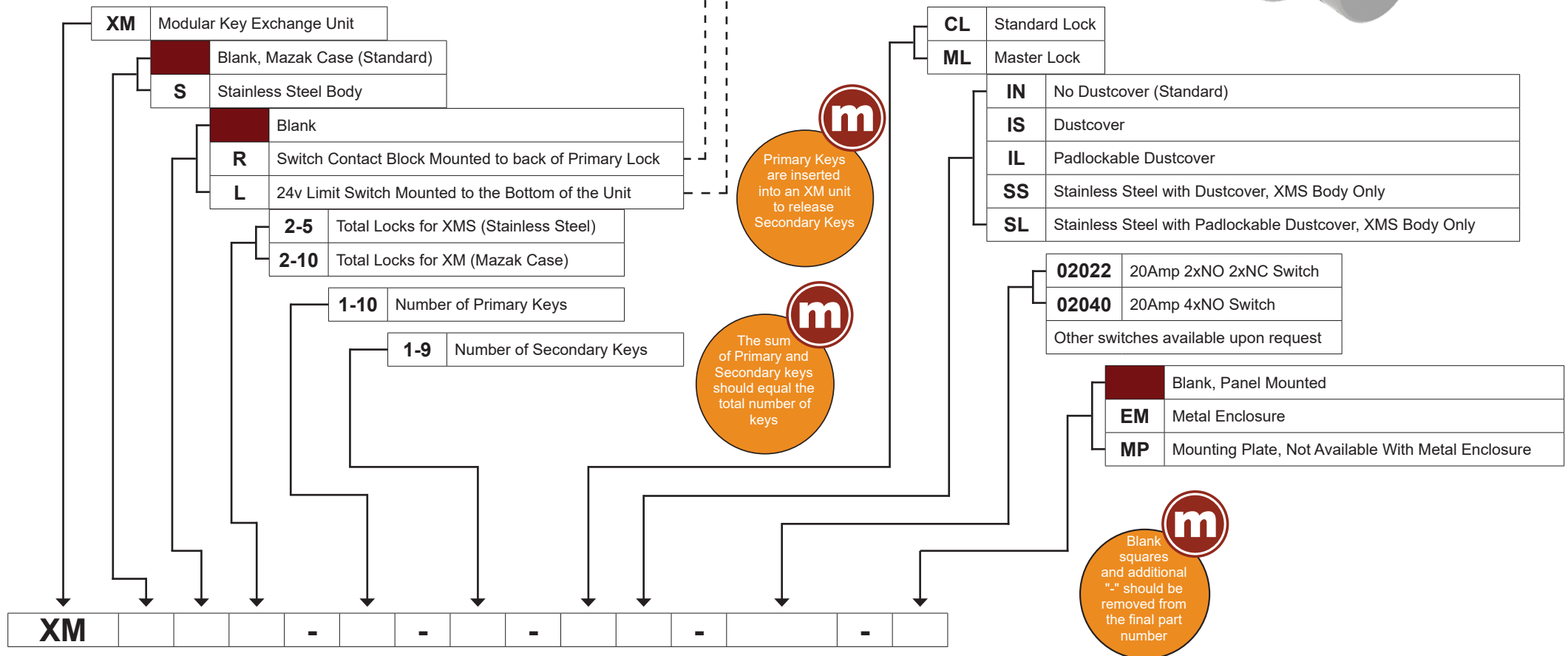


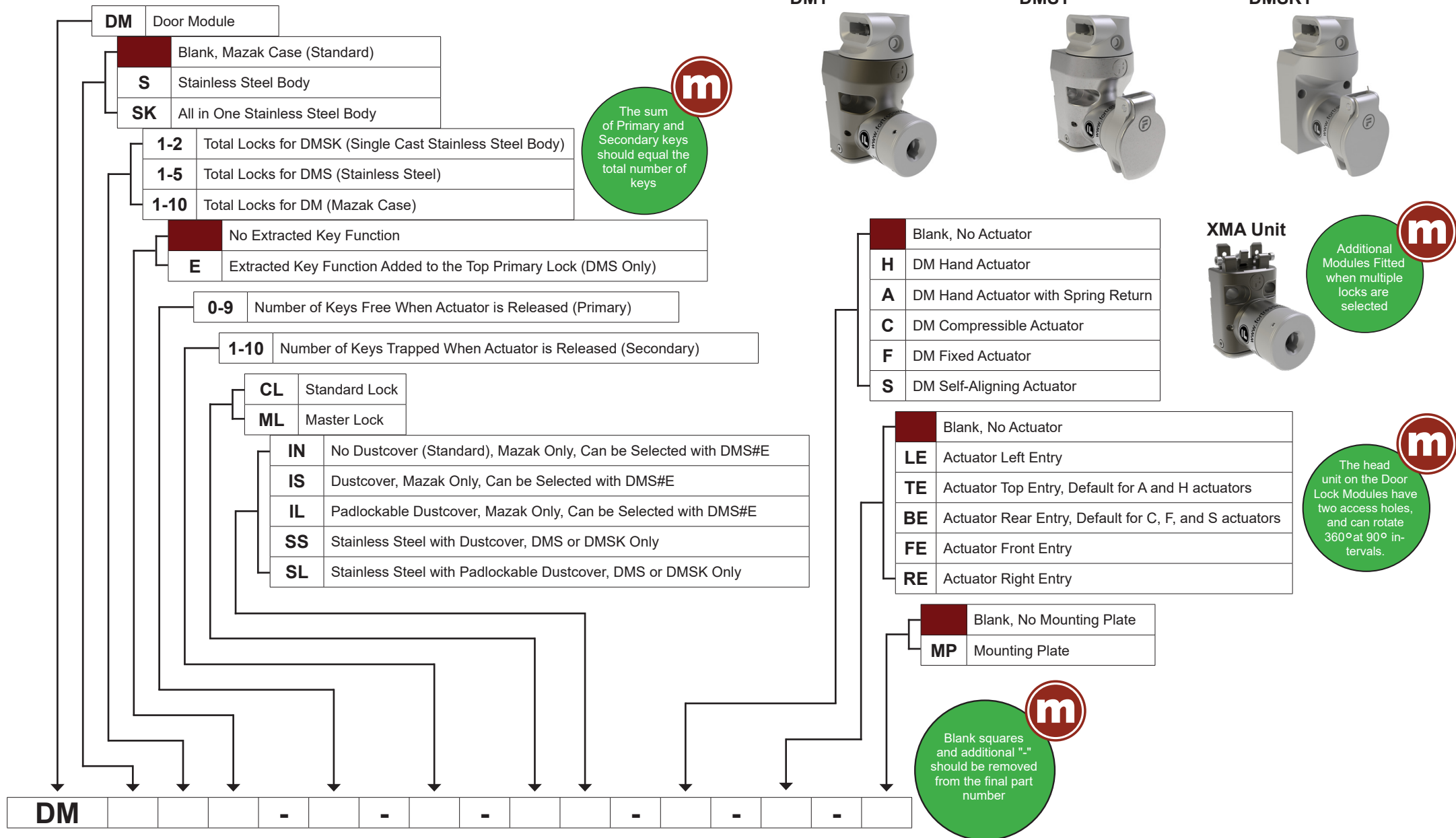
XMA Unit



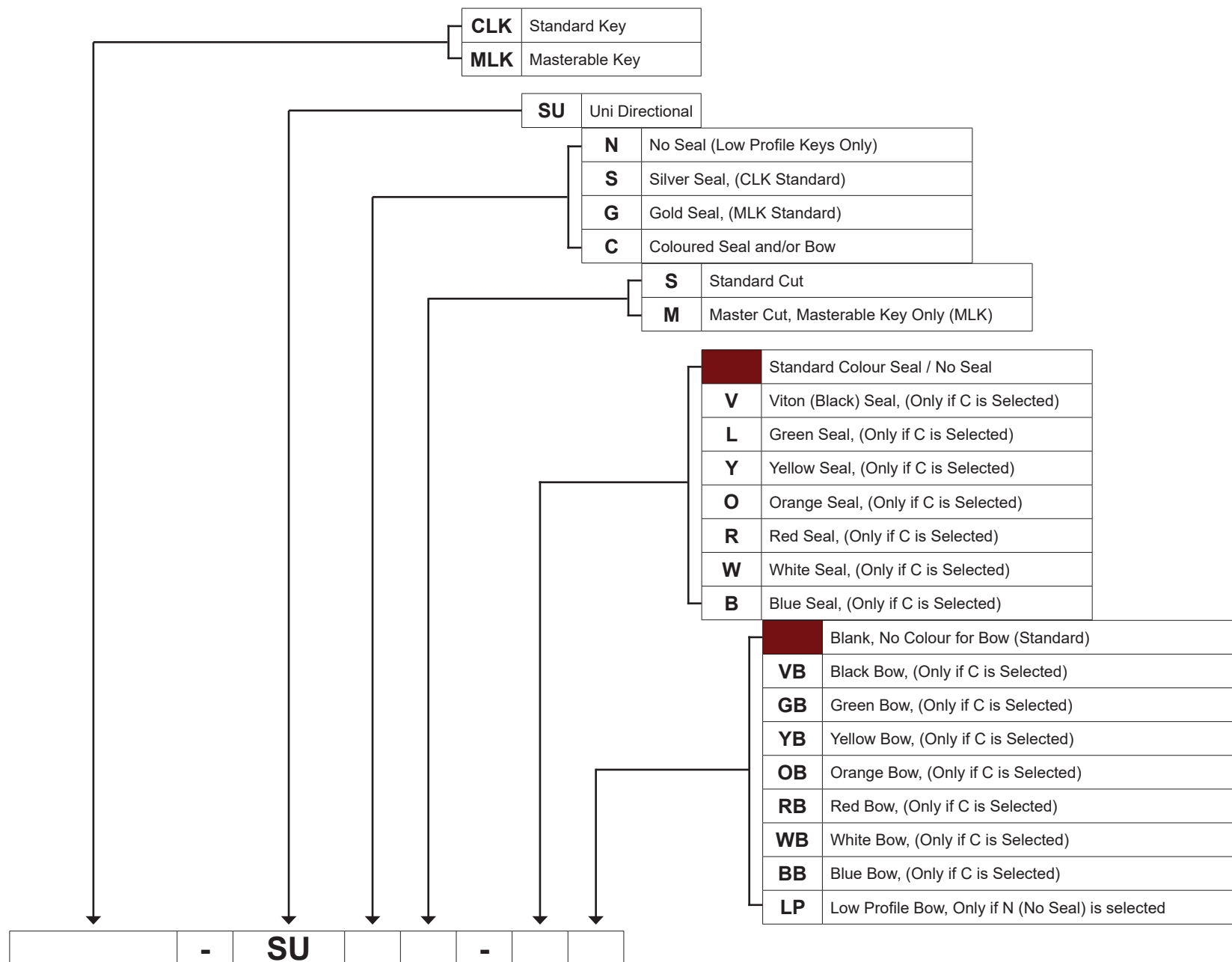
On L versions
the switch is 2NC
1NO positive
break

Additional
Modules Fitted
when multiple
locks are
selected





Keys and Accessories



CLK-SUSS



MLK-SUGS



MLK-SUCS-VYB



CLK-SUNS-LP



Blank squares and additional "-" should be removed from the final part number

Keys and Accessories

Stainless Steel Dust Cover



Part Number

CLDC

Stainless Steel
Padlockable Dust Cover



Part Number

PLDC

Lockout Scissor Hasp



Part Number

LOS3

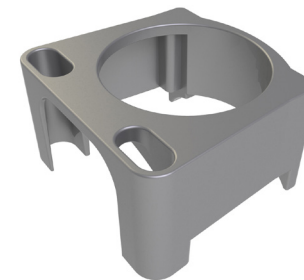
Lockout Scissor Hasp with
Cable



Part Number

LOS3C

Back of Board Adaptor



Part Number

M-BOB

Add-On Lock Module



Part Number

XMA-CLIN: Mazak Body, No Dustcover

XMA-CLIS: Mazak Body, Dustcover

XMA-CLIL: Mazak Body, Padlockable Dustcover

Stainless Steel Add-On Lock Module

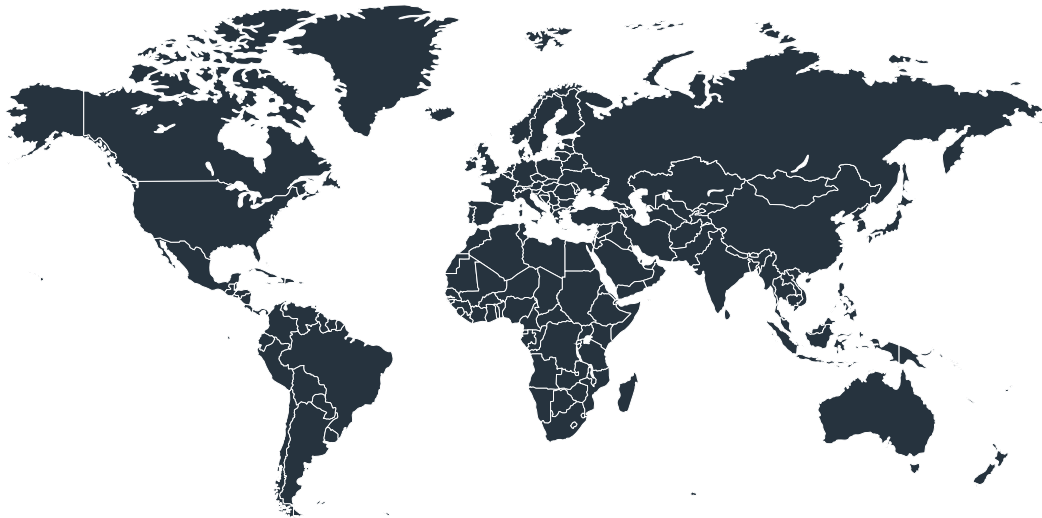


Part Number

XMSA-CLSS: Stainless Steel Body, Dustcover

XMSA-CLSL: Stainless Steel Body, Padlockable Dustcover

Mechanical Trapped Key Interlocks Certified to PLe



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A **Halma** company

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