Accessories

Operating Instructions: Accessories

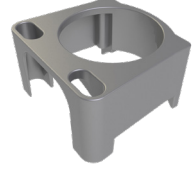| Description	CLDC	LOS3
LOS3: • Lockout Scissor Hasp manufactured in 316 Stainless Steel • Can be used with the PLDC and a wider range of applications • Accepts padlocks from 3x3-8mm • Also available with a Stainless-Steel cable (LOS3C)		
M-BOB:	**M-BOB**	**PLDC**
• Provides a flat mounting surface for back of board panel mounting • Easy conversion from front of board, surface mounting **PLDC:** • Incorporates two padlock holes into dustcover • Accepts padlocks from 3-8mm • Compatible with lockout scissor hasps		
CLDC:	**XMA**	**XMSA**
• Spring closed lid • Moulded seal prevents dust ingress into lock mechanism. **XMA / XMSA:** • Expansion module for use with the DM, XM and BM products • Supplied with CAMS to determine sequence during installation • Available with a choice of CL or ML lock mechanism		

Important:

This product is designed for use according to the installation and operating instructions enclosed. It must be installed by competent and qualified personnel who have read and understood the whole of this document prior to commencing installation. Any modification to or deviation from these instructions invalidates all warranties. Fortress accepts no liability whatsoever for any situation arising from misuse or misapplication of this product.
IF YOU HAVE ANY QUESTIONS OR QUERIES OF ANY NATURE WHATSOEVER PLEASE CONTACT THE SUPPLIER WHO WILL BE PLEASED TO ADVISE AND ASSIST.

Part Numbers

Description	Part No.
Stainless Steel Dust Cover	CLDC
Stainless Steel Padlockable Dust Cover	PLDC
Lockout Scissor Hasp (with Cable)	LOS3(C)
Back of Board	M-BOB

Standard Functionality

Sequencing - XMA

The mGard system is extremely flexible in terms of its sequencing possibilities. Two basic types of operation are possible.
Sequential Operation:
The key in any given module interacts only with module(s) immediately adjacent to it. This dictates the order in which keys are inserted and removed.
Non-Sequential Operation:
Turning one key can free or trap a number of the keys in a group simultaneously. Therefore, the order in which keys are inserted or removed from the group is not always essential. However, all keys in a group must be either trapped or removed to allow the keys working against them to be freed or replaced.

The two types can be used separately or combined to create very complex key exchange systems. The number of exchange sequences possible using the Fortress Patented Modular Key Exchange System is massive. Many combinations of sequential and Non-sequential sequences can be configured in the same product. On purchasing an XMA there are a variety of possible modifications to an existing installation that a customer may wish to make. These instructions aim to cover the most common ones but for more unusual sequences it may be necessary to seek advice from your supplier. It is not practicable to cover all permutations and combinations in this document.

mGard Terminology

mGard part numbers describe their units in the reference state we call the "Normal State", which means the following will be true:
• Switches will be in their described state, i.e. "Normally Closed" or "Normally Open".
• Any keys used as personnel keys will be inserted in a lock.

Locks are split into two groups, which are described in the part number as shown below:
• Normally In Locks (NIL) have keys inserted in the Normal State.
• Normally Out Locks (NOL) do not have keys inserted in the Normal State.

The other reference point used to describe our units is the "Opposite State", which means all the locks, switches and actuators will be in the opposite state to the Normal State. The schematics below represent the two reference states using the symbols defined in the Trapped Key Interlocking standard ISO TS19837 (2018).

For a typical machine guarding system, the system will be described with all units in their Normal State (i.e. machine running). For more complicated systems like switch gear interlocking, the system might be described with some units in their Normal State, and others in their Opposite State. Similarly, the process to convert a system in its normal state to the system in its opposite state will result in steps where parts of the system are in Normal State, parts are in Opposite State.
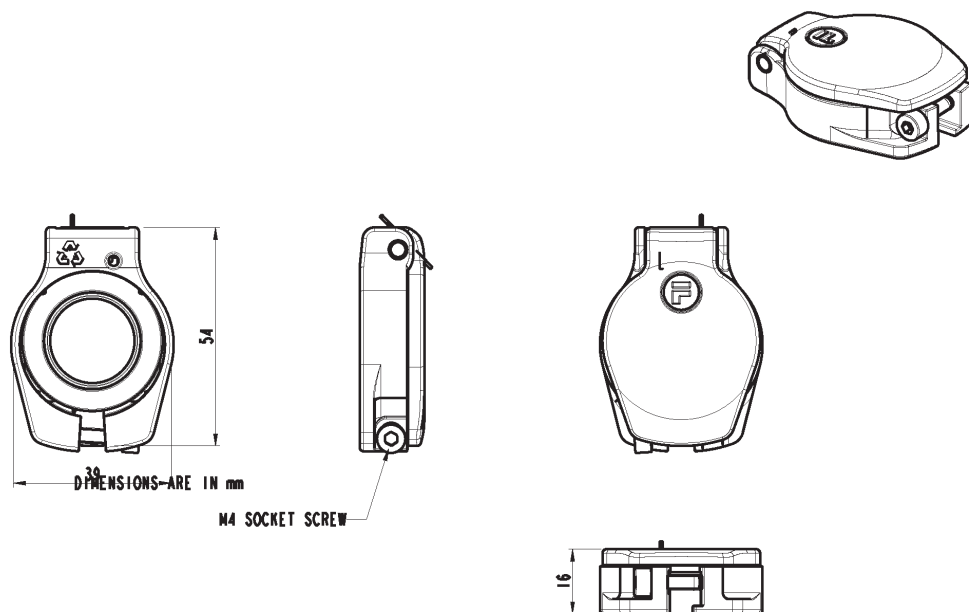
Expansion of BM, BMS, DM and DMS Products:

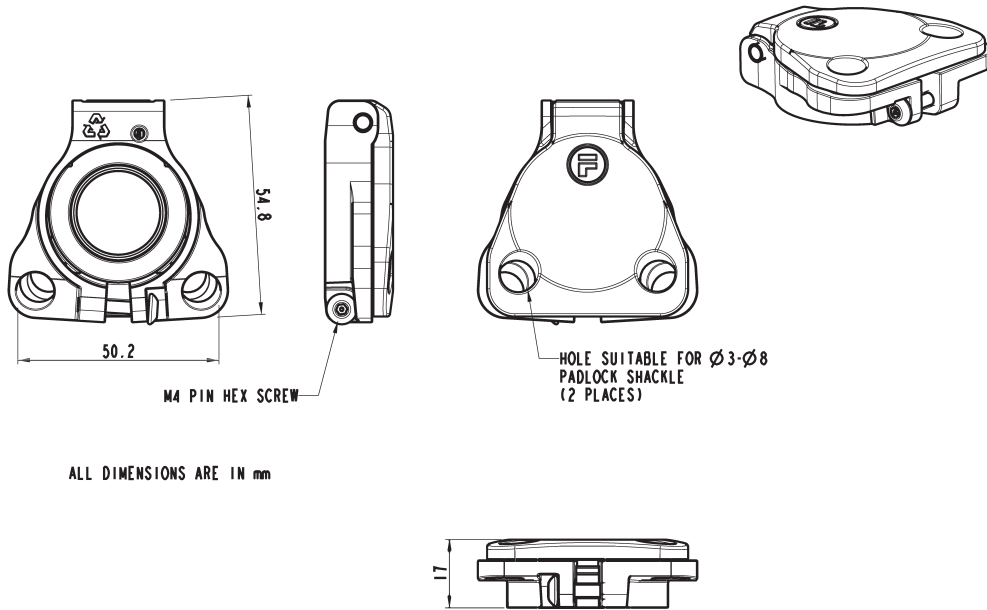Due to the complexity of these products, please contact your supplier about your specific requirements.

Expansion of XM and XMS Products:

A maximum of 10 XM modules can be joined to make an XM assembly. A maximum of 5 XMS modules can be joined to form an XMS assembly. If your application necessitates the joining of a number of modules that exceeds these limits, please contact your supplier for guidance. The below guidance should be used with reference to the relevant operating instructions for XM(S), DM(S), and BM(S) and details how to increase the number of NOL.
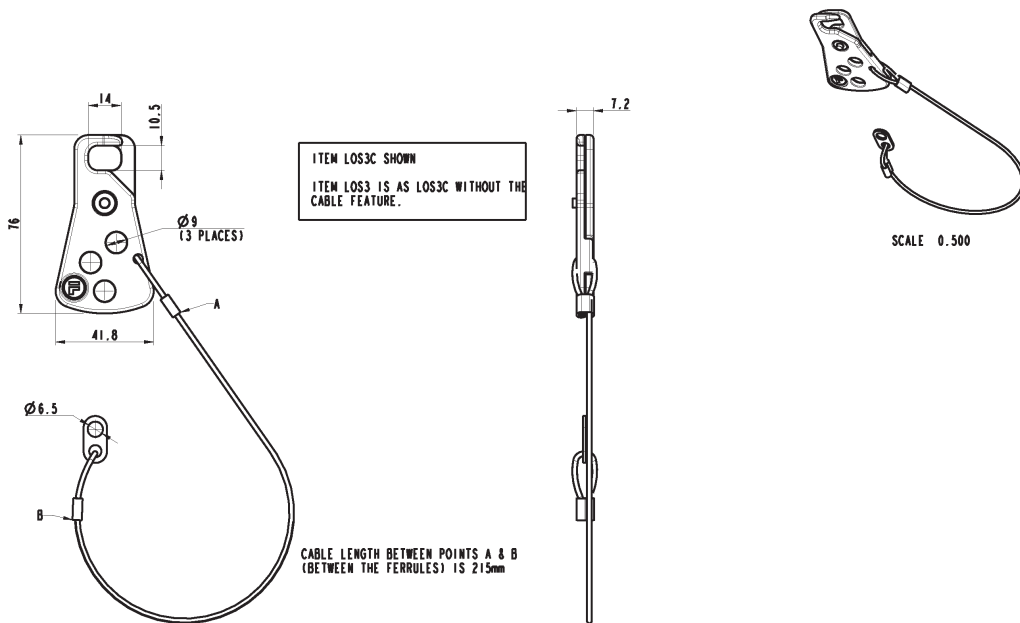
Figure 1: Dimensional Drawing - CLDC

DIMENSIONS ARE IN mm

M4 SOCKET SCREW

Figure 2: Dimensional Drawing - PLDC

54.8

50.2

M4 PIN HEX SCREW

HOLE SUITABLE FOR Ø3-Ø8
PADLOCK SHACKLE
(2 PLACES)

ALL DIMENSIONS ARE IN mm

17

Figure 3: Dimensional Drawing - LOS3(C)

14

10.5

76

Ø9
(3 PLACES)

41.8

A

ITEM LOS3C SHOWN

ITEM LOS3 IS AS LOS3C WITHOUT THE
CABLE FEATURE.

7.2

SCALE 0.500

Ø6.5

B

CABLE LENGTH BETWEEN POINTS A & B
(BETWEEN THE FERRULES) IS 215mm

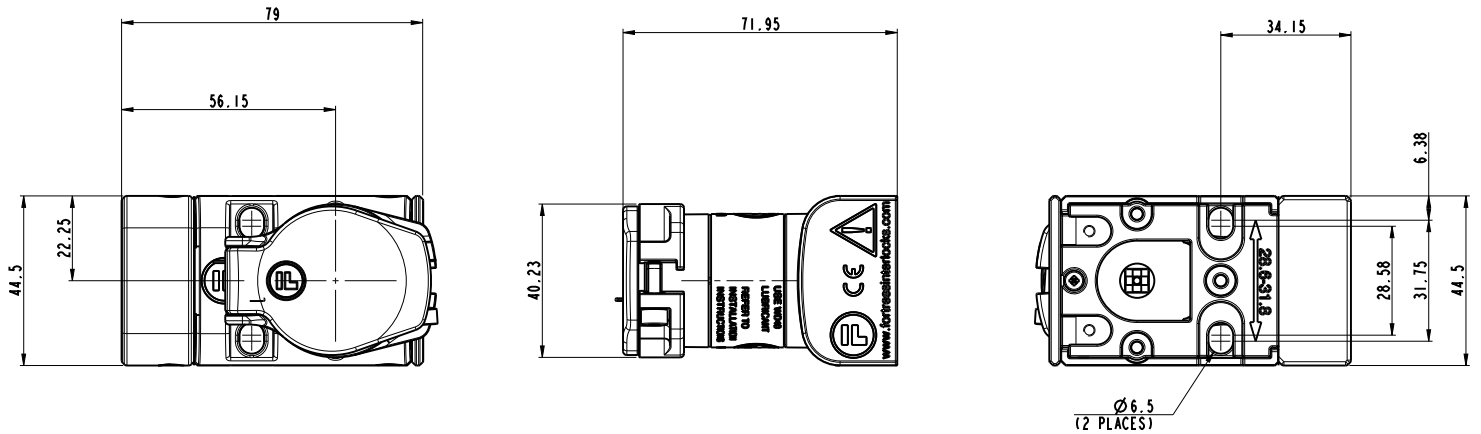## Figure 4: Dimensional Drawing - MBOB
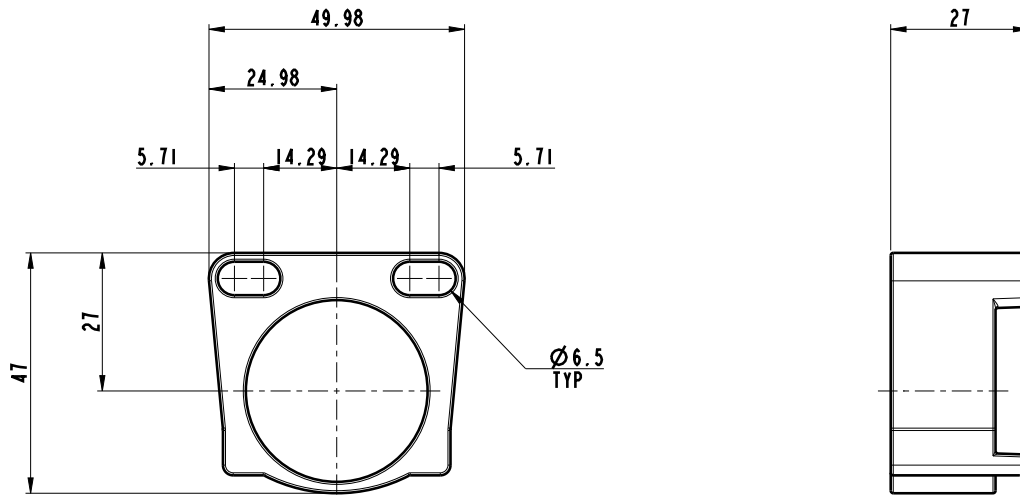
Figure 5: Dimensional Drawing - XMA
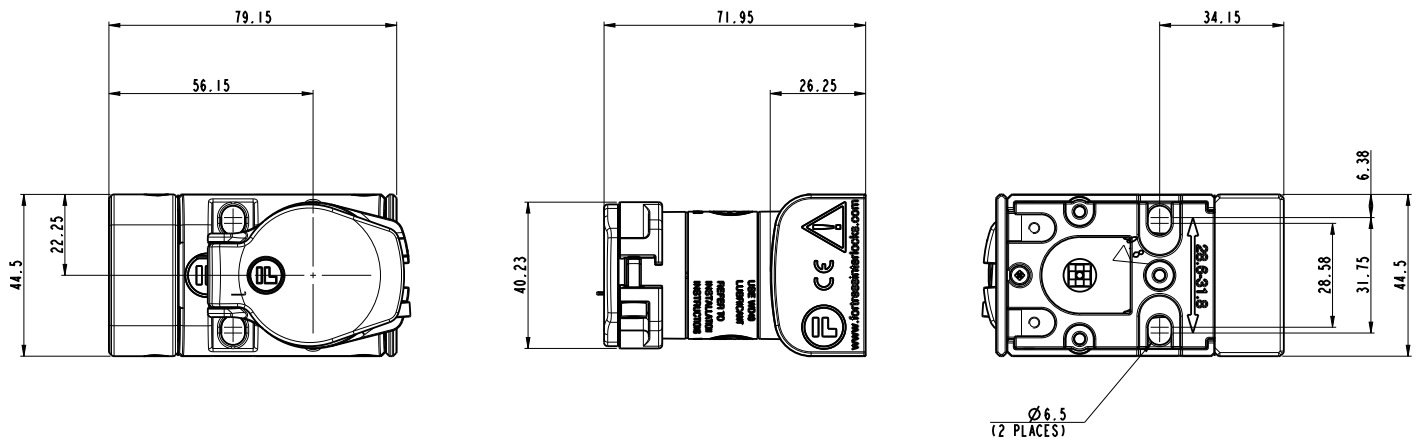
Figure 6: Dimensional Drawing - XMSA

Tools and Fixings Required

• 2 x Cap head / hexagonal head bolts for each module.
Front of Board mounting:
• M6 x 25
Back of Board mounting:
• M6 x 55
Suitable driver for above.
If using through holes:
• 1 x Drill Ø6.5
• 2 x M6 Full nuts per module
If using threaded holes:
• 1 x Drill Ø5
• 1 x M6 Tap and wrench

Mounting

Mount this unit well away from sources of vibration or use anti-vibration mountings in order to avoid the effects of vibration, shock and bump. Mount the unit only in its correctly assembled condition to fl at steel plate of minimum thickness 3.0mm or 6.0mm if aluminium. XM / XMS can be mounted in any orientation, observing the following rules:
1. Locate the unit so that all the locks are within easy reach.
2. Mount the unit to the panel using the chosen fixings.
3. Tighten the fixings to a Torque of 8 to 10Nm (5.9 to 7.4 lbf.ft)
4. All fixing screws must be permanently prevented from removal, either by vibration or by personnel using standard tools.

Installation of the M-BOB

The M-BOB is used for mounting XM and BM variants inside an enclosure or flat surface (back of board mounting). This is a common installation method for XM/BM with a wired switch. The below demonstrates some general guidance on installing the M-BOB to a XM & BM for mounting behind a panel/enclosure.

Step 1: Remove any dustcovers from the lock modules to expose the bare lock barrel as shown in the image below.

Step 2: Use the dimensions specified for your product to drill the required holes into the enclosure. Typically, you will require two fixing holes for each lock barrel present on your product. In the image below, six holes are required, one for each lock barrel, and four for the fixing screws.

Step 3: Place the M-BOB components onto the lock modules as shown in the image below and enter these lock barrels through the holes created in the enclosure.

PLEASE NOTE: for any sequential system requiring back of board mounting, a bowless key will be required for either 'all NIL (normally in locks)' or 'all NOL (normally out locks)' to install this device. A standard CL or ML key bow will not fit inside the diametric drilled hole in the mounting face.

Step 4: Use two M6x50 fixings for each lock module to secure the product onto the fixing surface.

Step 5: Re-affix the dust covers to the lock barrels on the surface of the lock barrels. This can be achieve by tightening the M4x12 cap head fixing securing the dustcover.
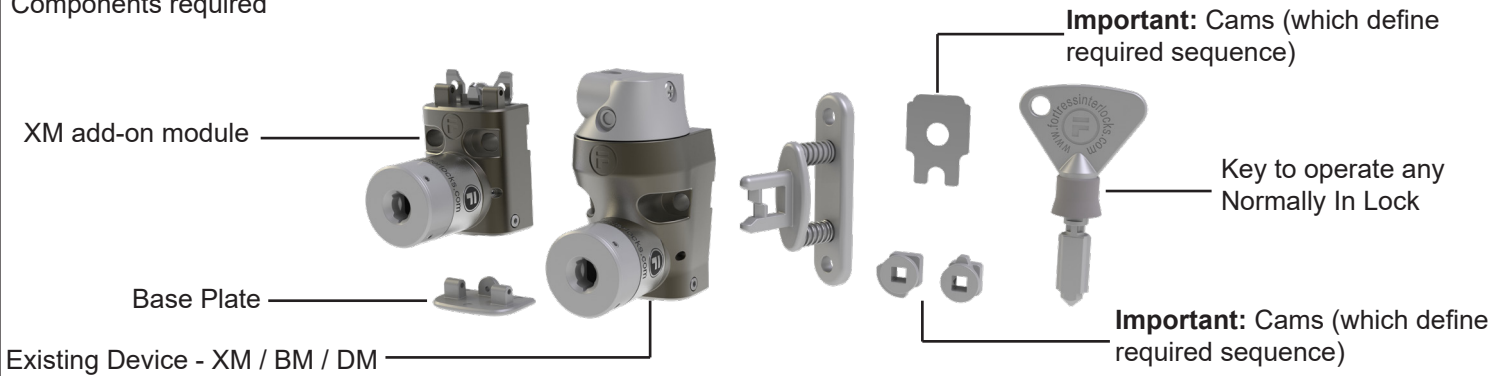
Operating Instructions: Accessories
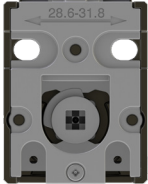
XM/XMS Add On Module

Components required

XM add-on module

Base Plate

Existing Device - XM / BM / DM

Important: Cams (which define required sequence)

Key to operate any Normally In Lock
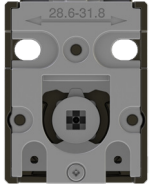
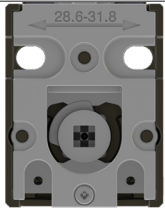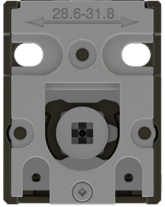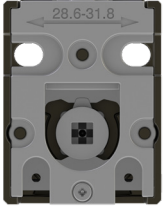**Important:** Cams (which define required sequence)

1. Ensure that all necessary backup measures are in place to perform the role of the key exchange system whilst it is out of commission.

2. Remove the XM product that is to be extended from its mountings.

3. Ensure all Normally In Locks have keys inserted and trapped, and all Normally Out Locks have keys freed and removed.

4. Dependant on the position you are adding your add-on module (see column 3), follow the guidance in the table below:

Number of Existing Normally In Locks	Number of Existing Normally Out Locks	Position adding the add-on module	See Step:
0	1+	A Normally In Lock	Not Applicable
1+	0	A Normally Out Lock	5a
1+	1+	A Normally In Lock	5b
1+	1+	A Normally Out Lock	5c

5(a). To commence the extension of the XM assembly, first of all the end cover must be removed. For older XM products, it may be necessary to remove the M3 countersunk screw from the base of the assembly. The use of this screw has now been discontinued.

5(c). For both XM and XMS products, remove the two cap head screws from the sides of the end module. Withdraw the end cover from the assembly.

5(b).

(i) To commence the extension of the XM assembly, the stack must be split at the joint between the last NIL module and the first NOL module. Normally there is only one Normally In Lock (NIL) module, so this split is likely to be after the first module on the product. The position of this split is easily recognised since all NOL modules should have keys in, whilst NIL modules have not

(ii) Remove the relevant M3 pozi-drive countersunk screw from the identified joint at the rear of the assembly. Now remove the two cap-head screws from the sides of the module on the same joint and pull the modules apart. If it is not possible to separate the modules after following this procedure, the product is configured with a non-standard sequence. Please contact your supplier for further guidance on your specific key exchange sequence.

6. On your add-on module, the next few steps will confirm the correct cam and orientation of that cam for the desired sequence. To get access to the cam, withdraw the small stainless steel trap-door from the back of the add-on module, sliding it towards the open end.

7. There are two types of cams supplied with an add on module; bi-directional (shown on the left image below) and uni-directional (shown on the right image below). The positioning of these cams is shown in the table below.
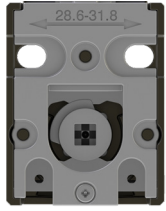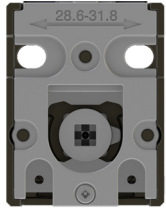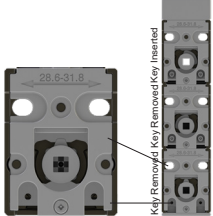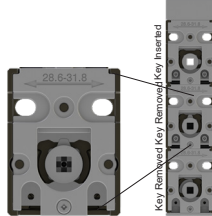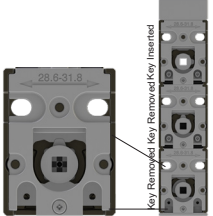
	Bi-directional			Uni-directional

Number of existing Normally In Locks	Number of existing Normally Out Locks	Position adding the add-on module	Use Cam:	Cam Positioning (Note that all normally in locks have keys trapped, and all normally out locks have keys free and removed)
0	1+	A Normally In Lock	Not Applicable	
1+	0	A Normally Out Lock	Bi-directional Cam	
1+	1+	A Normally In Lock	Uni-directional Cam	
1+	1+	A Normally Out Lock		

8. Cams are inserted such that the square face portion is inserted into the module face down, and the circular face, visible in the images in table 7, are facing outwards (looking at the rear of the product).

No. NIL	No. NOL	Position adding the add-on module	Product: DM (Door Module)	Product: XM (Key Exchange)	Product: BM (Bolt Module)
0	1+	A Normally In Lock	This modification is not possible within this range		
1+	0	Normally Out Lock			
1+	1+	A Normally In Lock			
1+	1+	Normally Out Lock			

9. Do not rotate, insert or remove any keys from the unit. Slide the supplied stainless steel trap-door into the base of the new XMA module. Enter the trap door into the module as shown in the image with the dual prongs facing away from the entry slot and the top edge sitting inside the indent inside the add on module


10. Attach the new XMA module by slotting it into the end where the trap-door has just been fed in. Join the two modules together; and gently secure the two cap head screws on the side of the add on unit (do not tighten).
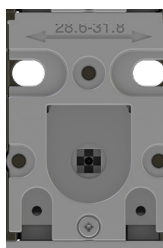

Cap Head Screw

Cap Head Screw

11. Add the end cover to the bottom of the add on module and gently secure the two cap head fixings on the two sides of the unit.

Cap Head Screw

End Cover

Cap Head Screw
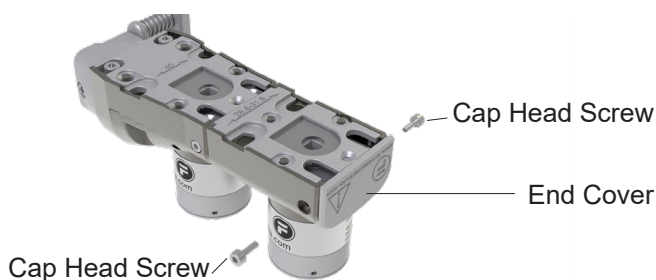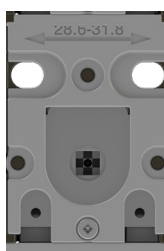
12. Secure the end cover to the module to the back of the add-on module with one pozi drive countersunk screw

13. Add the third fixing to secure the two modules together with one pozi drive countersunk screw.

Pozi Drive Countersunk Screw

14. Fasten all fixings tightly

Pozi Drive Countersunk Screw

Cam

Trap Door

Cap Head Screw

End Cover
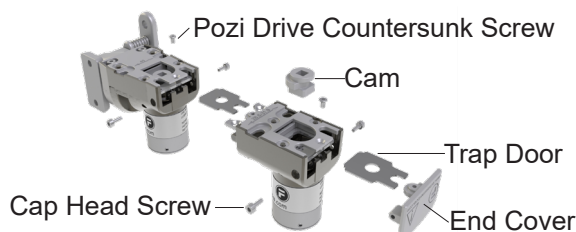
15. Check that the extended assembly provides the desired functionality, with reference to the detailed mechanical function test description in the commissioning section of this document. It is most important to ensure that the key in the NIL cannot be removed without the presence of all keys inserted into NOL and that none of the keys from NOL can be re moved unless the all key(s) are inserted and turned into NIL. Please note that it is normal not to use all the parts supplied with the XMA module. If all safety checks are successful, the product can now be remounted. Additional fixing holes will be necessary, as the new XMA module.

Mechanical Function Test

1. Start with all keys inserted into NIL and all keys removed from NOL
2. Check no keys can be removed from the NIL

Number of NIL	Number of NOL	Sequence Type	Test Sequence
1	1	Y	• Enter the key into the NOL and turn 120°. Ensure key can be removed from NIL. • With the key in the NIL removed, check key in NOL cannot be fully turned and removed.
2+	1	Y	• Enter the key into the NOL and turn 120°. Ensure any key can be removed from NIL in any order. • With one key removed from the NIL, check key in NOL cannot be fully turned and removed. • Repeat with other keys.
1	2+	Y	• Enter all keys into the NOL and turn 120°. Ensure the key can be removed from the NIL. • With the key removed from the NIL, check no keys in NOL can be fully turned and removed. • Re-enter the key into the NIL, check the first key can be removed from the NOL and return to turned position. • Repeat with next NOL position(s).
2+	2+	Y	• Enter one key into any NOL position and turn 120°. Check no NIL can be removed. Remove this key • Repeat with remaining NOL lock positions. • Enter keys into all NOL locks. • Rotate and free key from first NIL to check it is now free. • Check no keys can be freed from NOL. • Return the key to the NIL position. • Repeat the last three steps will all remaining NIL positions

Alternative Sequencing

Y Sequence – standard sequencing; lock closest to the cap is a NIL, NOL are furthest from the cap. Both Lock groups operate non-sequentially.

Non sequential is defined where a group of locks (i.e. NOL or NIL) can be operated in any order; such that keys can be inserted and rotated into any position first.

Partially sequential is defined where the top key from a group of locks (i.e. NOL or NIL) must be removed first, followed by any remaining keys within that group.

For guidance on any of the following sequences, please get in touch with our team to discuss;

Z Sequence –In this sequence both NIL and NOL are partially sequential, such that the first lock in the group must be operated first, followed by any remaining lock within that group.

W Sequence – this is a non-standard sequence where NIL are partially sequential, however NOL are sequential; this means the locks in must be operated in order starting with the top position, and finishing with the bottom most position.

V Sequence – this is a non-standard sequence where both NIL and NOL are sequential; this means the locks in each group must be operated in order starting with the top-most position and finishing with the bottom most position.

Service and Inspection
Regular weekly inspection of the following is necessary to ensure trouble-free, lasting operation: • Secure mounting of components. • Debris and wear. If lubrication / cleaning is required use WD40 **DO NOT USE DRY LUBRICANT** There are no user serviceable parts in these modules. If damage or wear is found, the whole module must be replaced.
Disposal
The XMA/XMSA does not contain any certified hazardous materials so should be disposed of as industrial waste.
Liability coverage is voided under the following conditions:
• If these instructions are not followed. • Non-compliance with safety regulations. • Installation not performed by authorised personnel. • Non - implementation of functional checks.
Fortress Interlocks Ltd reserves the right to modify the design at any time and without notice.
This guide should be retained for future reference.