

Operating Instructions: Alfred Solenoid Controlled Guard Lock

Description

The Alfred Solenoid Controlled Guard Lock is a robust, heavy duty Solenoid Controlled Guard Locking Device which can be used to lock and secure a machine guarding application and/or provide an interlocking function to a machine.

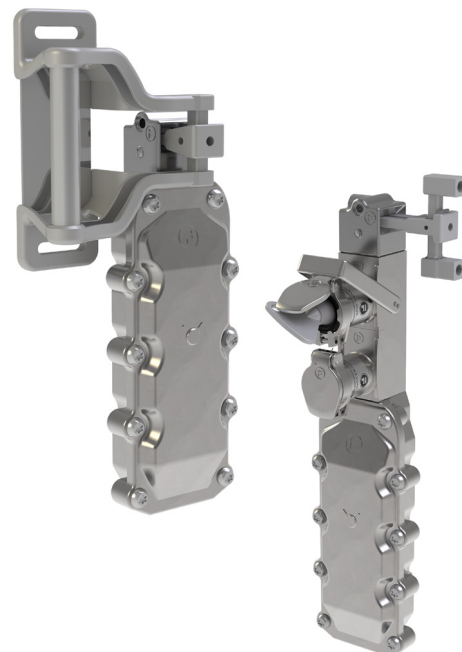
A full Alfred Solenoid Controlled Guard Lock product can be configured from a selection of Actuator Modules, Head Modules and can include up to three Key Adaptors all mounted above an Ex rated Solenoid Module.

The Ex rated Solenoid Module at the base of an Alfred Solenoid Controlled Guard Lock product contains dual safety circuits and a monitoring circuit which are linked to the operation and function of the assembled Head Module and / or Key Adaptor modules.

The Ex rated Solenoid Module is available in both Power-To-Unlock and Power-To-Lock versions and with and without Safety Circuit monitoring on the Solenoid locking or unlocking action. See Options and Ordering Information section for details.

The Alfred Solenoid Controlled Guard Lock's tough Stainless-Steel enclosures and IP67 and IP69 sealing protection make it perfect for any heavy duty or regular application.

As consistent with the rest of the Alfred product range, the Alfred Solenoid Controlled Guard Lock is rated for use in Hazardous Locations and Explosive Atmospheres (See ATEX, IECEx and HazLoc section below for full product ratings, marking and detail).



Approvals and Certifications



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. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Any modification to or deviation from these instructions invalidates all warranties. Fortress Interlocks Ltd accepts no liability whatsoever for any situation arising from misuse or misapplication of this product.

This product is not to be used as a Mains Isolator or Emergency Stop. The unit is a component to be added to a permanent electrical installation meeting the requirements of the applicable IEC/EN standards. This product meets the requirements of the standard IEC/ EN 61010-1:2001 safety requirements for electrical equipment for measurement control and laboratory use - Part 1 General Requirements.

The voltages used within the Alfred Ex Rated Solenoid Module circuits must all be of the same type. i.e. ALL Hazardous Live or ALL Machine Extra Low Voltage. It is vitally important that the correct version of this unit is selected.

DO NOT LEAVE AUXILIARY RELEASE/ MANUAL OVERRIDE KEY IN PLACE! DO NOT REMOVE LID WITH OVERRIDE KEY IN PLACE!

Always keep Manual Override Key in a secure place, under management control, as it allows access to areas that may have a residual hazard and may result in incorrect operation of some devices.

BEWARE OF INTENTIONAL MISUSE CAUSED BY OPERATORS WANTING TO BYPASS SAFETY SYSTEMS. THE INSTALLER SHOULD ASSESS THE RISKS AND MITIGATE AGAINST THEM.

IF YOU HAVE ANY QUESTIONS OR QUERIES OF ANY NATURE WHATSOEVER PLEASE CONTACT THE SUPPLIER WHO WILL BE PLEASED TO ADVISE AND ASSIST.

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ATEX, IECEx and HazLoc Ratings and Classifications

The Alfred Solenoid Controlled Guard Lock is certified and rated for use within ATEX, IECEx and HazLoc environments of the following ratings;

ATEX and IECEx product ratings;

(as per IEC 60079-0)



II 2 G Ex db h IIC T6 Gb



II 2 D Ex h tb IIIC T85°C Db IP67

Tamb -20°C to +60°C

North American HazLoc product ratings;

(as per NEC 500, CEC Annex J)

Class I, Division 2, Groups A,B,C,D T4

Class II, Division 2, Groups F,G T110°C

Class III, Division 2

(as per NEC 505, CEC 18)

Class I, Zone 1, AEx db IIC T4 Gb

Zone 21, AEx tb IIIC T110°C Db IP67

Approvals

IECEx BAS 20.0080X

BAS21UKEX0009X

SGS20ATEX0171X

SGSNA/21/CA/00001X

Specific Conditions of Use

1. It is the responsibility of the installation engineer to ensure that a suitable IECEx/ATEX/UKEX equipment certified cable gland is installed in accordance with IEC60079-14, which meets the IP rating of IP67, to ensure that this is maintained on the enclosure. See Electrical Connection section for further detail.
2. Flameproof Joints of the Ex Rated Solenoid Module enclosure are not intended to be repaired.
3. If required, any replacement Lid assembly fasteners must be identical to those as supplied by Fortress and as detailed in the *Lid Assembly Requirements* section of this document. The specification of these are M8 x 14mm, property class of A2-70 with a minimum yield strength of 700 MPa to ISO 3506, ISO 262, ISO 965-1, and ISO 965-3.
4. When used for a Group III application, the adhesive labels and non-metallic coatings may store electrostatic charge and become a source of ignition. Guidance on protection against the risk of ignition due to electrostatic discharge can be found in IEC TS 60079-32-1. Cleaning of the adhesive labels and non-metallic coatings should only be done with a damp cloth.

WARNING – Do not open device when an explosive atmosphere is present!

WARNING – Do not open device when energised!

The purchaser or Installation Engineer should be aware of any External effects or Aggressive substances that the Alfred Solenoid Controlled Guard Lock may be exposed to and should inform Fortress accordingly.

Symbol Description



Warning Electricity



Direct Opening Action



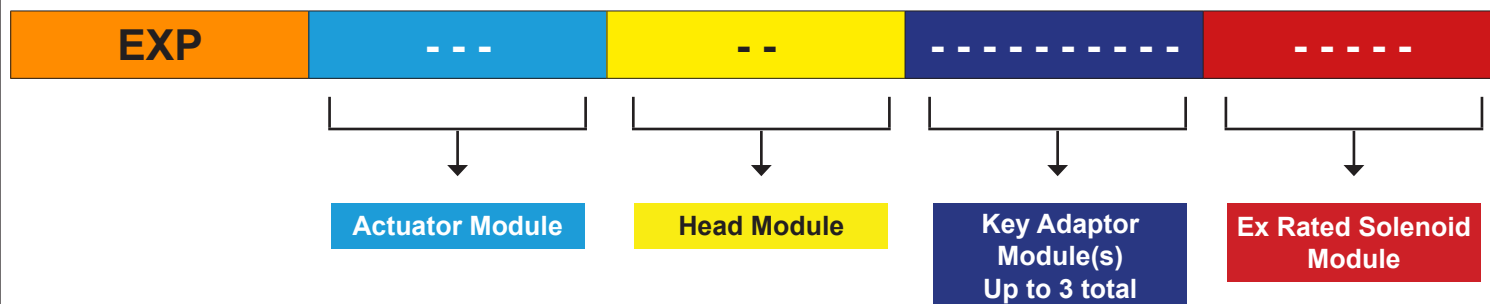
Locking monitoring of locking elements

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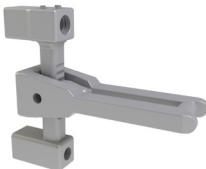



Options & Ordering Information

The Alfred Solenoid Controlled Guard Lock product can be configured from a selection of Actuator Modules, Head Modules and can include up to three Key Adaptors all mounted above an Ex rated Solenoid Module. Each unique Alfred Solenoid Controlled Guard Lock product configuration will have its own unique part number in the format below. Part Numbers can be generated via Fortress' online product configurators or by speaking to your local Fortress Channel partner.

Note: All Alfred Solenoid Controlled Guard Lock products will have the EXP part number prefix.



Actuator Modules

Description	Part No.	Handing	
Tongue Assembly	EXPTA*	Front / Left / Rear / Right	
<ul style="list-style-type: none">• Vertical misalignment of +/-12mm.• Minimum hinged guard operating radius: 750mm.• Can be fitted in two positions at 90° to either hinged or sliding door/gates.			
Description	Part No.	Handing	
Hinged Handle Assembly	EXPHL1	Front	
<ul style="list-style-type: none">• Integrated handle for guarding applications with hinged door/gates.• Vertical misalignment of +/-12mm.• 6mm overtravel allowance.• Minimum hinged guard operating radius: 250mm.			
Description	Part No.	Handing	
Standard Slidebar Assembly	EXPTN*	Left / Right	
<ul style="list-style-type: none">• Slidebars have a second operating action and are suitable for hinged or sliding guards. No hinged guard radius limit is present and the risk of impacts to interlock on large guards is removed.• Built in lock-out facility to accommodate a maximum of 4 padlocks with up to 8mm diameter shackles.			
Description	Part No.	Handing	
Sprung Slidebar	EXPTS*	Left / Right	
<ul style="list-style-type: none">• Standard Slidebar with spring mechanism to extend Actuator when in knob has been lifted.			

* Part Number 1, 2, 3 or 4 here indicates Actuator and Head Orientation, See Figure 1 below.

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Head Modules


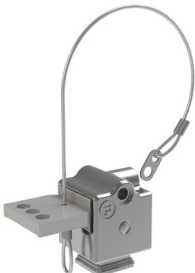
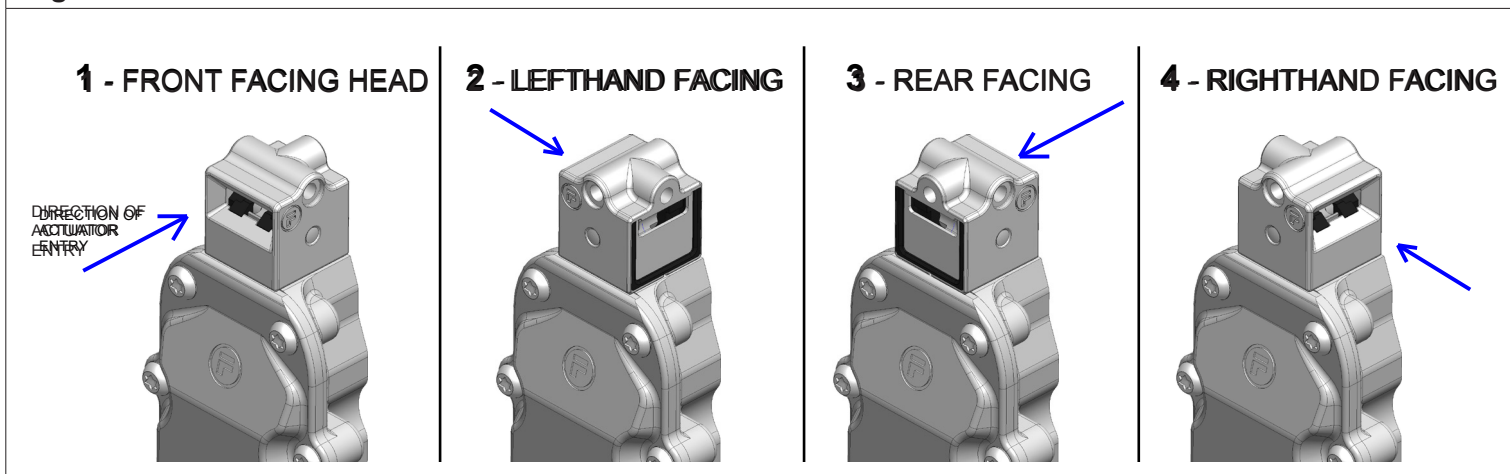
Description	Part No.	Handing	
Stainless Steel Slimline Head	EXPS6	Front / Left / Rear / Right	
<ul style="list-style-type: none"> Full Stainless-Steel construction. 			
Description	Part No.		
Stainless Steel Slimline Head with Additional Padlockable Lock-Out plug	EXPS8		
<ul style="list-style-type: none"> Full Stainless-Steel construction. Lock-Out suitable for up to three Ø8mm padlocks to prevent Actuator insertion. 			

Figure 1: Actuator and Head Orientation



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Options & Ordering Information

Key Adaptor Modules

Key Adaptor Modules are an optional, configurable attachment for the Alfred Solenoid Controlled Guard Lock. They can be used to provide the function of an access lock to prevent unauthorised access to a hazardous area, or alternatively provide a personnel key function to prevent unexpected start up. Key Adaptors are available in three variations;

Access Key Adaptors

Used to prevent unauthorised personnel from opening a guard and stopping a machine. Ideally suited for authorised access only, or linked access to other machinery that is required to be isolated before access.

Safety Key Adaptors

Used to provide a personnel key function to prevent unexpected machine start up.

Extracted Key Adaptor

Also used as a personnel key to prevent unexpected machine start up but include a forced extraction before machine guarding can be opened.

Key Adaptor Modules

Description

Part No.

Access Key Adaptor

AKL2^z

- Standard lock type, standard dustcover.

Description

Part No.

Access Key Adaptor

AKL7^z

- Master lock type, standard dustcover.



Description

Part No.

Access Key Adaptor

AKL3^z

- Standard lock type, padlockable dustcover.

Description

Part No.

Access Key Adaptor

AKL8^z

- Master lock type, padlockable dustcover.



Description

Part No.

Safety Key Adaptor

SKL2^z

- Standard lock type, standard dustcover.

Description

Part No.


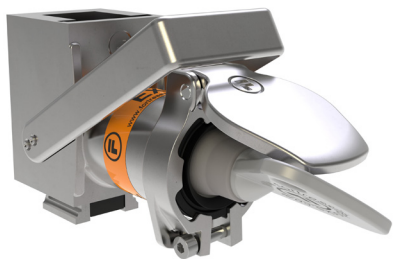

Safety Key Adaptor

SKL7^z

- Master lock type, standard dustcover.



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Description	Part No.	
Safety Key Adaptor	SKL3 ^z	
<ul style="list-style-type: none">• Standard lock type, padlockable dustcover.		
Description	Part No.	
Safety Key Adaptor	SKL8 ^z	
<ul style="list-style-type: none">• Master lock type, padlockable dustcover.		
Description	Part No.	
Extracted Key Adaptor	EKL2	
<ul style="list-style-type: none">• Standard lock type, standard dustcover.		
Description	Part No.	
Extracted Key Adaptor	EKL7	
<ul style="list-style-type: none">• Master lock type, standard dustcover.		
Description	Part No.	
Extracted Key Adaptor	EKL3	
<ul style="list-style-type: none">• Standard lock type, padlockable dustcover.		
Description	Part No.	
Extracted Key Adaptor	EKL8	
<ul style="list-style-type: none">• Master lock type, padlockable dustcover.		
<p>* Part number 1, 2 or 3 here indicates quantity of Access Key or Safety Key adaptor modules selected. Note; Up to 3 Key Adaptors total can be configured into a full Alfred Solenoid Controlled Guard Lock product.</p>		
<p>Note: Keys sold separately.</p>		

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Options & Ordering Information

Ex Rated Solenoid Module

Solenoid Controlled locking Module to add locking control to either a guarded area or interlocked Key. The Ex Rated Solenoid Module is available in both Power-To-Unlock and Power-To-Lock versions and with and without Safety Circuit monitoring on the Solenoid locking or unlocking action. See Functioning section for more detail. All Ex Rated Solenoid Modules are constructed in full-stainless steel flameproof enclosures and sealed to IP67 and IP69.

Ex Rated Solenoid Modules

Description	Part No.
Power-to-Unlock, Safety-on-Guard-Locking	EXPXL411
<ul style="list-style-type: none">• Power-to-Unlock device.• Dual Safety Circuits change state on Unlocking/Locking of Solenoid mechanism.• Monitoring circuit on Solenoid action provides feedback when product is in its unlocked stated.• Monitoring circuit on the Actuator and Head and/or Key Adaptor operation provide feedback on the opening of a guarded area or operation of an interlocked key.• Auxiliary Release function included to override Solenoid locking during commissioning or in the event of a power failure.	
Description	Part No.
Power-to-Unlock, Safety-on-Guard (un-monitored solenoid)	EXPXL416
<ul style="list-style-type: none">• Power-to-Unlock device.• Dual Safety Circuits change state on opening/closing of a guarded area or operation of an interlocked key.• Monitoring circuit on Solenoid action provides feedback when product is in its unlocked stated.• Monitoring circuit on the Actuator and Head and/or Key Adaptor operation provide feedback on the opening of a guarded area or operation of an interlocked key.• Auxiliary Release function included to override Solenoid locking during commissioning or in the event of a power failure.	



Description	Part No.
Power-to-Lock, Safety-on-Guard-Locking	EXPXL471
<ul style="list-style-type: none">• Power-to-Lock device.• Dual Safety Circuits change state on Unlocking/Locking of Solenoid mechanism.• Monitoring circuit on Solenoid action provides feedback when product is in its unlocked stated.• Monitoring circuit on the Actuator and Head and/or Key Adaptor operation provide feedback on the opening of a guarded area or operation of an interlocked key.	
Description	Part No.
Power-to-Lock, Safety-on-Guard (un-monitored solenoid)	EXPXL461
<ul style="list-style-type: none">• Power-to-Lock device.• Dual Safety Circuits change state on opening/closing of a guarded area or operation of an interlocked key.• Monitoring circuit on Solenoid action provides feedback when product is in its unlocked stated.• Monitoring circuit on the Actuator and Head and/or Key Adaptor operation provide feedback on the opening of a guarded area or operation of an interlocked key.	



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Technical Specification	Actuator and Head Modules	Key Adaptor Modules	Safety-on-Guard-Locking type Solenoid Modules XL411 & XL471	Safety-on-Guard type Solenoid Modules XL416 & XL461
Construction Materials	316 Stainless Steel and Stainless Steel to BS3146-2:1975 (ANC4B)			
Mechanical Life	1,000,000 operations			
Holding Force, F _{ZH}	7kN			
Maximum Holding Force, F _{1MAX}	14kN			
Operating Force (unlocked unit, without Key Adaptors)	XX N	N/A		
Key Operation Force	N/A	XX N	N/A	
Electrical Specification	N/A		AC 50 / 60Hz / DC	
Utilisation Category	N/A		AC 15 or DC 13	
Maximum Switch Current	N/A		DC13: Le=0.5A, Ue=24V DC AC15: Le=1A, Ue=24V AC	
Minimum Switch Current	N/A		1mA at 5V DC	
Maximum Switching Voltage	N/A		24V AC/DC	
Switch Conformance	N/A		DIN VDE 0060 Part 206 & IEC 947-5-1	
Switch Contacts on Actuator/Key operation	N/A		2NC 1NO	2NC 1NO
Switch Contacts on Solenoid operation	N/A		2NC 1NO	1NO
Safety Circuit Switching Principle	N/A		Positive break, dual channel	
Solenoid Voltage	N/A		24V DC (+/-10%)	
Solenoid Power Rating	N/A		350mA max @ 24V DC	
Solenoid Rating (Duty Cycle)	N/A		100%	
Transient Overvoltages Installation	N/A		Category III	
Cable Size	N/A		28 – 12 AWG	
Diagnostic Coverage (DC)	99%			
λd	10%			
Performance Level	N/A		Up to PLe	PLc to PLe*
Category	Up to Cat.4			
B10d	5,000,000 operations			
Ingress Protection	N/A		IP67 & IP69	
Pollution Degree (IEC 664)	N/A		Degree 2	
Environment	Indoor & Outdoor			
Ambient Temperature	-20°C (-4°F) ** to +60°C (+140°F)			
Maximum Humidity	80%@<=31°C; 50%@40°C			
Maximum Altitude	2000m			
Shock and Vibration Resistance	Tested in accordance with GS-ET-19_2015-05			
Applicable Standards	BS EN ISO 13849-1:2015, BS EN ISO 13849-2:2012, BS EN ISO 14119:2013, BS EN IEC 60079-0:2018, BS EN 60079-1:2014, BS EN ISO 80079-36:2016			
* Depending on application.				
** The units will only continue to work below freezing point (0°C) where it can be guaranteed that ice will not form on or in the unit as it will cause the mechanical parts to bind and jam.				

Safety Functions		Part No.
Safety Function 1	Turns mechanical movement of assembled Head module and/or Key Adaptor module into operation of Safety Contacts.	EXP ... XL***
Safety Function 2	Solenoid Mechanism holds door/gate locked.	EXP ... XL***

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Functionality

The Alfred Solenoid Controlled Guard Lock product can be configured from a selection of Actuators, Head modules and Key Adaptor modules all mounted above an Ex Rated Solenoid Module.

The Ex Rated Solenoid Module provides a locking function to securely trap either the Actuator and Head mechanism and/or an assembled Key Adaptor mechanism

In an Alfred Solenoid Controlled Guard Lock product without any Key Adaptor modules included, the Ex Rated Solenoid Module can be used to directly lock and secure a guarded area.

In an Alfred Solenoid Controlled Guard Lock product with a Key Adaptor module included, the Ex Rated Solenoid Module can be used to lock and trap a key operation, while the assembled Key Adaptor(s) can be sequenced to lock and secure a guarded area.

Dual Safety Circuits within the Ex Rated Solenoid Module can be paired to a machine control and guarding system to generate a machine-stop command on either the unlocking or opening of a guarded area or operation of an interlocked key.

- In Safety-On-Guard-Locking type Solenoid Modules (EXPXL411 & EXPXL471) the Safety Circuits will change on the unlocking or locking of the internal Solenoid mechanism.
- In Safety-On-Guard type Solenoid Modules (EXPXL416 & EXPXL461) the Safety Circuits will change on the insertion and extraction of the Actuator into/from the Head Module or, if Key adaptors are included, on the operation of the primary Key Adaptor.

Alfred Solenoid Controlled Guard Lock Product with Power-to-Unlock Ex Rated Solenoid Module (EXP - - - XL411 and EXP - - - XL416)

Closing and Locking:

- Close the Gate / Door of the guarded area to Insert the Actuator into the Head Module

Note: Some Actuators require additional operation to insert into Head Module, see specific functioning sections below.

- If Alfred product is fitted with Key Adaptors, operate them into their closed or 'machine-run' state.

Note: Exact sequence of Key Adaptor operation can vary depending on product selection and configuration. See specific functioning section below.

- With Solenoid de-energised, the Internal mechanism of the Power-to-Unlock Ex Rated Solenoid Module automatically engages to lock the Head module and any Key module (if fitted) placing the complete Alfred Product into its Locked state.
- Once Locked, the Safety Circuits of the Ex Rated Solenoid Module will be made / closed, the Gate Monitor Circuit will be open / broken, and the Solenoid Monitor Circuit will be open / broken.

Unlocking:

- Energise the Solenoid.
- Internal locking mechanism dis-engages to remove locking force from the Head Module and / or Key Adaptor Module (if fitted).
- Switch status for Safety-on-Guard-Locking type Ex Rated Solenoid Module with fully Monitored Solenoid Safety (EXPXL411);
 - Safety Circuits open / break, Solenoid Monitor Circuit makes / closes.
- Switch status for Safety-on-Guard type Ex Rated Solenoid Module with Un-Monitored Solenoid Safety (EXPXL416);
 - Safety Circuits remain closed, Solenoid Monitor Circuit makes / closes.

Opening:

- Remove the Actuator from the Head Module or operate the primary Key Module (if fitted).
- Switch status for Safety-on-Guard-Locking type Solenoid Module (EXPXL411);
 - Gate Monitor Circuit makes / closes.
 - Safety Circuits remain broken, Solenoid Monitor Circuit remains closed.
- Switch status for Safety-on-Guard type Solenoid Module (EXPXL416);
 - Safety Circuits open / break, Gate Monitor Circuit makes / closes.
 - Solenoid Monitor Circuit remains closed.

Auxiliary Release Function:

During product installation and commissioning, or in the event of a power failure it may be necessary to perform a manual Auxiliary Release operation to Unlock and Open the Ex Rated Solenoid Module.

- Use supplied Override Key to rotate and operate the centrally located Override spindle 90° Clockwise. (See Figure 7)
- Internal locking mechanism dis-engages to remove locking force from the Head Module and/or Key Module (if fitted).
- Switch status for Safety-on-Guard-Locking type Solenoid Module (EXPXL411);
 - Safety Circuits open / break, Solenoid Monitor Circuit makes / closes.
- Switch status for Safety-on-Guard type Solenoid Module (EXPXL416);
 - Safety Circuits remain closed, Solenoid Monitor Circuit makes / closes.

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Alfred Solenoid Controlled Guard Lock Product with Power-to-Lock Ex Rated Solenoid Module (EXP - - - XL471 and EXP - - - XL461)

Closing:

- Close the Gate / Door of the guarded area to Insert the Actuator into the Head Module
- Note:** Some Actuators require additional operation to insert into Head Module, see specific functioning sections below).
- If Alfred product is fitted with Key Adaptors, operate them into their closed or 'machine-run' state.
- Note:** Exact sequence of Key Adaptor operation can vary depending on product selection and configuration. See specific functioning section below.
- Switch status for Safety-on-Guard-Locking type Ex Rated Solenoid Module with fully Monitored Solenoid Safety (EXPXL471);
 - Gate Monitor Circuit opens / breaks.
 - Safety Circuits remain broken, Solenoid Monitor Circuit remains closed.
- Switch status for Safety-on-Guard type Ex Rated Solenoid Module with Un-Monitored Solenoid Safety (EXPXL461);
 - Safety Circuits make / close, Gate Monitor Circuit opens / breaks.
 - Solenoid Monitor Circuit remains closed.

Locking:

- Energise the Solenoid to engage the internal locking mechanism within the Ex Rated Solenoid Module.
- Switch status for Safety-on-Guard-Locking type Solenoid Module (EXPXL471);
 - Safety Circuits make / close, Solenoid Monitor Circuit opens / breaks.
 - Gate Monitor Circuit remains broken.
- Switch status for Safety-on-Guard type Solenoid Module (EXPXL461);
 - Solenoid Monitor Circuit opens / breaks.
 - Safety Circuits remain closed, Gate Monitor Circuit remains broken.

Unlocking:

- De-Energise the Solenoid.
- Internal locking mechanism dis-engages to remove locking force from the Head Module and / or Key Adaptor Module (if fitted).
- Switch status for Safety-on-Guard-Locking type Solenoid Module (EXPXL471);
 - Safety Circuits open / break, Solenoid Monitor Circuit makes / closes.
 - Gate Monitor Circuit remains broken.
- Switch status for Safety-on-Guard type Solenoid Module (EXPXL461);
 - Solenoid Monitor Circuit makes / closes.
 - Safety Circuits remain closed, Gate Monitor Circuit remains broken.

Opening:

- Remove the Actuator from the Head Module or operate the primary Key Module (if fitted).
- Switch status for Safety-on-Guard-Locking type Solenoid Module (EXPXL471);
 - Gate Monitor Circuit makes / closes.
 - Safety Circuits remain broken, Solenoid Monitor Circuit remains closed.
- Switch status for Safety-on-Guard type Solenoid Module (EXPXL461);
 - Safety Circuits open / break, Gate Monitor Circuit makes / closes.
 - Solenoid Monitor Circuit remains closed.

Note: There is no Auxiliary Release function on a Power-To-Lock Device.

Hinged Handle and Tongue Actuators

Closing and Opening:

- Push / Pull the Gate / Door of the guarded area in the direction parallel to the Actuators entry into the Head Module.
- No additional steps required to operate Actuator.

Slidebar Actuators

Closing:

- Close the Gate / Door of the guarded area.
- Lift the Knob casting of the Slidebar Actuator and drive the Slidebar towards the Head Module so that the Tongue portion inserts into the Head Module.

Opening:

- Grasp the Knob casting and slide the Slidebar away from the Head Module.

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Key Adaptors

Up to 3 Key Adaptors total can be configured into a full Alfred Solenoid Controlled Guard Lock product.
If multiple different Key Adaptor types are configured, Extracted style Key Adaptors will always be located closest to the Head Module and Access style Key Adaptors will always be located closest to the Ex Rated Solenoid module.

Access Key Adaptors

In the Closed or Locked state of an Alfred Solenoid Controlled Guard Lock, an Access style Key Adaptor will be removed or 'key-free'.

Up to 3 Access style Key Adaptors can be configured into a full Solenoid Controlled Guard Lock product.
If more than one Access style Key Adaptor is used, the primary Access Key will be the one located closest to the Head Module. If multiple Access style Key Adaptors are used, then all other Access style Keys must be inserted and operated before the primary Key.

Safety Key Adaptors

In the Closed or Locked state of an Alfred Solenoid Controlled Guard Lock, a Safety style Key Adaptor will be inserted and rotated.

Up to 3 Safety style Key Adaptors can be configured into a full Solenoid Controlled Guard Lock product.
If more than one Safety style Key Adaptor is used, the primary Safety Key will be the one located closest to the Head Module.

Extracted Key Adaptors

In the Closed or Locked state of an Alfred Solenoid Controlled Guard Lock, an Extracted style Key Adaptor will be inserted and rotated.

A maximum of 1 Extracted style Key Adaptor can be configured into a full Solenoid Controlled Guard Lock product.

An Extracted style Key Adaptor will always be located closest to the Head Module.

If Extracted style and Safety style Key Adaptors are configured together, their operation sequence will combine so that the Extracted style Key will become the primary Safety Key.

To open a closed guarded area (after unlocking the Solenoid Module)

- The primary Access Key must be inserted and rotated clockwise. If multiple Access style Key Adaptors are used, then all other Access Keys must be inserted and operated before the primary Access Key.
- The primary Safety Key must be rotated anti-clockwise to its 'key-free' position.

Note: If an Extracted style Key Adaptor is fitted it must be rotated and removed.

To lock a closed guarded area (prior to locking the Solenoid Module)

- The primary Extracted or Safety Key must be inserted and rotated clockwise. If multiple Safety style Key Adaptors are used, then all other Safety Keys must be inserted and operated before the primary Safety Key.
- The primary Access Key must be rotated anti-clockwise to its 'key-free' position.

Switch Statuses when used with Safety-On-Guard type Solenoid Modules

- If an Access style Key Adaptor is fitted the operation of the Safety Circuits and Gate Monitor Circuit of the Ex rated Solenoid Module will change on the operation of the primary Access Key.
- If no Access style Key Adaptor is fitted the operation of the Safety Circuits and Gate Monitor Circuit of the Ex rated Solenoid Module will change on the operation of the primary Extracted or Safety Key.

Note: Key operation does not affect Safety Circuit Status when used with Safety-On-Guard-Locking type Solenoid Modules.

Operating Instructions: Alfred Solenoid Controlled Guard Lock

Figure 2: Dimensional Drawing – Alfred Solenoid Controlled Guard Lock

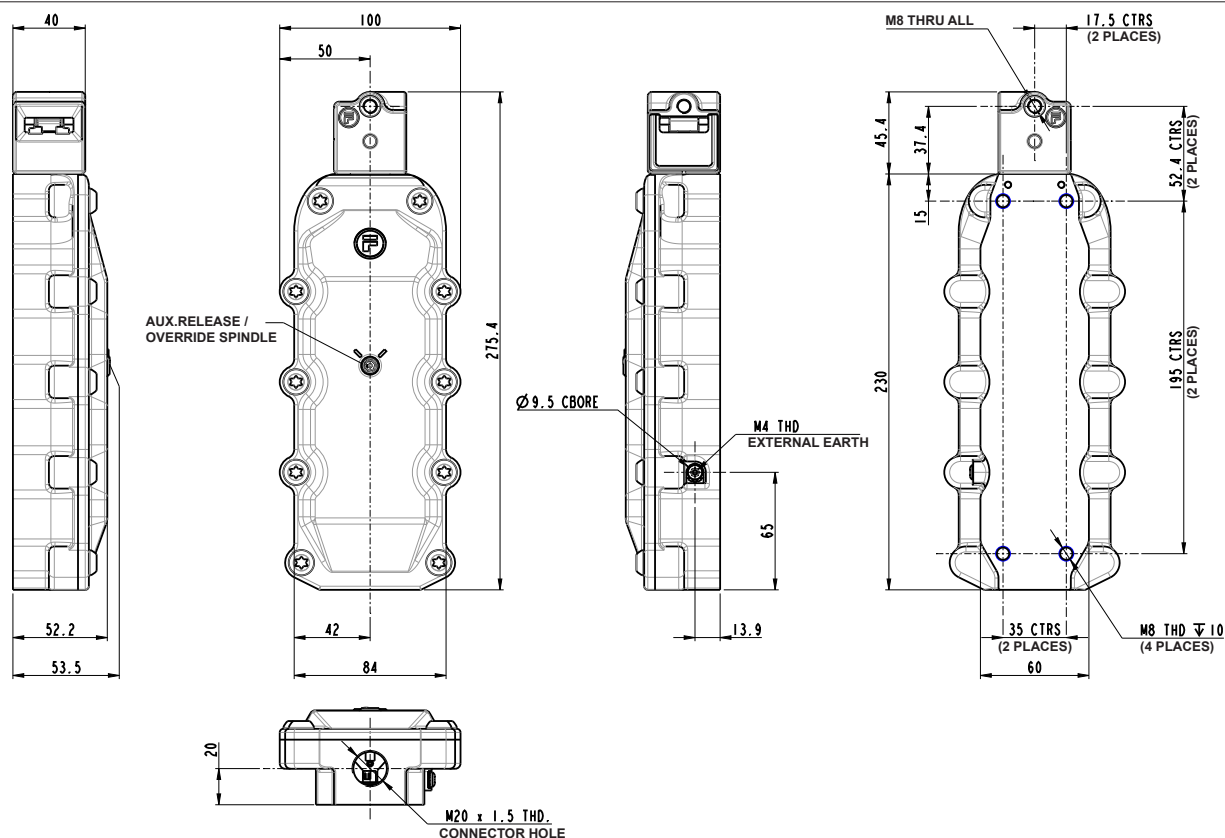


Figure 3: Dimensional Drawing – Alfred Solenoid Controlled Guard Lock with Key Adaptor(s)

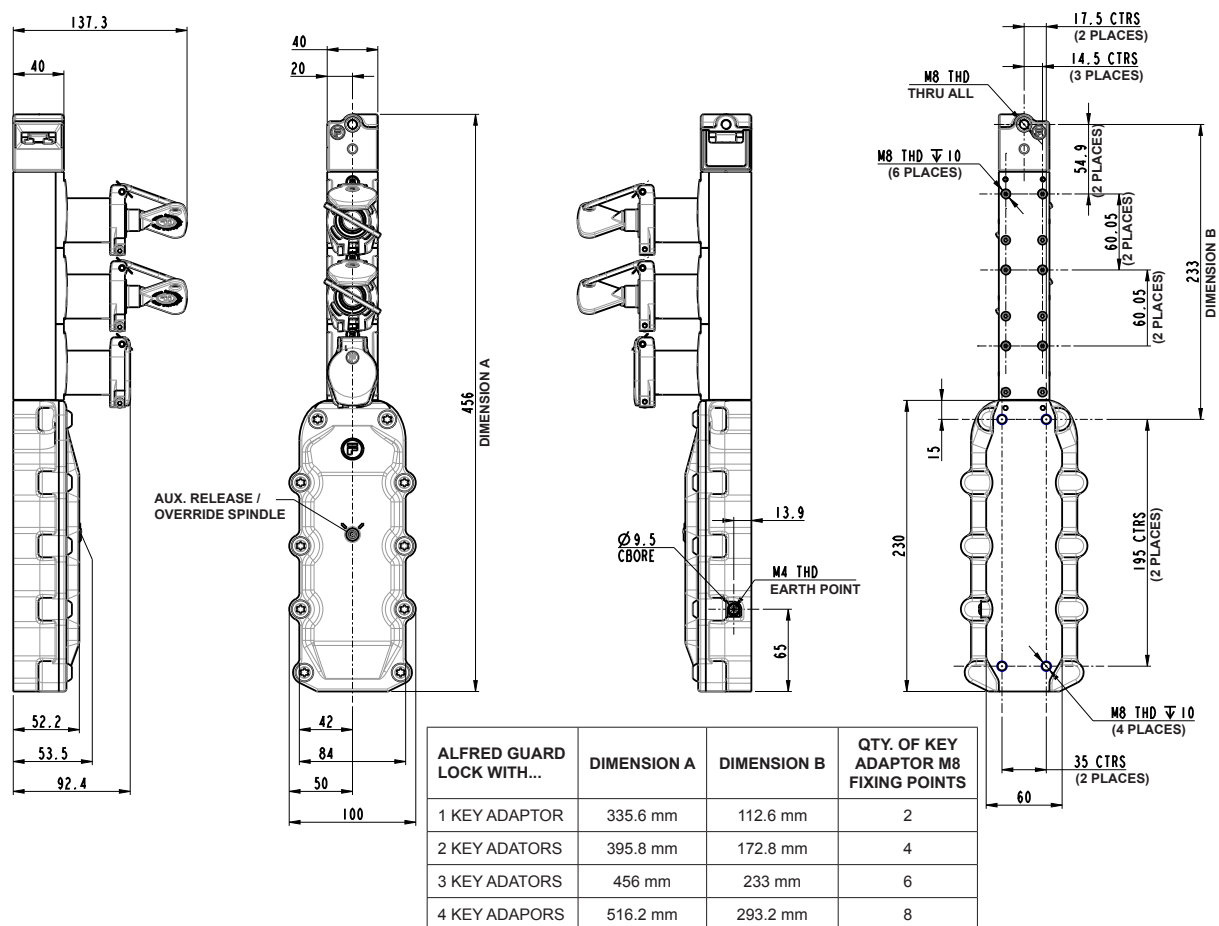


Figure 4: Dimensional Drawing – EXPTA Actuator Assembly

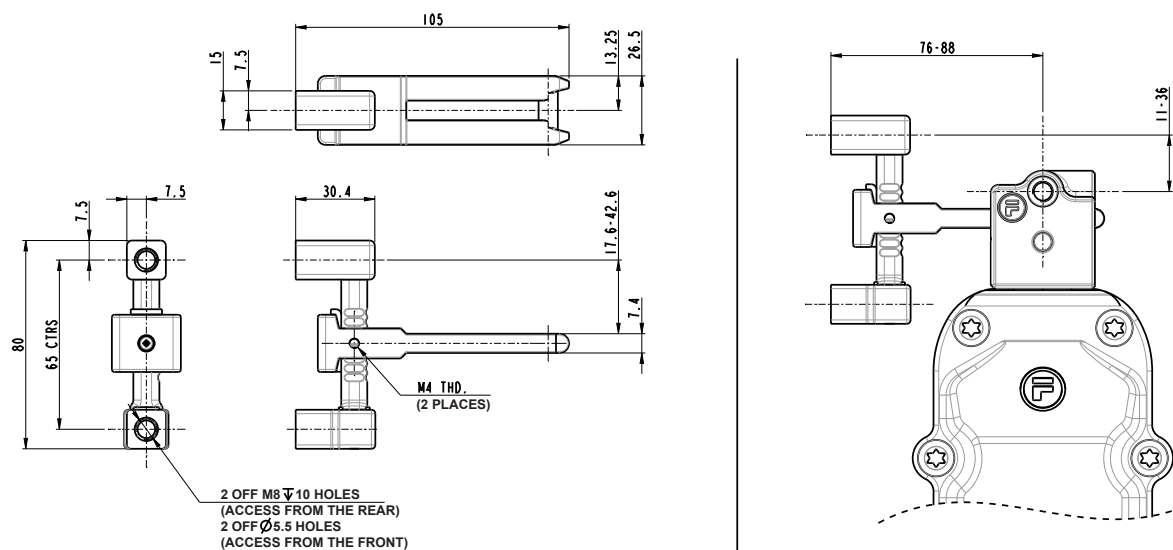


Figure 5: Dimensional Drawing – EXPHL1 Actuator Assembly

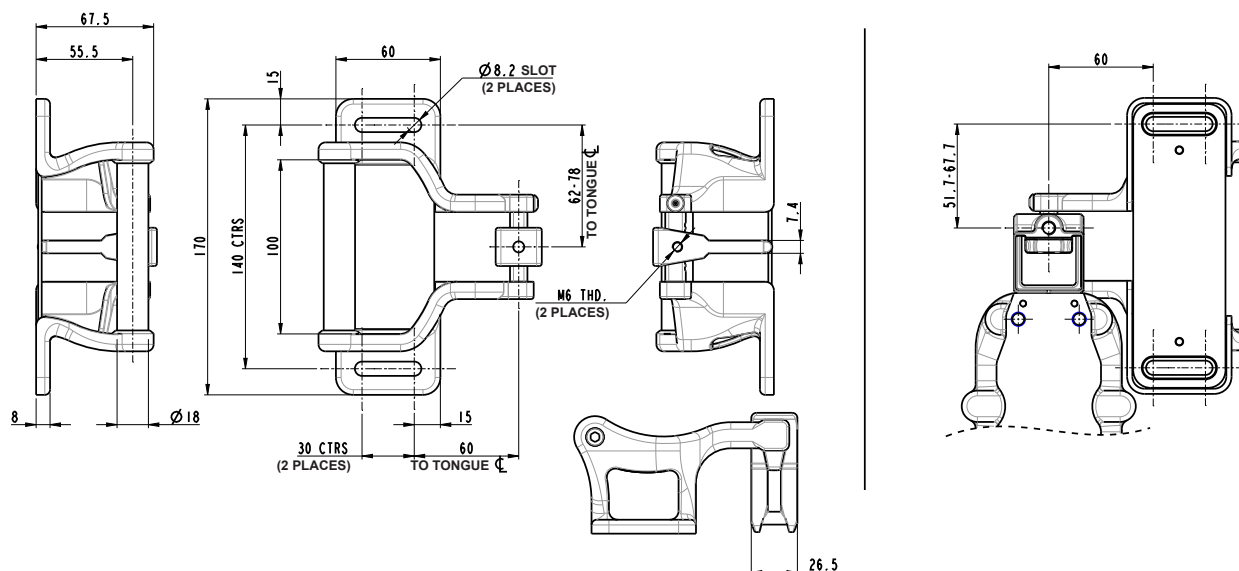
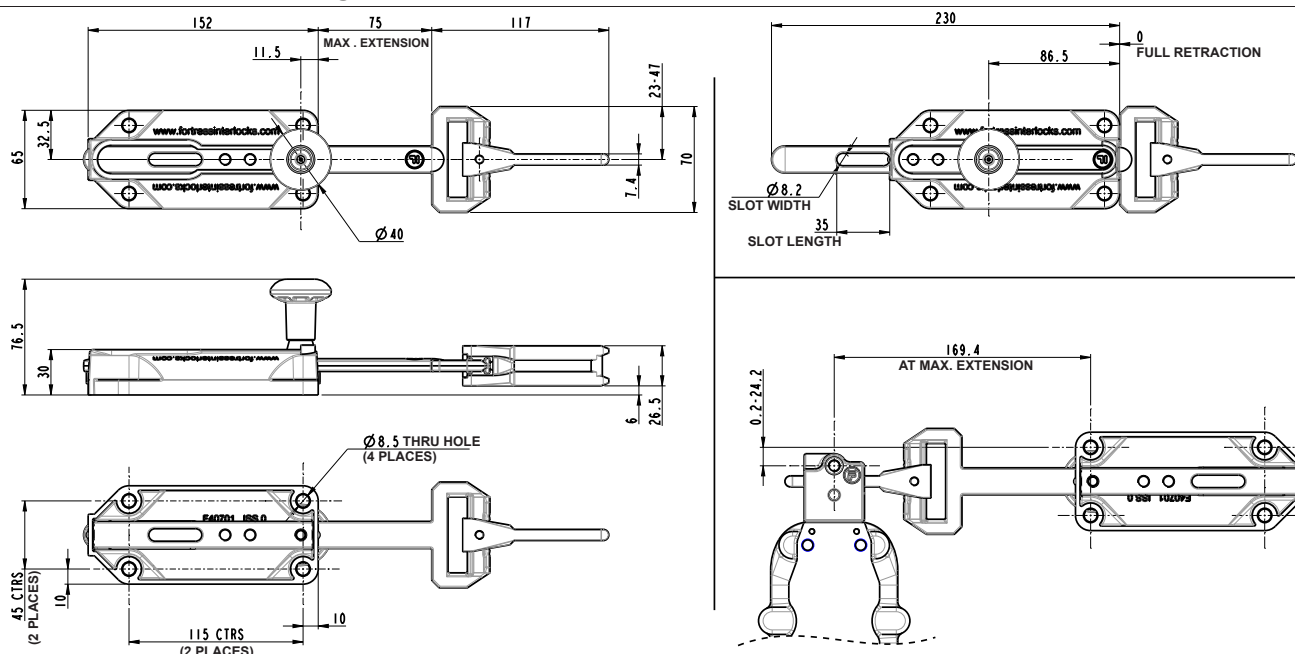


Figure 6: Dimensional Drawing – EXPTN and EXPTS Slidebar Actuator



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Mounting and Installation Instructions
Mechanical Mounting and Installation
Tools and Fixings Required
<ul style="list-style-type: none">• Up to 4 x M8 screws for securing Actuator assembly.• 1 x M8 screw for securing Head Module.• Up to 6 x M8 screws for securing Key Adaptor assemblies.• 4 x M8 screws for securing Ex Rated Solenoid Module.<ul style="list-style-type: none">◦ All screws must be suitable length for a minimum of 10mm thread engagement.◦ All screws must be security type to prevent unauthorised removal or tampering.◦ All screws must be of type A2-70 Stainless Steel.◦ Required torque setting; 25 Nm.• Driver suitable for securing M8 screws.• TX40 Driver Bit (provided).• Adhesive Threadlocker to secure mounting fixings from loosening due to vibration.<ul style="list-style-type: none">◦ Threadlocker must be 'middle strength' or greater.
Mounting
<ol style="list-style-type: none">1. Locate the complete Alfred Solenoid Controlled Guard Lock product so that is in a suitable position for full operation and functionality and is within reach for easy user operation.2. Secure the Actuator assembly to the Door / Gate of the guarded area (See Figures 4, 5 & 6 for location of mounting hole positions).3. Secure the remainder of the complete Alfred Solenoid Controlled Guard Lock, including the Ex rated Solenoid module, using M8 screws fixed into the rear of the product. (See Figures 2 & 3 for location of mounting hole positions).4. Perform Mechanical Function tests before completing installation and commission. See Mechanical Function test section for more details.
General mounting requirements and cautionary notes:
<ul style="list-style-type: none">• Mount the complete Alfred Solenoid Controlled Guard Lock product in the correctly assembled condition.• All mounting surfaces should be flat and stable.• The complete Alfred Solenoid Controlled Guard Lock product must be located so that all scheduled inspection and maintenance procedures are all easily possible.• All fixing screws used to mount the complete Alfred Solenoid Controlled Guard Lock product must be permanently prevented from removal. If mounting fixings are visible, they must be secured against removal by personnel using standard tools, manipulation and un-authorised or un-identifiable removal. If mounting fixings are not visible or hidden, they must be secured against removal or loosening due to vibration. In both cases, a middle strength adhesive threadlocker is required.
Additional mounting requirements if Alfred Solenoid Controlled Guard Lock product is used for Machine Guarding:
<ul style="list-style-type: none">• The Alfred Solenoid Controlled Guard Lock product must not be used as a mechanical stop. Where applicable, precautions must be made to ensure the door or gate of any guarded area has sufficient support and stops to prevent the impact on the product.• The complete machine guarding installation must conform to all relevant design, construction and installation standards and guidelines.• Any gap around the perimeter of the machine and guarding when under operation (Safety Outputs High) must not exceed the limits specified in ISO 13857 & ISO 14120.• The installation and operation of the complete Alfred Solenoid Controlled Guard Lock product must take into account the requirements of EN ISO 14119; in particular Section 7 – Design for minimising defeat possibilities.
Lid Assembly Requirements
<p>During electrical wiring and installation, the lid of the Ex Rated Solenoid Module needs to be removed for access. Care must be taken during Lid dis-assembly and re-assembly in order to maintain Ingress Protection (IP) level and maintain enclosure protection levels of ATEX and IECEx ratings.</p>
<p>To remove the Lid assembly from the Ex Rated Solenoid Module;</p> <ol style="list-style-type: none">1. Remove the 10 x M8 Torx screws securing the Lid assembly to the Solenoid Switch enclosure using the supplied TX40 driver bit.2. Lift off the Lid Assembly.3. Set Lid Assembly aside safely to protect internal gasket assembly.

Operating Instructions: Alfred Solenoid Controlled Guard Lock

To refit the Lid assembly;

1. Place Lid Assembly onto the Solenoid Switch enclosure.

Note: No additional sealing elements or compounds (for example Silicon sealant) are required to refit and reseal the Lid Assembly. Any additional materials or work may reduce IP level and will void Fortress warranty.

2. Refit and tighten the 10 x M8 Torx screws in an even distribution. For example;

i. Half tighten screws in the order specified in Figure 7.

ii. Fully tighten screws in the order specified in Figure 7.

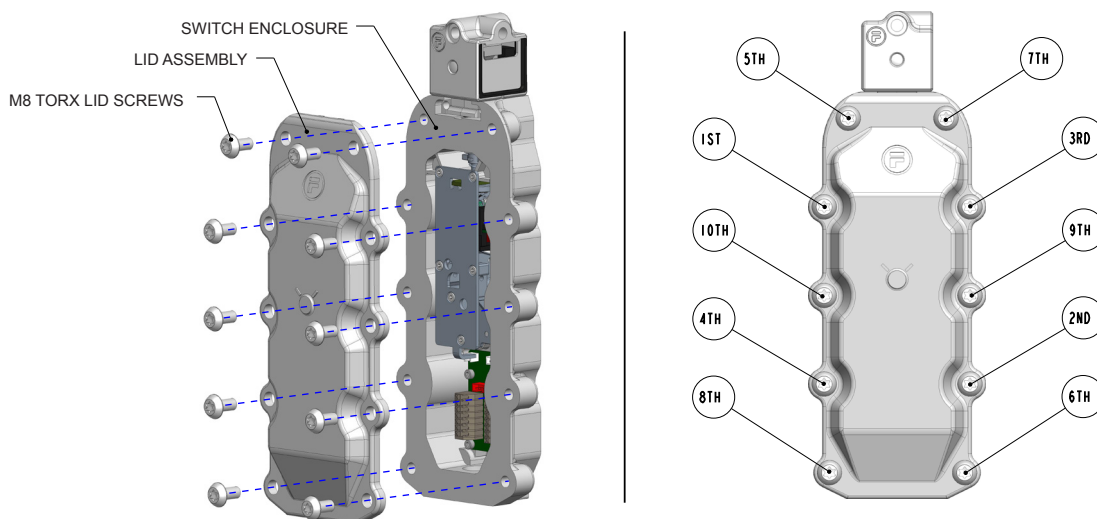
iii. Check and, if necessary, re-tighten screws in the order specified in Fix.2.

Note: All M8 Torx lid screws must be fully refitted and tightened to a minimum torque setting of 20Nm to maintain IP level. Note: It is recommended that all M8 Torx Lid screws be secured against tampering removal or loosening due to vibration using a middle strength adhesive threadlocker.

3. Fully test and operate the complete Alfred Solenoid Controlled Guard Lock to ensure correct function and operation. See Mechanical Function Test section for more details.

If required, any replacement Lid assembly screws must be identical to those as supplied by Fortress and must be M8 x 14mm, property class of A2-70 with a minimum yield strength of 700 MPa to ISO 3506, ISO 262, ISO 965-1, and ISO 965-3.

Figure 7: Lid Assembly



Electrical Connection and Installation

Tools and Fixings Required

Terminal Screwdriver.

Cable and Wiring selection requirements:

- All cabling and wiring used to connect and install the Alfred Solenoid Controlled Guard Lock must be of an equal or greater level of ATEX and IECEx protection in order to maintain ATEX Device ratings (See ATEX, IECEx and HazLoc section for Device rating and detail).

- Correctly rated and sized cable glands and connectors must be used in order to maintain the IP67 and IP69 protection rating of the Ex Rated Solenoid module.

Note: The conduit connection hole of the Solenoid Module is an M20 x 1.5mm pitch threaded hole.

- The cable and cable gland used must have a minimum service temperature in excess of 70°C.

- The wire used to connect to the Internal Earthing point of the Solenoid Module (see Figure 11) must have a greater than or equal cross-sectional area to that of the phase conductor wires.

Note: The internal Earthing point shall be used for the Equipment Grounding connection.

- The wire or cabling used to connect to the External Earthing point of the Solenoid Module (see Figure 11) must have a cross-sectional area of at least 4mm².

Note: The external Earthing point shall be used for a Supplementary Bonding Connection where local codes or authorities permit or require such connection.

- Both the Internal and External Earthing wires must be secured and clamped so that they cannot be readily loosened or twisted. This could be done using a U-Shaped Saddle Clamp or similar.

- All internal wiring for the Safety Circuits and Gate Monitor Circuits must be made using 24-16 AWG copper cable.

Operating Instructions: Alfred Solenoid Controlled Guard Lock

Electrical Connection

1. Check that the Alfred Solenoid Controlled Guard Lock product to be installed is of the same electrical type and voltage rating as the machine control circuits. This information can be found on a label, fixed to the back of the device. Note that the Ex Rated Solenoid Module is designed to operate at +/-10% of the nominal supply voltage. The use of an incorrect voltage can seriously damage the device.
2. Remove the Lid Assembly from the Ex Rated Solenoid Module of the Alfred Solenoid Controlled Guard Lock product following the guidelines and instructions detailed in the Lid Assembly Requirements section above.
3. Make sure the electrical supply is fully isolated before any connection is made.
4. Attach suitable Cable and Cable Gland – See requirements above for further detail.
5. Bond the Device enclosure to Earth via the Internal Earthing point provided (see Figure 11) and also, if required, the additional External Earthing point (see Figure 11). See Earthing requirements above for further detail.
6. Connect all required internal wiring to the Safety Circuits and Gate Monitor Circuits. See Wiring Diagrams below and function descriptions below for further detail.

The electrical system must incorporate fuse protection for all circuits, using a Quick-Acting (F) fuse (maximum rating 3A, 250V to IEC 127). All fuses must be inserted on the positive line.

Terminals 2 & 14. (Safety Circuit I)

These Contacts should be connected in series with the external device which isolates all electrical parts of the machine that are being protected by the Alfred Solenoid Controlled Guard Lock product.

Each safety circuit should be connected to an appropriate evaluation device e.g. a 'safety relay'. The diagnostic coverage of the evaluations device will affect the safety performance of the system. Connecting safety circuits of multiple products in series may reduce the performance level of the system according to DIN EN 13849-1 owing to reduced fault recognition.

Terminals 3 & 4. (Solenoid operating supply).

By applying the solenoid control supply to these terminals, the machine control can operate the locking mechanism in the Solenoid Module.

Terminals 5 & 7. (Safety Circuit II)

This is a second, isolated Safety Circuit for redundancy (see the description above).

Terminal 6.

Input voltage to terminal 12 for Gate Monitor Circuit and terminal 13 Solenoid Monitor Circuit.

Terminal 12. (Guard Open Output Signal).

Control signal produced by the Ex Rated Solenoid Module to indicate that the Machine Guarding is in an open state or that the primary Key has been removed depending on the complete Alfred Product type and application. This signal can be used for indication and / or machine control.

Terminal 13. (Guard Unlocked Output Signal).

Control signal produced by the Ex Rated Solenoid Module to indicate that the Module is unlocked and ready to open. This signal can be used for indication and / or machine control.

Terminals 6 & 12. (Guard Open Output Signal / Gate Monitor).

Control signal produced by the Alfred Safety Switch to indicate that the Machine Guarding is in an open state or that the primary Key has been operated depending on the complete Alfred Product type and application. This signal can be used for indication and / or machine control.

7. Once all wiring is complete, refit the Lid Assembly to the Ex Rated Solenoid Module Enclosure following the guidelines and instructions detailed in the Lid Assembly Requirements section above.
8. Fully test and operate the complete Alfred Solenoid Controlled Guard Lock product for correct electrical and mechanical operation.

Wiring Diagrams

Figure 8: Safety-On-Guard-Locking type Solenoid Module

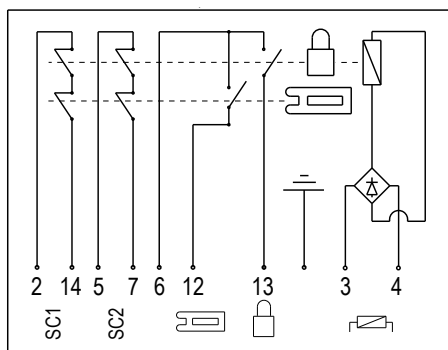


Figure 9: Safety-On-Guard type Solenoid Module

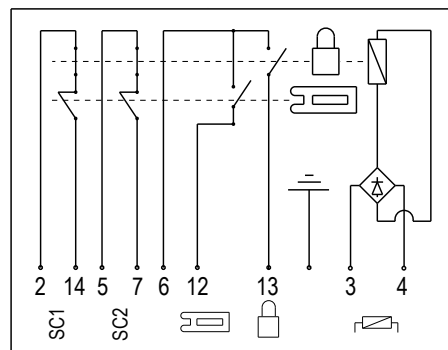


Figure 10: Terminal Positions

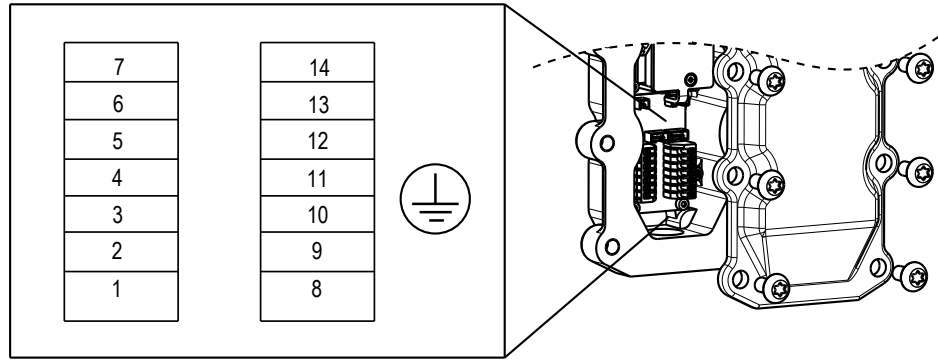
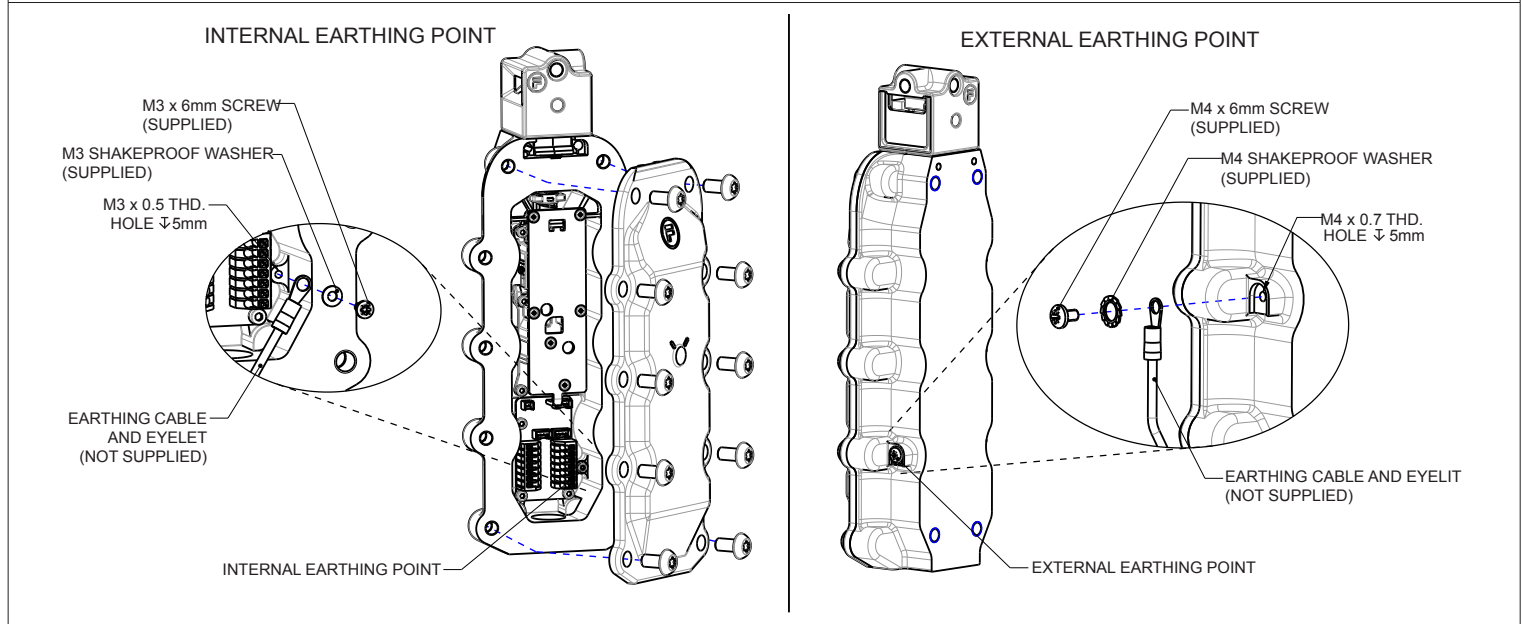


Figure 11: Internal and External Earthing Points



Device Testing and Commissioning Instructions

Mechanical Function Tests (Unpowered)

Alfred Solenoid Controlled Guard Lock Product with Power-to-Lock Ex Rated Solenoid Module (EXP - - - XL471 and EXP - - - XL461)

Test 1

Insert Actuator into Head Module and/or operate all Key Adaptors to their locked state.

- **The Actuator and / or Key Adaptors must mechanically lock into place.**

Note: Sequence and operation of Key Adaptors varies depending on product selection and configuration.

Test 2

Use the Override Key to perform an Auxiliary Release operation (see Functionality section for details)

- **The Actuator and / or Key Adaptors must be able to be removed.**
- **Return Override Spindle back to Locked position (anti-clockwise).**
- **Attach Override Seal label (provided) onto the Override Spindle to cover keyhole.**

Warning: This device does not contain the reset facility after emergency and auxiliary release of guard locking. Additional measures are required to achieve the reset of the machine system.

Operating Instructions: Alfred Solenoid Controlled Guard Lock

Alfred Solenoid Controlled Guard Lock Product with Power-to-Lock Ex Rated Solenoid Module (EXP - - - XL471 and EXP - - - XL461)
Test 1 Insert and remove Actuator into Head Module and/or operate all Key Adaptors. <ul style="list-style-type: none">• The Actuator and/or Key Adaptors must not be mechanically trapped. Note: Sequence and operation of Key Adaptors varies depending on product selection and configuration.
Electrical Function Tests
Operate the Alfred Solenoid Controlled Guard Lock product by closing and opening the Guarded Area and / or operating all Key Adaptors. Validate the safety circuits change state as expected, see Electrical Function descriptions and Wiring Diagrams above for detail. If the complete Alfred Product is used in a Machine Guarding application, ensure the Machine Guarding can only be opened under the conditions outlined within the risk assessment. See ISO 13849-2 Safety of machinery — Safety-related parts of control systems — Part 2: Validation for further guidance.
Service and Inspection
Regular inspection of the following is necessary to ensure trouble-free, lasting operation of the Alfred Solenoid Controlled Guard Lock product: <ul style="list-style-type: none">• Correct operating function.• Secure mounting of all components.• Debris and wear.• Sealing of cable entry.• Loose cable terminals or plug connectors. WD40 lubricant or equivalent, should be applied to each mechanical element of the Alfred Solenoid Controlled Guard Lock product every 10,000 operations, or sooner, to ensure smooth product operation and function. There are no user serviceable parts in the Alfred Solenoid Controlled Guard Lock product. If damage or wear is found with an assembly, please contact your local Fortress Channel Partner. The complete interlock must be replaced after 1 million switching operations.
Disposal
The Alfred Solenoid Controlled Guard Lock product does not contain any certified hazardous materials so should be disposed of as industrial waste. Electrical items should not be disposed of in general waste and must be appropriately recycled.
Liability Coverage is Voided Under the Following Conditions:
<ul style="list-style-type: none">• If these instructions are not followed.• Non-compliance with safety regulations.• Installation not performed by authorised personnel.• Non-implementation of functional checks.
Protection Against Environmental Influences
A lasting and correct safety function requires that the Alfred Solenoid Controlled Guard Lock be protected against the ingress of foreign bodies such as swarf, sand, blasting shot, etc. The Solenoid Controlled Guard Lock is to be mounted away from the machine, or by the use of anti-vibration mountings, in order to avoid the effects of vibration, shock and bump. Use in Dusty Environments: Careful product selection is required, which is best performed under the guidance of a Fortress Representative, in order to assess the dust type and product style required. It is normally accepted that the product performs best in a dusty environment when mounted upside down. Use in Corrosive Environments: Careful product selection is required, which is best performed under the guidance of a Fortress Representative.
The manufacturer reserves the right to modify the design at any time and without notice.
This guide should be retained for future reference.

EU Declaration of Conformity

Electro-mechanical product

Equipment Reference	EXP(z)XL(y)(x), EXP(z)XT(y)(z)
Equipment Rating	IP67

This Declaration of Conformity is issued under the sole responsibility of the manufacturer

This declaration relates to the Alfred Solenoid and related variations as described in the certificate, coded:	Group II Category 2G Ex db h IIC T6 Gb Ex tb h IIIC T85°C
The objective of the declaration described above is in conformity with the relevant Union harmonisation legislation:	2014/34/EU
The following harmonised standards and other technical specifications were used in support of this declaration:	
Harmonised Standards:	EN 60079-1:2007 EN 60079-31:2009
Other Specifications:	EN 60079-0:2009 – This standard has been compared with EN 60079-0:2012 + A11:2013 (Currently harmonised) and no significant changes have occurred which are applicable to this equipment
Notified body SGS Baseefa (number 1180) performed the EU-Type examination in accordance with Annex III of the directive and issued the certificate: SGS20ATEX0171X	
Notified body SGS Baseefa (number 1180) performed the Conformity to type based on quality assurance of the production process in accordance with Annex IV of the directive and issued the QA Notification document: 8029	

S. Burns

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Signed for and on behalf of Fortress Interlocks Ltd



Digitally signed by Stuart Burns
 Date: 2021.06.25 12:46:24
 +01'00'

UKEX Declaration of Conformity

Electro-mechanical product

Equipment Reference	EXP(z)XL(y)(x), EXP(z)XT(y)(z)
Equipment Rating	IP67

This Declaration of Conformity is issued under the sole responsibility of the manufacturer

This declaration relates to the Alfred Solenoid and related variations as described in the certificate, coded:	Group II Category 2G Ex db h IIC T6 Gb Ex tb h IIIC T85°C
The objective of the declaration described above is in conformity with the relevant Union harmonisation legislation:	2014/34/EU
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Harmonised Standards:	EN 60079-1:2007 EN 60079-31:2009
Other Specifications:	EN 60079-0:2009 – This standard has been compared with EN 60079-0:2012 + A11:2013 (Currently harmonised) and no significant changes have occurred which are applicable to this equipment
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