

Operating Instructions: Alfred Safety Switches

Description

The Alfred Safety Switch is a robust, heavy duty Switch Interlock Device which can be used to provide safe access and control for a variety of machinery.

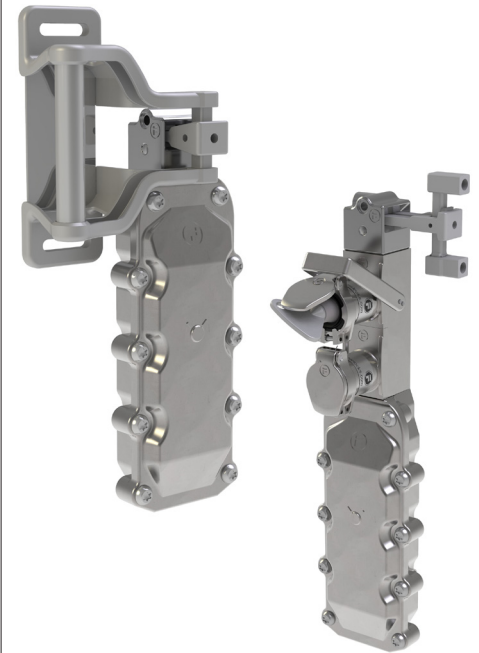
A full Alfred Safety Switch product can be configured from a selection of Actuator Modules, Head Modules and can include up to three Key Adaptors all mounted above an Ex rated Safety Switch Module.

The Ex rated Safety Switch Module at the base of an Alfred Safety Switch 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 Alfred Safety Switch is ideal for quick access to machines with no or short run-down times.

The Alfred Safety Switch's tough Stainless-Steel enclosures and IP67 and IP69 sealing protection make it perfect for any heavy duty or regular washdown application.

As consistent with the rest of the Alfred product range, the Alfred Safety Switch 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 Safety Switch 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.

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 Safety Switch 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!

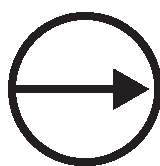
WARNING – Do not open device when energised!

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

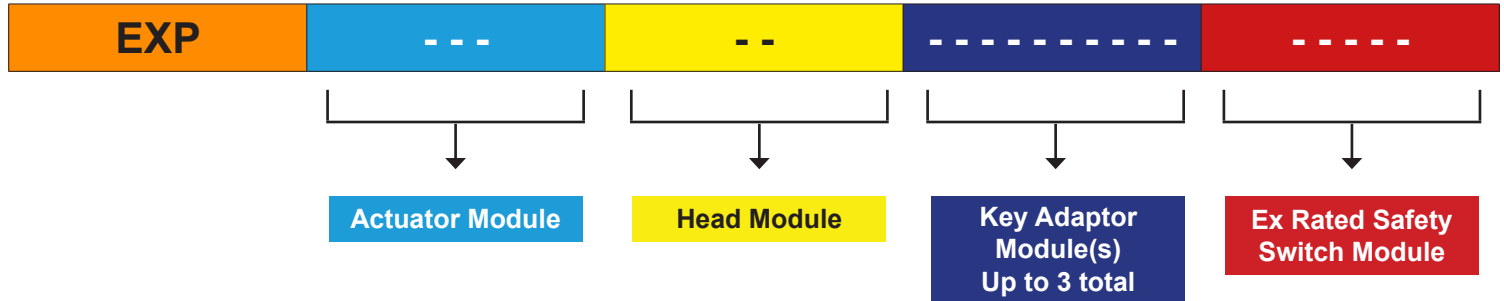
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Options & Ordering Information

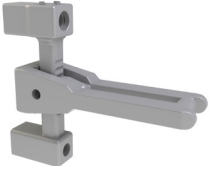
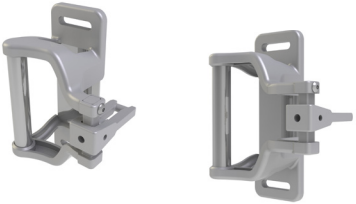


The Alfred Safety Switch product can be configured from a selection of Actuator Modules, Head Modules and can include up to three Key Adaptors all mounted above an Ex rated Safety Switch Module.

Each unique Alfred Safety Switch 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 Safety Switch 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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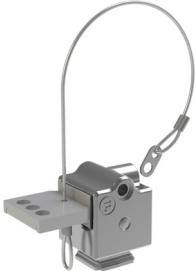
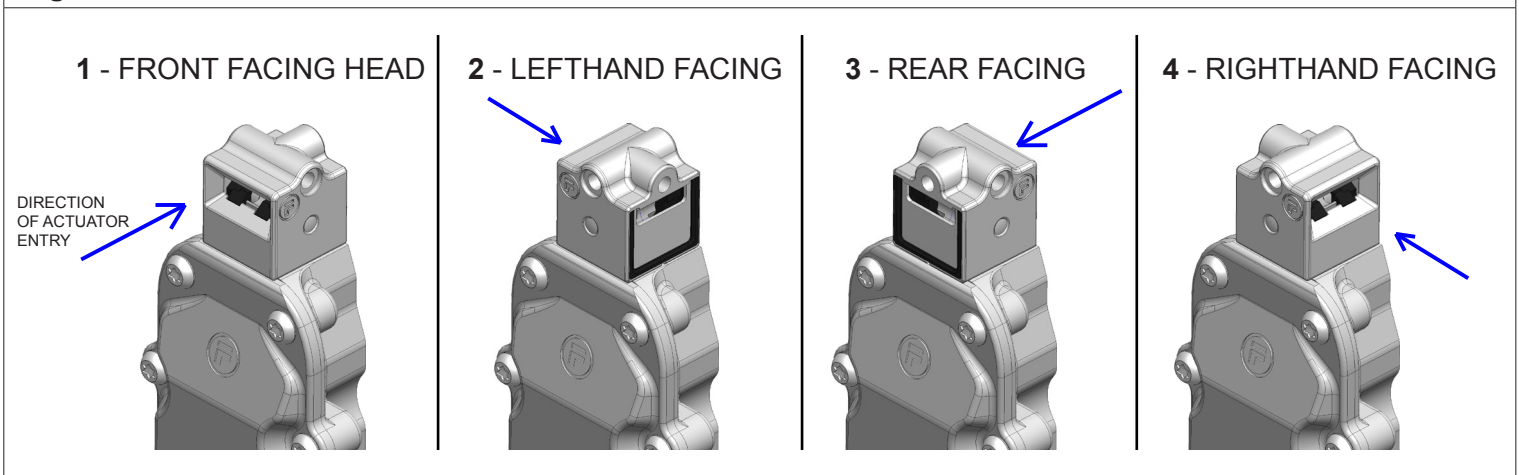
Head Modules		
Description	Part No.	Handing
Stainless Steel Slimline Head	EXPS6	Front / Left / Rear / Right
<ul style="list-style-type: none"> • Full Stainless-Steel construction. 		
		
Description	Part No.	
Stainless Steel Slimline Head with Additional Padlockable Lock-Out plug	EXPS8	
<ul style="list-style-type: 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	
<ul style="list-style-type: none"> Standard lock type, standard dustcover. 		
Description	Part No.	
Access Key Adaptor	AKL7 ^Z	
<ul style="list-style-type: none"> Master lock type, standard dustcover. 		
Description	Part No.	
Access Key Adaptor	AKL3 ^Z	
<ul style="list-style-type: none"> Standard lock type, padlockable dustcover. 		
Description	Part No.	
Access Key Adaptor	AKL8 ^Z	
<ul style="list-style-type: none"> Master lock type, padlockable dustcover. 		
Description	Part No.	
Safety Key Adaptor	SKL2 ^Z	
<ul style="list-style-type: none"> Standard lock type, standard dustcover. 		
Description	Part No.	
Safety Key Adaptor	SKL7 ^Z	
<ul style="list-style-type: none"> Master lock type, standard dustcover. 		

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Description	Part No.
Safety Key Adaptor	SKL3 ²
<ul style="list-style-type: none"> • Standard lock type, padlockable dustcover. 	

Description	Part No.
Safety Key Adaptor	SKL8 ²
<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. 	



* 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.

Note: Keys sold separately.

Ex Rated Safety Switch Module

Description	Part No.
Ex rated Safety Switch module	EXPXT401
<ul style="list-style-type: none"> • Full Stainless-Steel Flameproof Enclosure. • 24V switching – 2NC, 1NO. • Contains 2 x Normally Closed switches for two independent Safety Circuits and 1 x Normally Open switch for Guard Open Output Signal / Gate Monitor status. • Sealed to IP67 and IP69. 	



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Technical Specification	Actuator and Head Modules	Key Adaptor Modules	Ex rated Safety Switch Module
Construction Materials	316 Stainless Steel and Stainless Steel to BS3146-2:1975 (ANC4B)		
Mechanical Life	1,000,000 operations		
Holding Force, F_{ZH}	7kN		N/A
Maximum Holding Force, F_{1MAX}	14kN		N/A
Operating Force (with 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: $I_e=0.5A$, $U_e=24V$ DC AC15: $I_e=1A$, $U_e=24V$ 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		N/A	2NC 1NO
Safety Circuit Switching Principle		N/A	Positive break, dual channel
Transient Overvoltages Installation		N/A	Category III
Cable Size		N/A	28 – 12 AWG
Diagnostic Coverage (DC)	99%		
λ_d	10%		
Performance Level	Up to PLe		
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		
* Only applicable in Alfred Safety Switch products with a Key Adaptor module included.			
** 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 ... XT401

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Functionality
<p>The Alfred Safety Switch product can be configured from a selection of Actuators, Head modules and Key Adaptor modules all mounted above an Ex rated Safety Switch module.</p> <p>Dual Safety Circuits within the Ex rated Safety Switch module are directly linked to the Actuator and Head and/or Key Adaptor mechanism so that they are positively broken by the removal of the Actuator or the operation of a Key. This action can be paired to a machine control and guarding system so that the opening of a guarded area or operation of an interlocked key can send the required machine-stop command.</p>
Full Alfred Safety Switch product
Closing: <ul style="list-style-type: none">• 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 Safety Switch 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 Actuator inserted and Keys operated, the Safety Circuits of the Ex rated Safety Switch module will be made / closed and the Gate Monitor Circuit will be open / broken.
Opening: <ul style="list-style-type: none">• Reverse the steps above.• With Actuator removed, the Safety Circuits of the Ex rated Safety Switch module will be open / broken and the Gate Monitor Circuit will be made / closed.
Switch Statuses: <ul style="list-style-type: none">• If Safety Switch product does not contain Key Adaptors, the Safety Circuits and Gate Monitor Circuit will change on the insertion and extraction of the Actuator into / from the Head Module.• If Safety Switch product does contain a Key Adaptor(s), the Safety Circuits and Gate Monitor Circuit will change on the operation of the primary Key Adaptor (see below for more detail).
Hinged Handle and Tongue Actuators
Closing and Opening: <ul style="list-style-type: none">• 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: <ul style="list-style-type: none">• 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: <ul style="list-style-type: none">• Grasp the Knob casting and slide the Slidebar away from the Head Module.
Key Adaptors
<p>Up to 3 Key Adaptors total can be configured into a full Alfred Safety Switch product.</p> <p>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 Safety Switch module.</p>
Access Key Adaptors
<p>In the Closed or Machine-run state of an Alfred Safety Switch, an Access style Key Adaptor will be removed or 'key-free'.</p> <p>Up to 3 Access style Key Adaptors can be configured into a full Safety Switch product.</p> <p>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.</p>
Safety Key Adaptors
<p>In the Closed or Machine-run state of an Alfred Safety Switch, a Safety style Key Adaptor will be inserted and rotated.</p> <p>Up to 3 Safety style Key Adaptors can be configured into a full Safety Switch product.</p> <p>If more than one Safety style Key Adaptor is used, the primary Safety Key will be the one located closest to the Head Module.</p>

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Extracted Key Adaptors

In the Closed or Machine-run state of an Alfred Safety Switch, an Extracted style Key Adaptor will be inserted and rotated. A maximum of 1 Extracted style Key Adaptor can be configured into a full Safety Switch 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:

- 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:

- 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:

- If an Access style Key Adaptor is fitted the operation of the Safety Circuits and Gate Monitor Circuit of the Extracted Safety Switch 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 Extracted Safety Switch will change on the operation of the primary Extracted or Safety Key.

Figure 2: Dimensional Drawing – Alfred Safety Switch

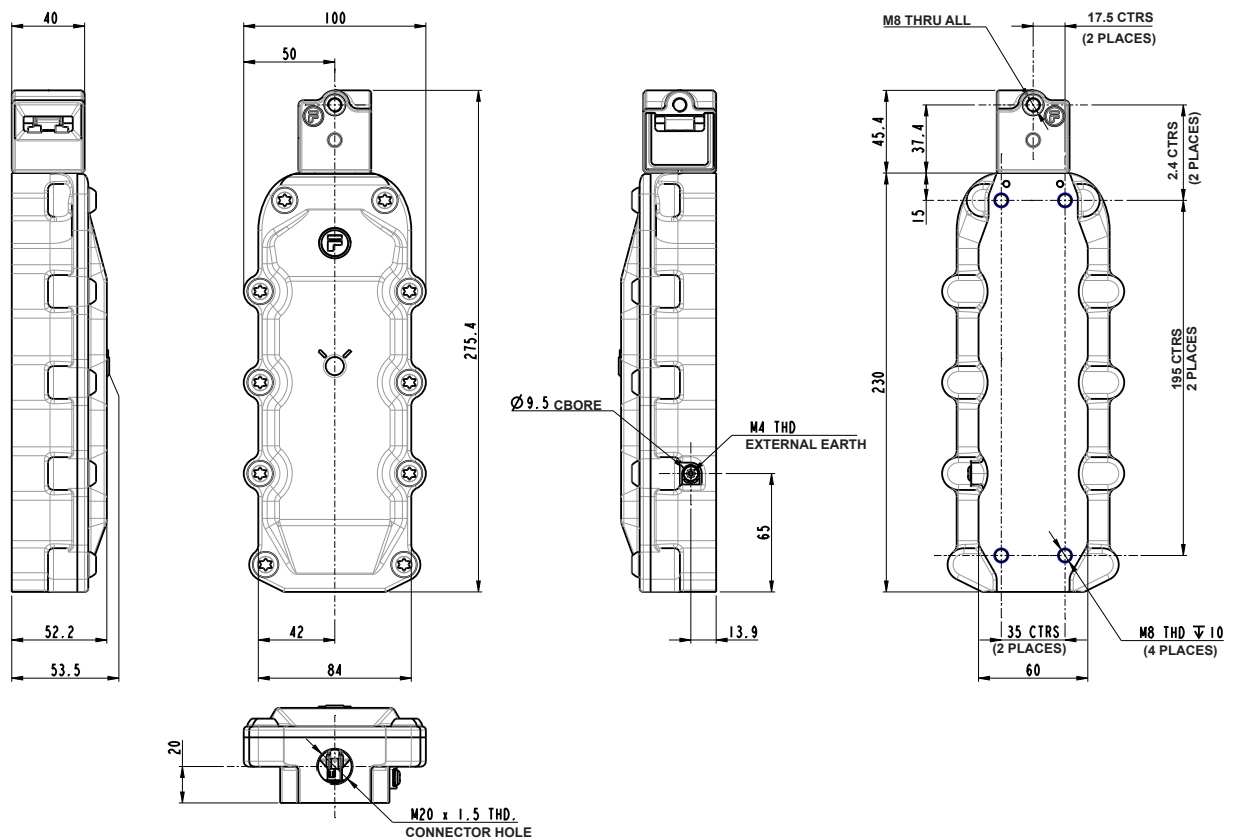
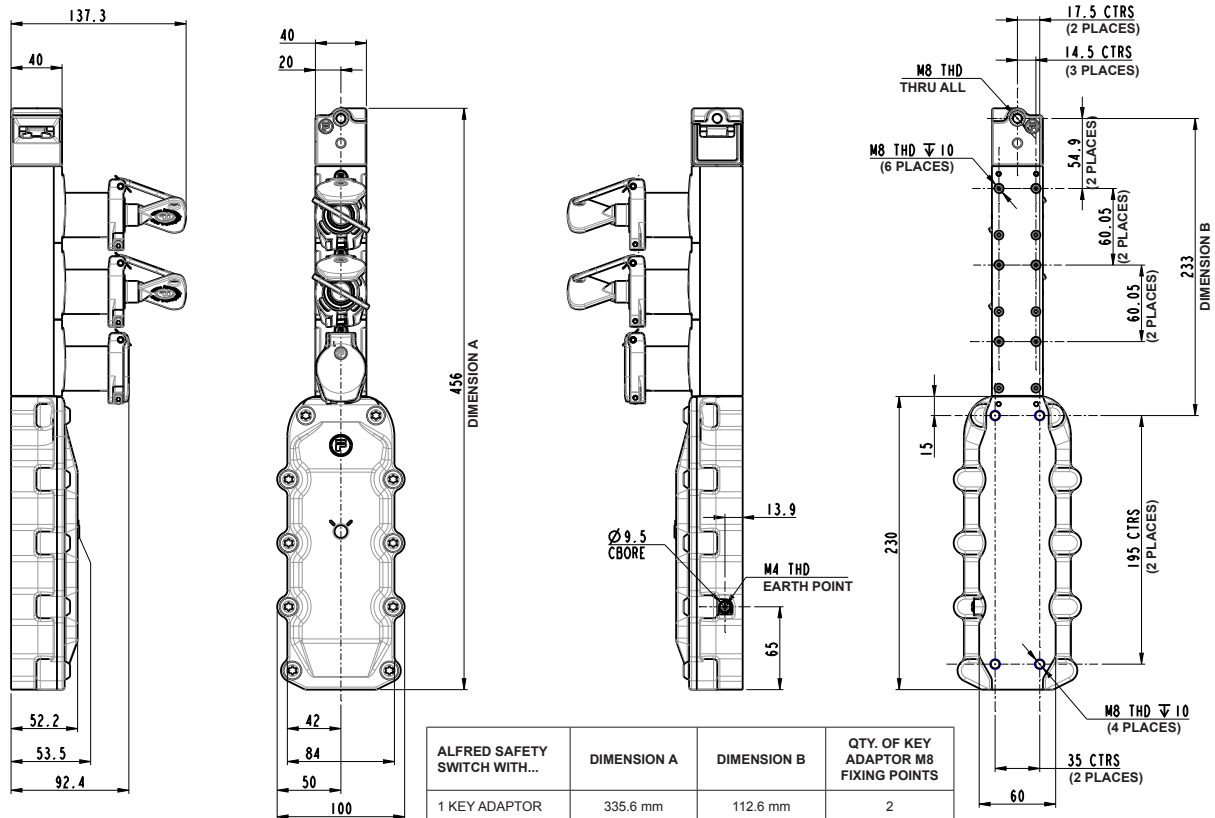


Figure 3: Dimensional Drawing – Alfred Safety Switch with Key Adaptor(s)



ALFRED SAFETY SWITCH WITH...	DIMENSION A	DIMENSION B	QTY. OF KEY ADAPTOR M8 FIXING POINTS
1 KEY ADAPTOR	335.6 mm	112.6 mm	2
2 KEY ADAPTORS	395.8 mm	172.8 mm	4
3 KEY ADAPTORS	456 mm	233 mm	6
3 KEY ADAPTORS AND GF MODULE	516.2 mm	293.2 mm	8

Figure 4: Dimensional Drawing – EXPTA Actuator Assembly

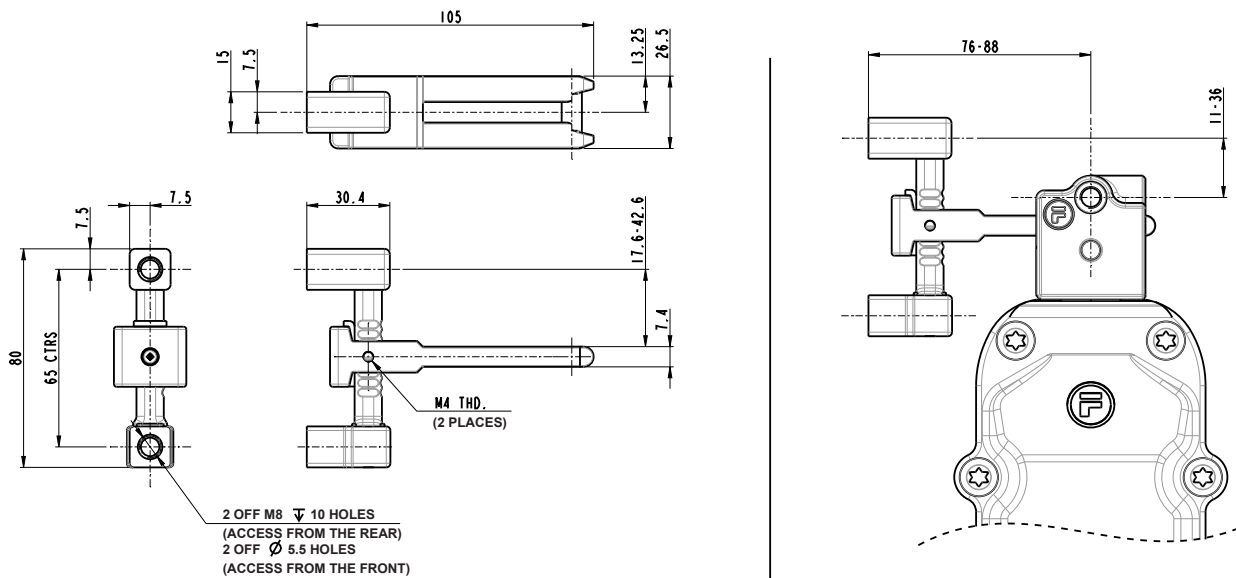


Figure 5: Dimensional Drawing – EXPHL1 Actuator Assembly

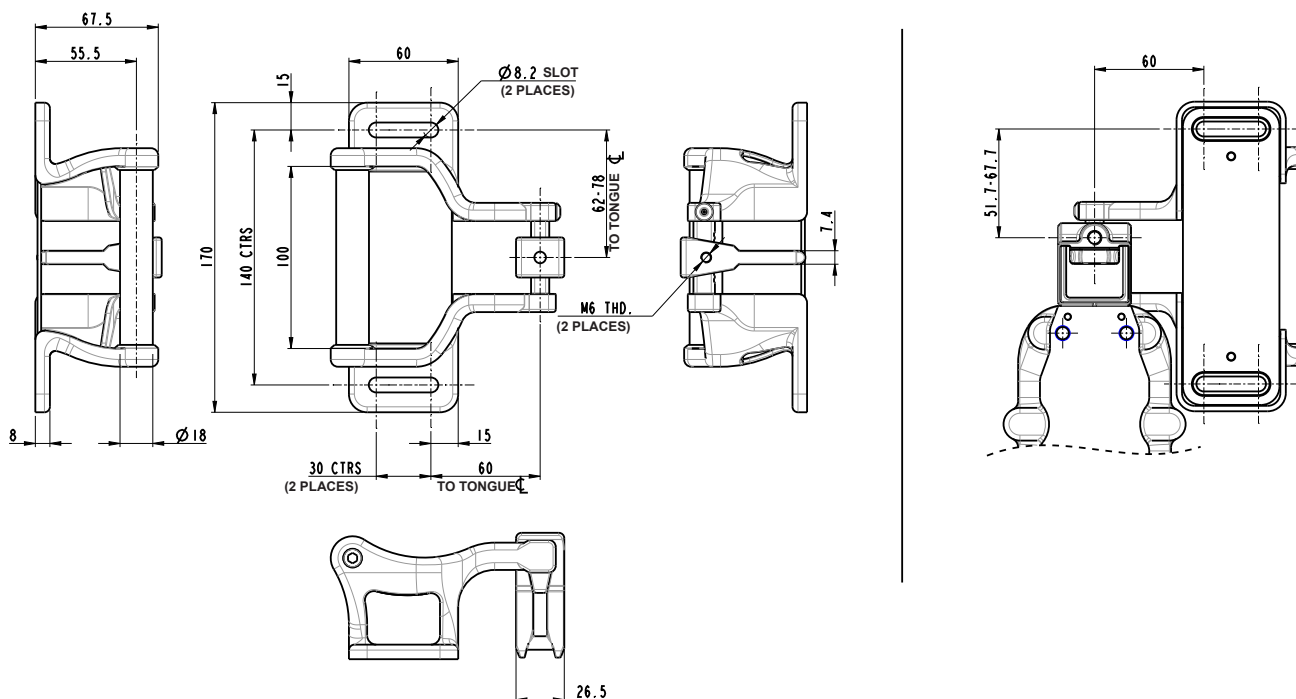
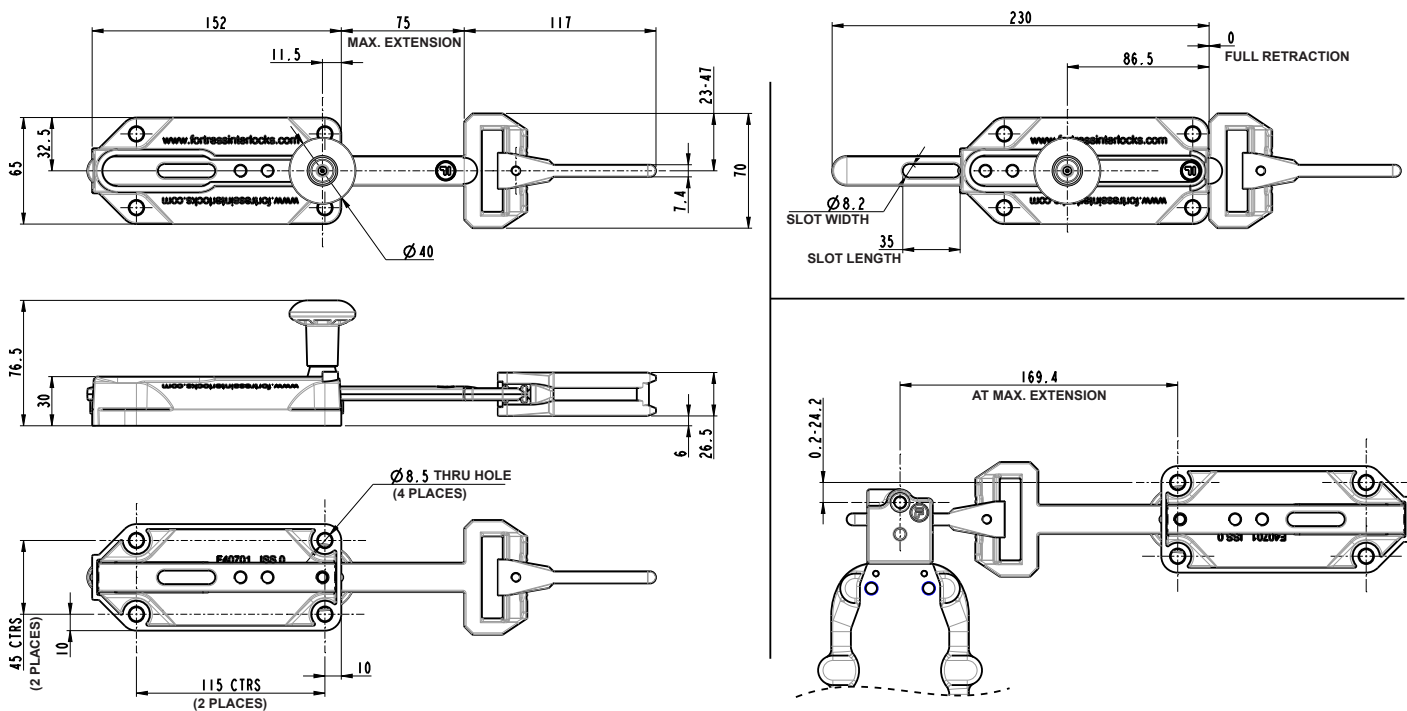


Figure 6: Dimensional Drawing – EXPTN and EXPTS Sidebar Actuator Assemblies



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Tools and Fixings Required

- **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.
 - **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.**
 - **Threadlocker must be 'middle strength' or greater.**

Mounting

1. Locate the complete Alfred Safety Switch 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 Safety Switch, including the Ex rated Safety Switch 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:

- **Mount the complete Alfred Safety Switch product in the correctly assembled condition.**
- All mounting surfaces should be flat and stable.
- The complete Alfred Safety Switch 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 Safety Switch 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 Safety Switch product is used for Machine Guarding:

- The Alfred Safety Switch 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 Safety Switch product must take into account the requirements of EN ISO 14119; in particular Section 7 – Design for minimising defeat possibilities.

Lid Assembly Requirements

During electrical wiring and installation, the lid of the Ex rated Safety Switch 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.

To remove the Lid assembly from the Ex rated Safety Switch module;

1. Remove the 10 x M8 Torx screws securing the Lid assembly to the 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.

To refit the Lid assembly;

1. Place Lid Assembly onto the 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.

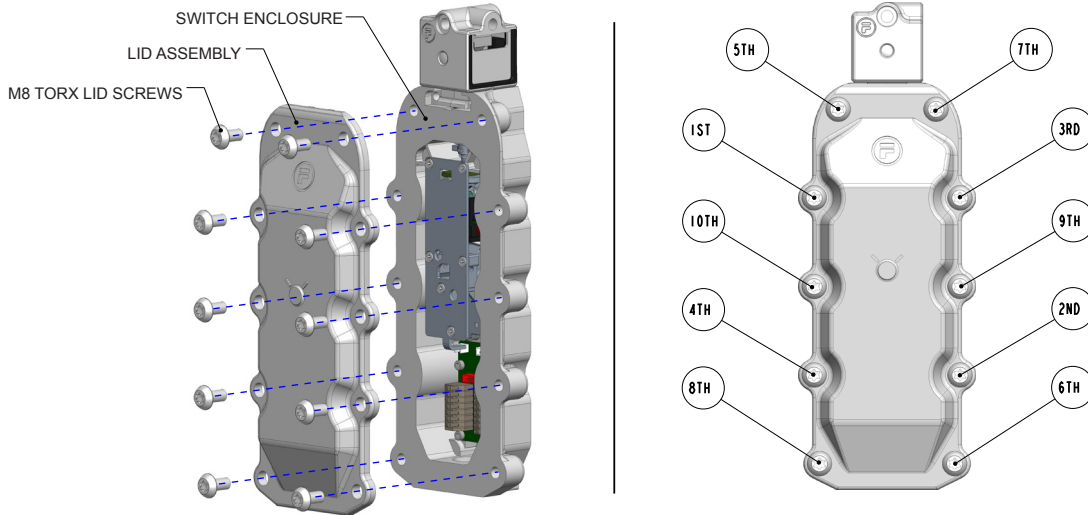
Note: All M8 Torx lid screws must be fully refitted and tightened to a minimum torque setting of 20Nm to maintain IP level. Note: It is recommended that all M8 Torx Lid screws be secured against tampering removal or loosening due to vibration using a middle strength adhesive threadlocker.

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3. Fully test and operate the complete Alfred Safety Switch 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 Safety Switch 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 Safety Switch module.

Note: The conduit connection hole of the Safety Switch 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 Switch (see Figure 9) 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 Switch (see Figure 9) 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 Switches and Gate Monitor Circuits must be made using 24-16 AWG copper cable.

Electrical Connection

1. Check that the Alfred Safety Switch 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 Safety Switch 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 Safety Switch module of the Alfred Safety Switch 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 9) and also, if required, the additional External Earthing point (see Figure 9). See Earthing requirements above for further detail.
6. Connect all required internal wiring to the Safety Switches 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.

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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 Safety Switch 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 Safety Switches in series may reduce the performance level of the system according to DIN EN 13849-1 owing to reduced fault recognition.

Terminals 5 & 7. (Safety Circuit II)

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

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 Safety Switch module Enclosure following the guidelines and instructions detailed in the Lid Assembly Requirements section above.

8. Fully test and operate the complete Alfred Safety Switch product for correct electrical and mechanical operation.

Figure 8: Wiring Diagram and Terminal Layout

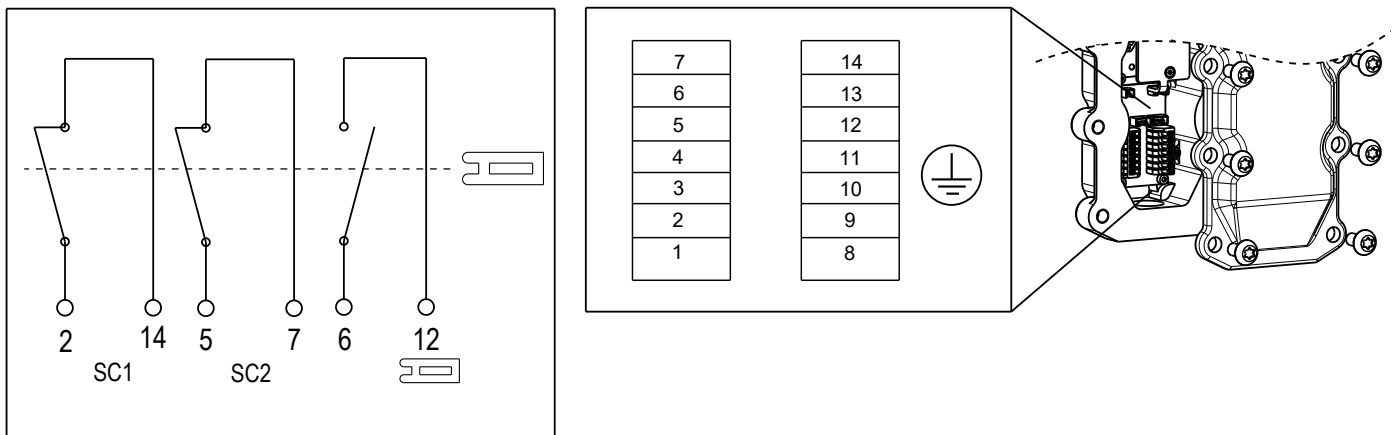
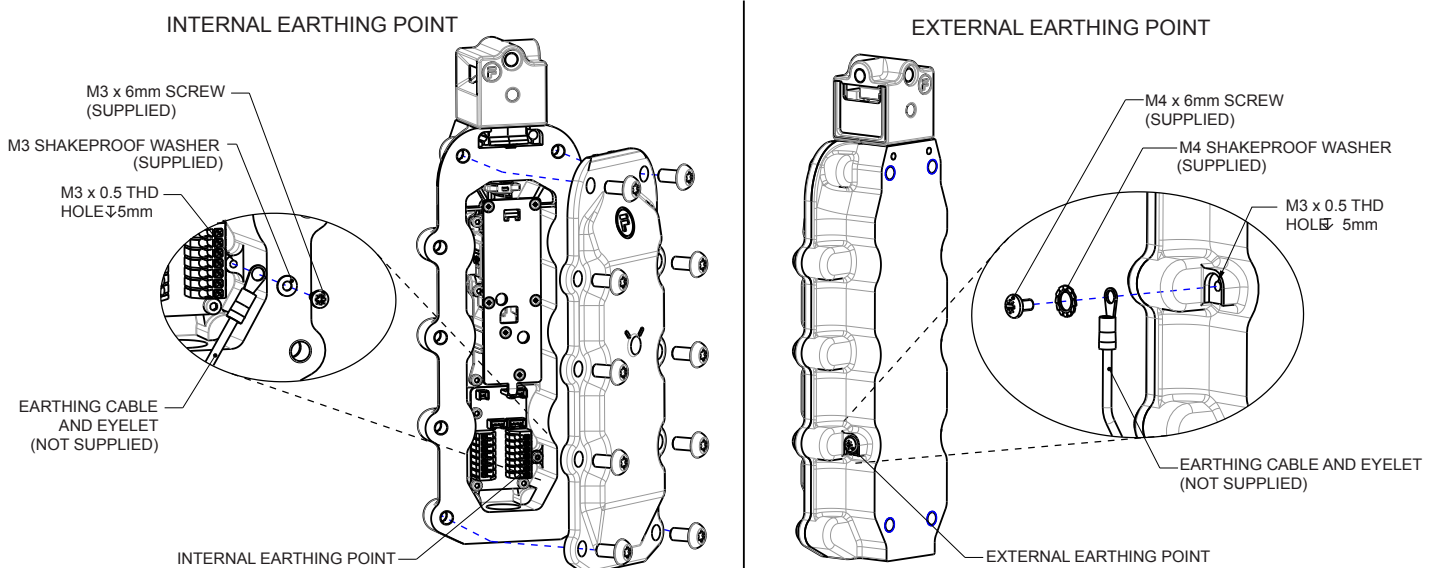


Figure 9: Internal and External Earthing Points



Operating Instructions: Alfred Safety Switches

Device Testing and Commissioning Instructions
Mechanical Function Tests (Unpowered)
Test 1 Insert Actuator into Head Module. <ul style="list-style-type: none">• The Actuator must operate smoothly and not mechanically lock into place.
Test 2 (if Key Adaptors are fitted) Operate all Key Adaptors to their closed or 'machine-run' state (note, exact sequence of Key Adaptor operation can vary depending on product selection and configuration. See functionality section for more details) <ul style="list-style-type: none">• The Actuator must be mechanically trapped.• If multiple Key Adaptors are fitted, check Keys are trapped and free at correct and intended points in product sequence.
Electrical Function Tests
Operate the Alfred Safety Switch 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 Safety Switch 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 Safety Switch product every 10,000 operations, or sooner, to ensure smooth product operation and function. There are no user serviceable parts in the Alfred Safety Switch 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 Safety Switch 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 Safety Switch be protected against the ingress of foreign bodies such as swarf, sand, blasting shot, etc. The Safety Switch 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
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: BAS21UKEX0009X	
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	

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