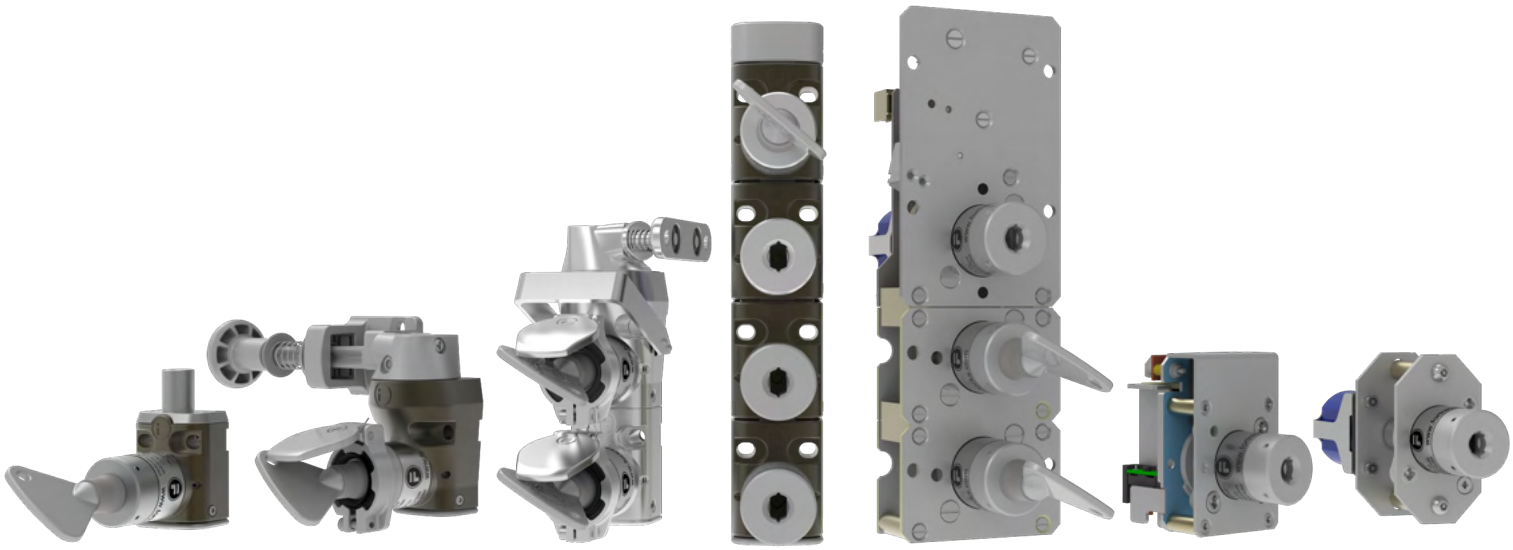
FORTRESS
INTERLOCKS

mGard

Mechanical Trapped Key Interlocks Certified to PLe



THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2018

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.

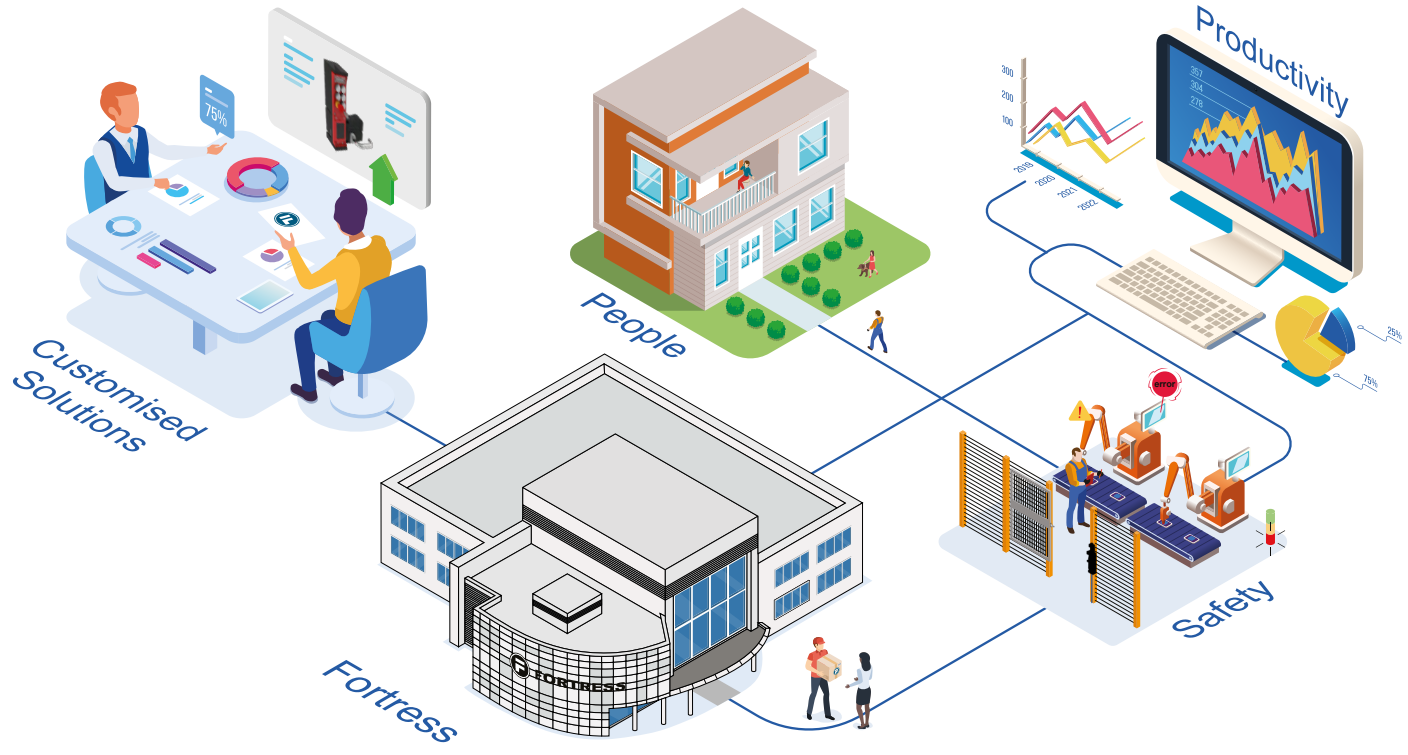
Over the last 40 years, Fortress has become well known in the industry for innovative design, robust engineering and reliability. Headquarters are in Wolverhampton (UK), with supporting offices and manufacturing facilities in the USA, Netherlands, Australia and China, further supported by a global network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

Fortress' current product portfolio includes:

- **mGard** - The only range of mechanical interlocks independently certified to PLe
- **amGard*pro*** - Heavy duty safety gate switches with connectivity and trapped key integration certified to PLe
- **amGard*S40*** - 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

FORTRESS

"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.

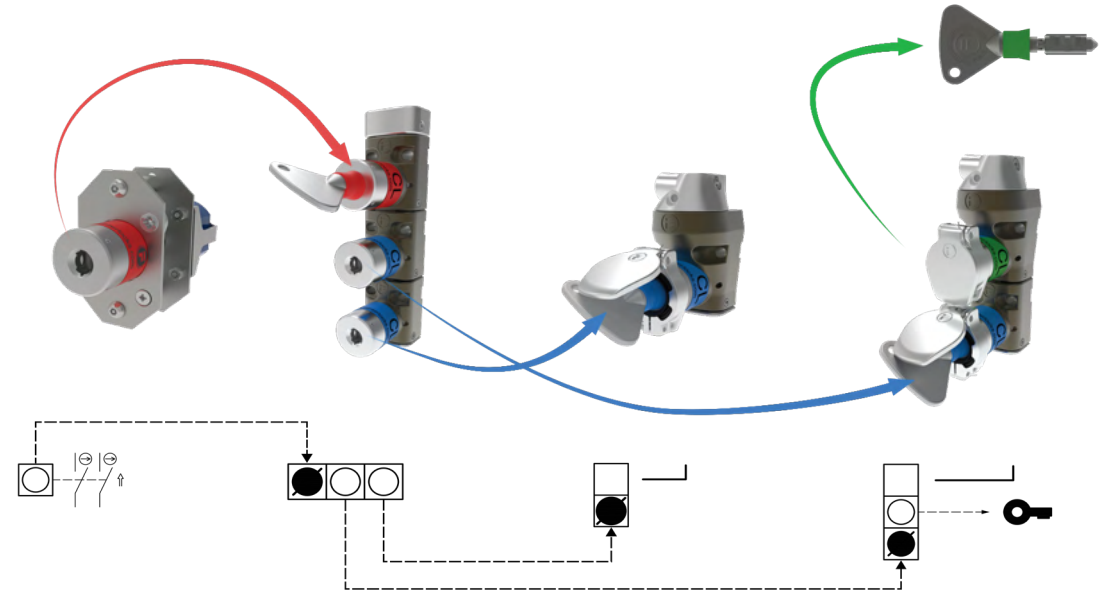
Why Mechanical?

- 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.

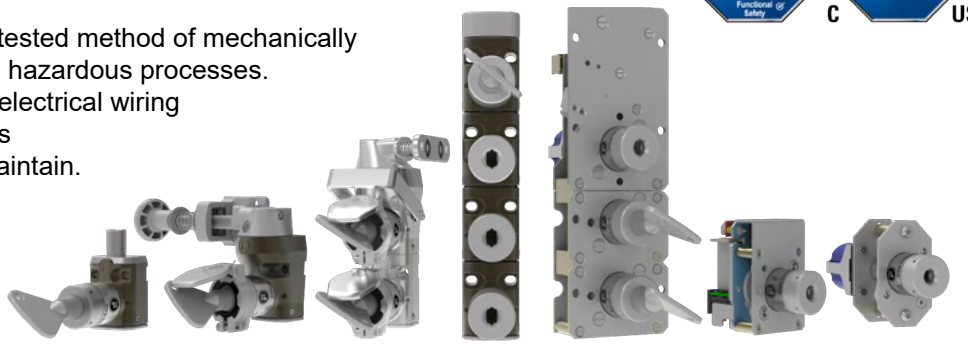
- Personnel keys can be used to prevent unexpected start up of machinery as per ISO 14118, removing the necessity for escape functions.



Key Operated Switch	Key Exchange Device	Access Lock	Access lock with Personnel Key
Key removed, contacts opened		Key trapped, actuator removed	Access key trapped, Personnel key removed, Access door open

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

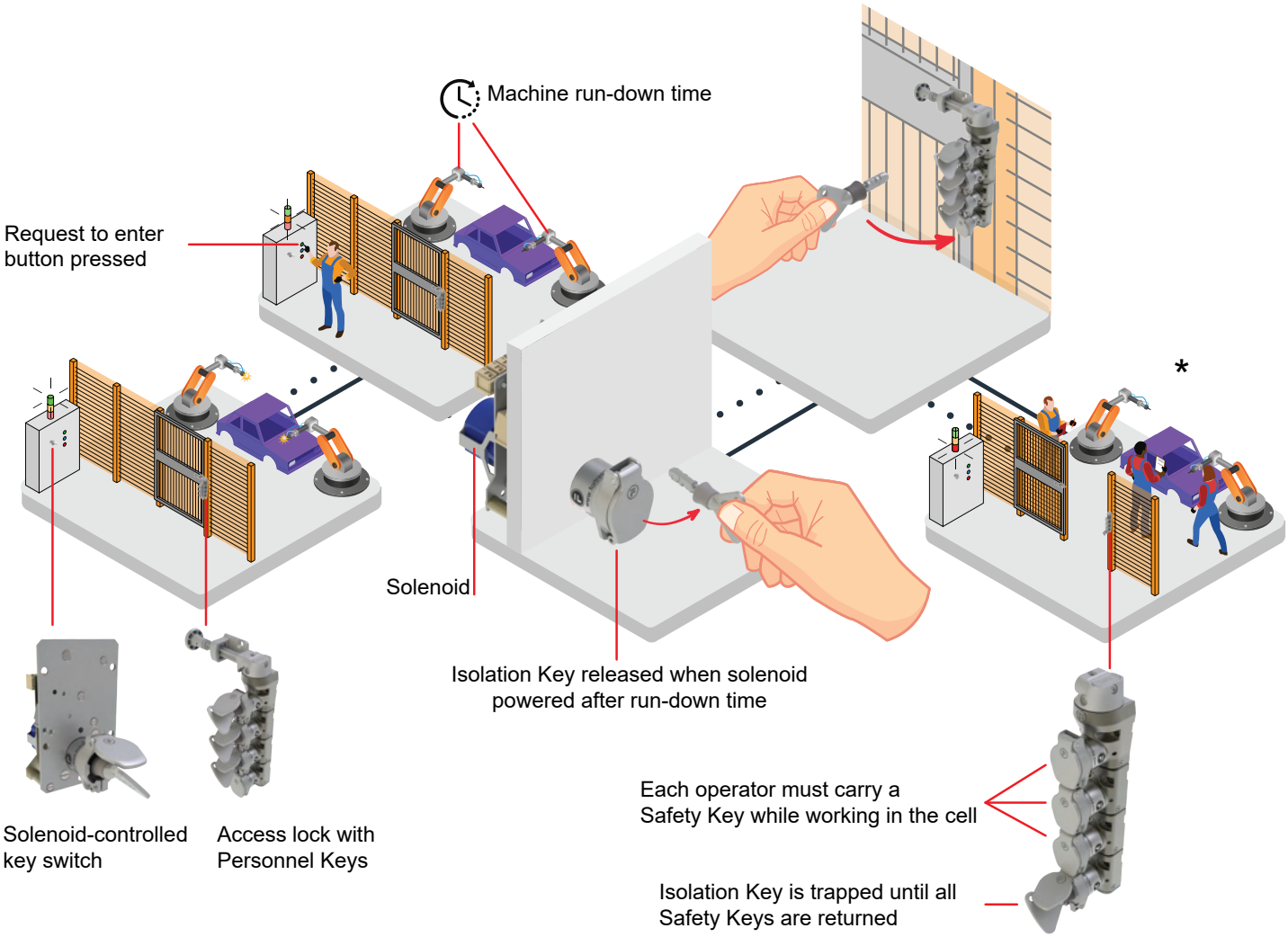
Application Requirement:
This robot welding cell's safety system must only allow operators to enter the cells when power to the cell has been isolated and the machinery has come to a controlled stop after a defined run-down time. After access, the system prevents unexpected start up when multiple operators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

Solenoid-controlled switch

Key removed, switching elements open (machine off)

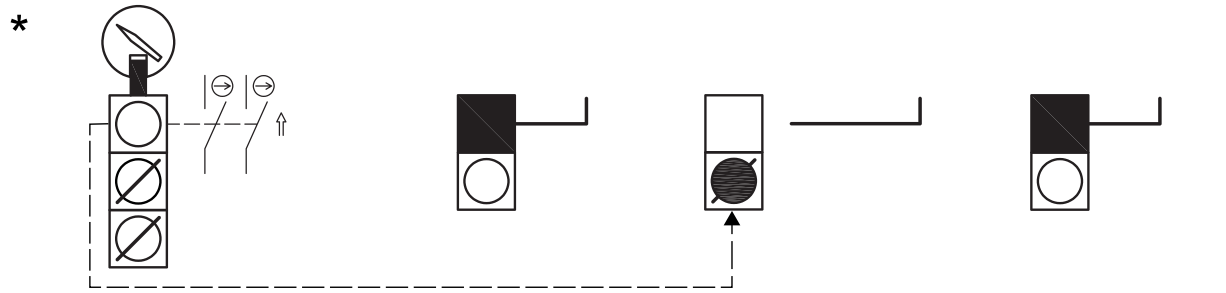
Access Lock no.1

Access key trapped, Personnel keys removed, Access door open

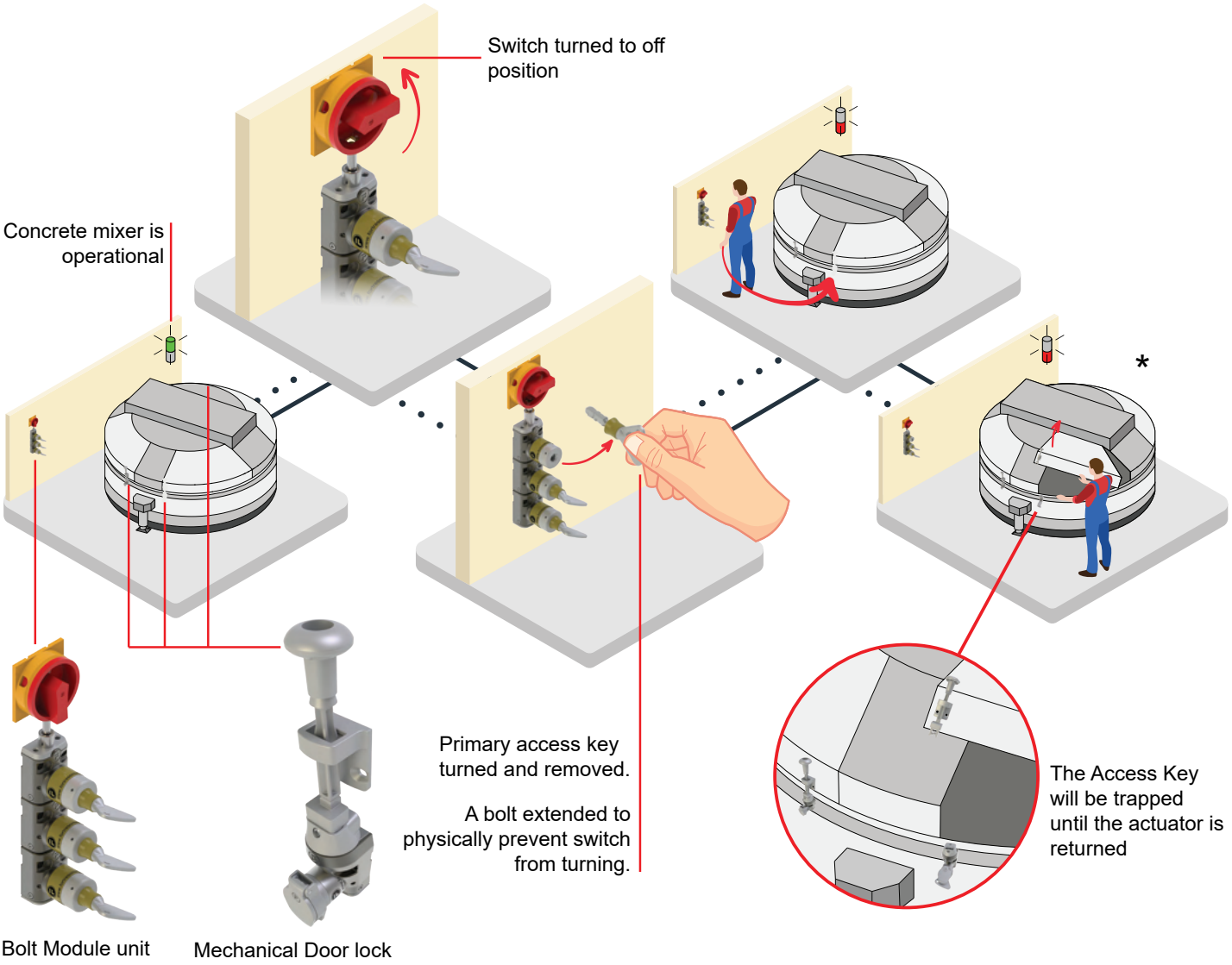


Concrete Mixer

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.

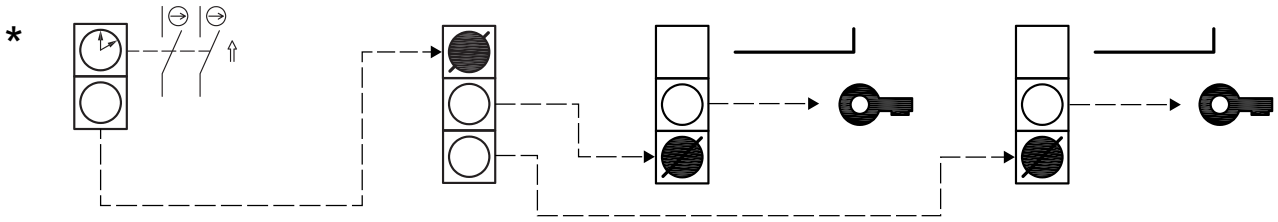


Bolt lock	Access Lock no.1	Access Lock no.2	Access Lock no.3
Key removed, bolt extended, contacts open (machine off)	Key removed, actuator locked	Key trapped, actuator removed	Key removed, actuator locked



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

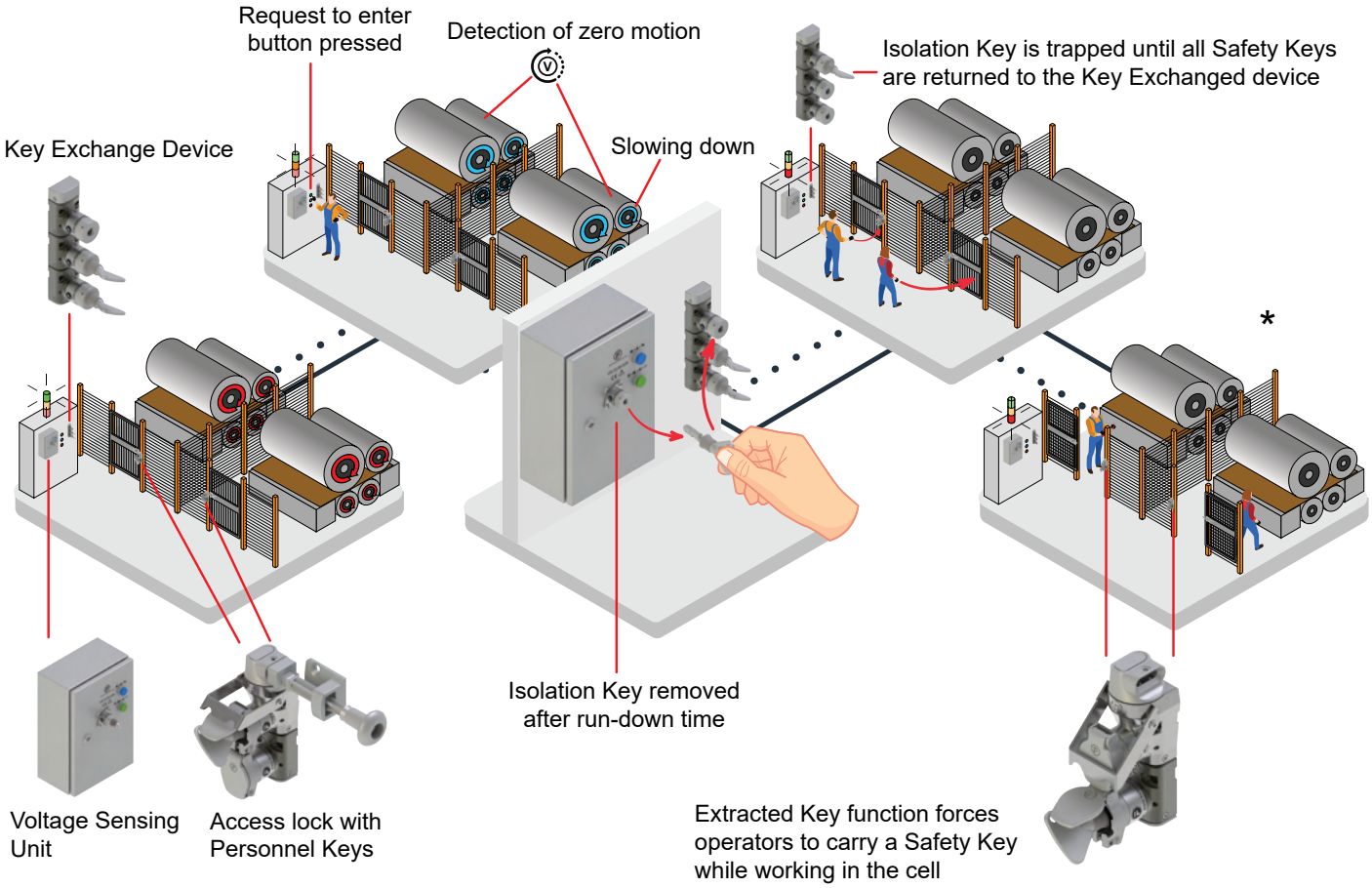
Isolation key trapped,
Access keys removed.

Access Lock with Personnel key no.1

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

Access Lock with Personnel key no.2

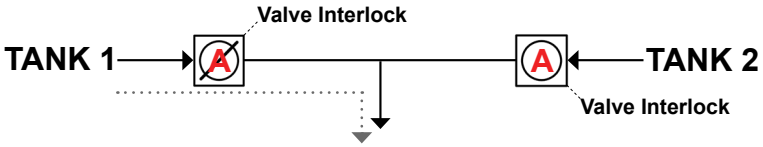
Access key trapped,
Personnel key removed,
Access door open.



Valves & Pneumatic Interlocks

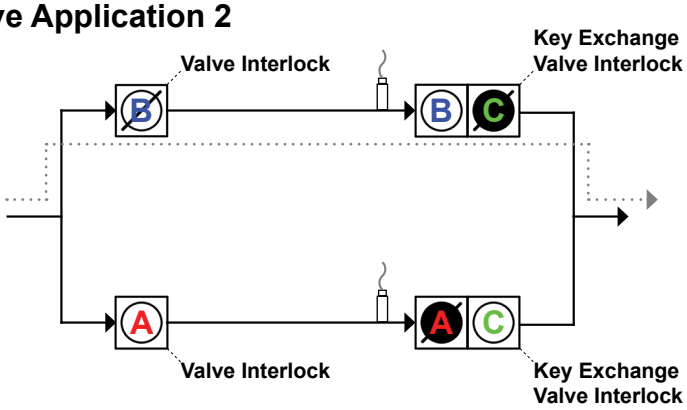
Fortress supplies a range of interlocks suitable for valve applications and for pneumatic isolation. With the incorporation of a mechanical module and key to a valve, Fortress has created a simplified solution for controlling the position of the valve and isolating the valve movement without the need 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

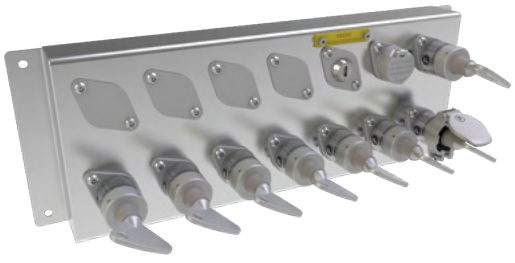


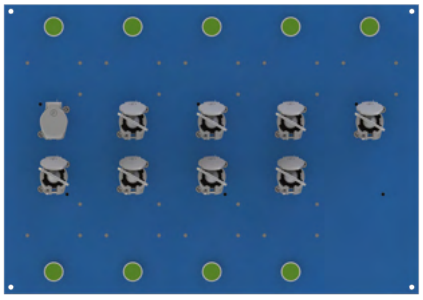
In this application, at least one pressure release line must be open at all times. The use of the Valve Interlocks insures at least one line will always be open because the independent interlocks A and B require their corresponding key to be turned to the locked position to close the valve. The two Key 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.





FORTRESS INTERLOCKS

mGard Range Card

Power Isolation

Control Interlocking

Panel Mounted | Panel Mounted Weatherproof | In Enclosure

Key Switch(es)

Knob Operated Switch Control Unit

Mini Solenoid Controlled Key Switch(es)

Key Operated Switch Control Unit

Solenoid Controlled Key Switch(es)

Electronic Time Delay Unit

ATEX Solenoid Controlled Key Switch

ATEX Key Switch

Voltage Sensing Unit

Power Interlocking

Mechanical Bolt Interlock

Bolt Interlock with Limit Switch

Bolt Interlock with Switch

Circuit Breakers

Valve & Pneumatic Interlocks

Key Exchange

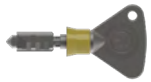
Modular Key Exchange Unit

Modular Key Unit with Switch(es)

Keys & Locks

Standard

Masterable



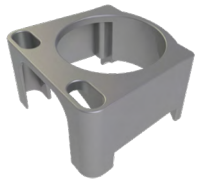
Accessories

Extension Module

Dustcovers (Available as Standard & Padlockable)

Lockout Hasps (For 3x Padlocks)

Back of Board Mounting Kit



Door Locks

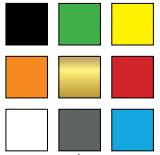
Single Door Interlock

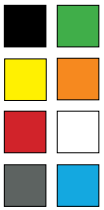
Multiple Modular Door Interlock

Forced Safety Key Door Interlock

All in One Door Interlocks

Colours available for key seal and lock label.

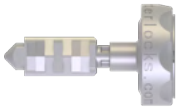




Colours available for key bow and dustcovers.

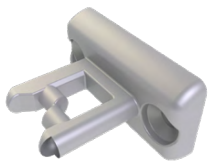
3 lines of 10 characters available for engravings.

Low Profile

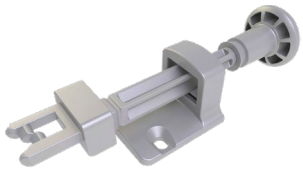


Actuators

Fixed Actuator



Handle Operated Actuator



Spring Released Handle Operated Actuator

Compressible Actuator

Self Aligning Actuator

BM1 Unit

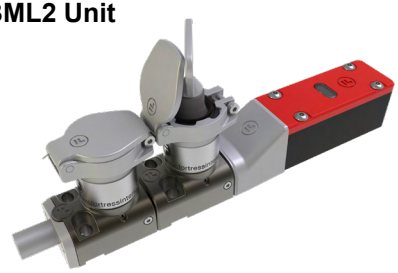
XMA Unit

Additional Modules Fitted when multiple locks are selected

BMR1 Unit

For BML2 switch is 2NC 1NO positive break

BML2 Unit



BM	Bolt Module

	Blank, Mazak Case (Standard)
S	Stainless Steel Body

	Blank
R	Switch Contact Block Mounted to Back of Primary Lock
L	24v Limit Switch Mounted to the Bottom of the Unit

1-5	Total Locks for BMS (Stainless Steel)
1-10	Total Locks for BM

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

0-10	Number of Primary Keys

Primary Keys directly affect the positioning of the bolt

0-10	Number of Secondary Keys

CL	Standard Lock
ML	Master Lock

IN	No Dustcover (Standard)
IS	Dustcover
IL	Padlockable Dustcover
SS	Stainless Steel with Dustcover, BMS Body Only
SL	Stainless Steel with Padlockable Dustcover, BMS Body Only

The Secondary Keys positioning is dependent of the chosen Key Sequencing for the Bolt Module Unit

A	Primary Key(s) Free Bolt Shot, Secondary Key(s) Trapped
D	Primary Key(s) Free Bolt Withdrawn, Secondary Key(s) Trapped
B	All Keys Free Bolt Shot (BM2+)
C	All Keys Free Bolt Withdrawn (BM2+)

	Leave Blank for BM, BMS, BML or BMSL
02022	20Amp 2xNO 2xNC Switch, BMR or BMSR Only
02040	20Amp 4xNO Switch, BMR or BMSR Only
Other switches available upon request	

006-022	Standard, Bolt Length of 6mm (Retracted)
003-019	Bolt Length of 3mm (Retracted)
013-029	Bolt Length of 13mm (Retracted)
030-046	Bolt Length of 30mm (Retracted)
050-066	Bolt Length of 50mm (Retracted)
150-166	Bolt Length of 150mm (Retracted)

	Blank, No Mounting Plate
MP	Mounting Plate

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

BM				-		-		-			-		-		-		-		

S Unit

S-WP Unit

S-EM Unit

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

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

S	Key Operated Switch

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

A02022	20Amp 2xNO 2xNC Switch
A02040	20Amp 4xNO Switch
Other switches available upon request	

Larger switches will be in a larger enclosure

	Panel Mounted (Standard)
WP	Weather (IP67) Proof Back of Board Mounting
EM	Metal Enclosure

S	**-**			**-**		**-**	

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

Solenoid Controlled Key Switch

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

SS	Solenoid Controlled Key Switch
1-10	Total Number of Locks
1-10	Number of Keys Freed when Solenoid is Energized (Primary)
0-9	Number of Keys Trapped when Solenoid is Energised (Secondary)
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 Solenoid Lock
B	Switch on Solenoid Lock & First Add-on Lock
02022	20Amp 2xNO 2xNC Switch
02040	20Amp 4xNO Switch
Other switches available upon request	
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

V	Locks Arranged Vertically
01	1 Row
C	Cam Sequence
B	Back of Board Mounting
WP	Weather (IP67) Proof 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

SS		-		-		-			-			-			**PU**	-	**V**	**01**	**C**	

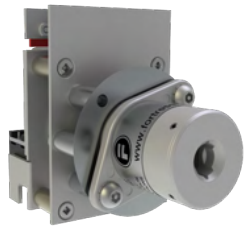
MSS Unit

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

MSS	-	1	-	0	-			-	A00302	-			PU	-	

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

VS Unit

TD Unit

VS	Voltage Sensing Unit
TD	Timer Delay Device - Key Initiated Timer
TS	Timer Delay Device - Switch Initiated Timer
TR	Timer Delay Device - Input Initiated Timer

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

024	24v DC Solenoid
110	110v DC Solenoid
230	230v DC Solenoid
PU	Power-to-Unlock Solenoid

All Solenoids used in the Time Delay and Voltage Sensing units are Power-to-Unlock

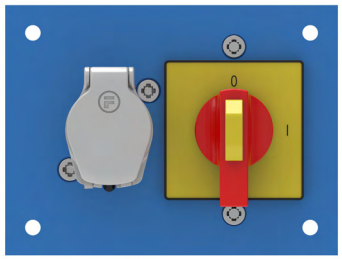
	Leave Blank for VS
30-300	30-300 Seconds (5 minutes) Adjustable Timer Delay, 110 / 230v Only
60-600	60-600 Seconds (10 minutes) Adjustable Timer Delay, 24v Only

	-			-		**PU**	-	

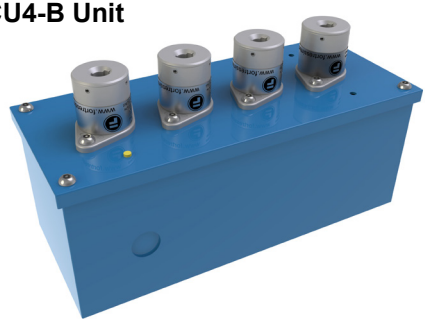
Blank squares and additional "-" should be removed from the final part number

Power Isolation: Control Interlocking — Solenoid Controlled Key Switch

SCU1-B Unit



LCU4-B Unit



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

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

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

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

XMA Unit

Additional Modules Fitted when multiple locks are selected

XM	Modular Key Exchange Unit
	Blank, Mazak Case (Standard)
S	Stainless Steel Body

	Blank
R	Switch Contact Block Mounted to back of Primary Lock
L	24v Limit Switch Mounted to the Bottom of the Unit

2-5	Total Locks for XMS (Stainless Steel)
2-10	Total Locks for XM (Mazak Case)

1-10	Number of Primary Keys

1-9	Number of Secondary Keys

Primary Keys are inserted into an XM unit to release Secondary Keys

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

CL	Standard Lock
ML	Master Lock

IN	No Dustcover (Standard)
IS	Dustcover
IL	Padlockable Dustcover
SS	Stainless Steel with Dustcover, XMS Body Only
SL	Stainless Steel with Padlockable Dustcover, XMS Body Only

02022	20Amp 2xNO 2xNC Switch
02040	20Amp 4xNO Switch
Other switches available upon request	

	Blank, Panel Mounted
EM	Metal Enclosure
MP	Mounting Plate, Not Available With Metal Enclosure

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

XM				-		-		-			-		-		

DM	Door Module

	Blank, Mazak Case (Standard)
S	Stainless Steel Body
SK	All in One Stainless Steel Body

1-2	Total Locks for DMSK (Single Cast Stainless Steel Body)
1-5	Total Locks for DMS (Stainless Steel)
1-10	Total Locks for DM (Mazak Case)

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

	No Extracted Key Function
E	Extracted Key Function Added to the Top Primary Lock (DMS Only)

0-9	Number of Keys Free When Actuator is Released (Primary)

1-10	Number of Keys Trapped When Actuator is Released (Secondary)

CL	Standard Lock
ML	Master Lock

IN	No Dustcover (Standard), Mazak Only, Can be Selected with DMS#E
IS	Dustcover, Mazak Only, Can be Selected with DMS#E
IL	Padlockable Dustcover, Mazak Only, Can be Selected with DMS#E
SS	Stainless Steel with Dustcover, DMS or DMSK Only
SL	Stainless Steel with Padlockable Dustcover, DMS or DMSK Only

DM1

DMS1

DMSK1

	Blank, No Actuator
H	DM Hand Actuator
A	DM Hand Actuator with Spring Return
C	DM Compressible Actuator
F	DM Fixed Actuator
S	DM Self-Aligning Actuator

XMA Unit

Additional Modules Fitted when multiple locks are selected

	Blank, No Actuator
LE	Actuator Left Entry
TE	Actuator Top Entry, Default for A and H actuators
BE	Actuator Rear Entry, Default for C, F, and S actuators
FE	Actuator Front Entry
RE	Actuator Right Entry

The head unit on the Door Lock Modules have two access holes, and can rotate 360°at 90° intervals.

	Blank, No Mounting Plate
MP	Mounting Plate

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

DM				-		-		-			-		-		-	

Keys and Accessories

CLK	Standard Key
MLK	Masterable Key

SU	Uni Directional

N	No Seal (Low Profile Keys Only)
S	Silver Seal, (CLK Standard)
G	Gold Seal, (MLK Standard)
C	Coloured Seal and/or Bow

S	Standard Cut
M	Master Cut, Masterable Key Only (MLK)

	Standard Colour Seal / No Seal
V	Viton (Black) Seal, (Only if C is Selected)
L	Green Seal, (Only if C is Selected)
Y	Yellow Seal, (Only if C is Selected)
O	Orange Seal, (Only if C is Selected)
R	Red Seal, (Only if C is Selected)
W	White Seal, (Only if C is Selected)
B	Blue Seal, (Only if C is Selected)

	Blank, No Colour for Bow (Standard)
VB	Black Bow, (Only if C is Selected)
GB	Green Bow, (Only if C is Selected)
YB	Yellow Bow, (Only if C is Selected)
OB	Orange Bow, (Only if C is Selected)
RB	Red Bow, (Only if C is Selected)
WB	White Bow, (Only if C is Selected)
BB	Blue Bow, (Only if C is Selected)
LP	Low Profile Bow, Only if N (No Seal) is selected

	-	**SU**			-		

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

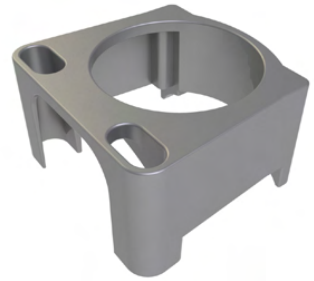
Lockout Scissor Hasp

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

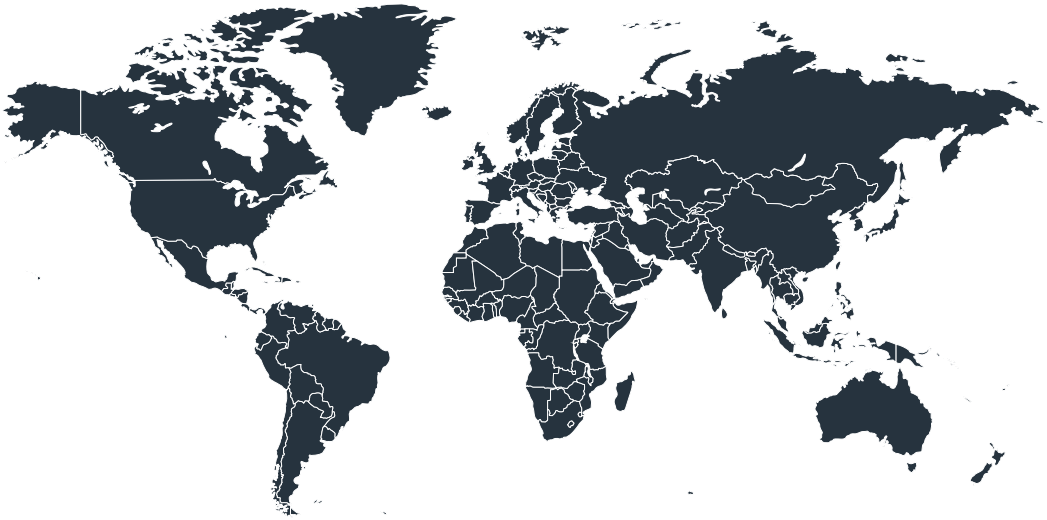
Part Number
XMSA-CLSS: Stainless Steel Body, Dustcover
XMSA-CLSL: Stainless Steel Body, Padlockable Dustcover

FORTRESS INTERLOCKS

mGard

Mechanical Trapped Key Interlocks Certified to PLe

A Halma company



June 2020 v1.5

COLTERLEC™

For more information
Call 1300 36 26 26 | sales@colterlec.com.au | www.colterlec.com.au