

Operating Instructions: RSK



Description

The RSK, or RFID Safety Key Pod, is designed to provide a compact, high coded safety key station for safeguarding operators from unexpected start up whilst inside a safeguarded space. Each pod can have between 1-4 key holders; each with individual solenoid locking functionality. Where only 1-2 keys are required, the modular design of RSK enables additional control elements to be combined within a key pod. RSK units can be used as standalone key stations or integrated within an interlock as part of the wider amGard pro range. The open design of each key holder ensures ease of cleaning in dirty & dusty environments. The device offers dual channel safety on key removal for a Cat. 4 system up to performance level e. On the front of each key holder, red/yellow LEDs provide localised device status for incorrect/missing key & guard unlocked respectively. The RSK removes the need for key management as each key within this system is assigned a 32 bit code which can be uniquely paired to a safety key pod. In the event of a lost key, replacement keys can be easily procured and taught to the device. In this process, any previous key codes are erased from the system, thus removing the risk of duplicate keys



Options and Ordering Information

Each RSK POD can be configured with up to 4 unique High-Coded RF Keys. Once installed, Keys are coded and configured to an individual RSK POD, see Coded Key Commissioning and Teaching Instructions. The Safety Circuits or Outputs of an RSK POD will only make or go High when the correct RSK Keys are inserted, allowing for use in applications where controlled Key access and monitoring is required. The RSK can be configured for order using either Solid State Relay (SSR) or OSSD switching options and with either Power-to-Lock or Power-to-Unlock Key types

Safety Switch Configurations:

Solid State Relay (SSR) Type

This configuration consists of two safety circuits. The safe state is indicated by an open circuit.

Solid State Relay (OSSD) Type

This configuration consists of two safety inputs and two safety outputs. The safe state is indicated by a "low" voltage. The safety circuits can be daisy chained without fault masking.

Key Locking Options:

Power-to-Lock

Once inserted, Keys can be locked by applying power to internal Solenoid mechanism. All Keys are locked simultaneously. Safety circuits or Outputs will change state when all correct coded Keys have been inserted.

Power-to-Unlock

Keys are mechanically trapped when inserted. Keys can be unlocked by applying power to internal Solenoid mechanism. All Keys are unlocked simultaneously. Safety circuits or Outputs will change state when all correct coded Keys have been inserted.

Note: Safety configurations and Key locking types cannot be mixed within a single RSK POD. All Keys must be of the same type.

RSK Options and Ordering:

Description

Part No.

Option Pod type

RSK Option Pod

H

Switching type and body type

Solid State Relay Pod With No Top Holes (Standalone Option Pod)

0

Solid State Relay Pod With Two holes on top of case (for fitment to SL,SR,SE,LL,LR,LE LOK only)

2

OSSD Pod With No Top Holes (Standalone Option Pod)




















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OSSD Pod With Two holes on top of case (for fitment to SL,SR,SE,LL,LR,LE LOK only)

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Description	Part No.
Key Locking / Switching Type	
No Key Locking	0
Power-To-Unlock Keys	1
Power-To-Lock Keys	6
Quantity of RSK Key holders per Pod	
1 Key Variant	1
2 Key Variant	2
3 Key Variant	3
4 Key Variant	4

Options & Ordering Information - Pushbutton and Control Element							
Buttons / Lamps / Switches	E - Stops	ET (Twist) Non-Illuminated	EP (Pull) Non-Illuminated	EI (Twist) Illuminated			
							
		* (Additional monitoring contacts)					
	Pushbuttons	P1 Illuminated	P2 Illuminated	P3 Illuminated	P6 Illuminated	P7 Illuminated	PB Non-Illuminated
							
	Lamps	LR	LY	LG	LB	LW	
							
	Illuminated Selector Switch	2E** (Latching 90 Degree)	2F** (Momentary 90 Degree)				
							
	Blank	00	Laser Engraving Information			 	
		Engraving for each button: 2 Lines of 8 Characters					

**2E, 2F & K5 Options can only be fitted in top right or bottom left positions.

Keys Options & Ordering Information	
Description	Part No.
Tag or Bow type	
No coloured tag or identification	N
Coloured Tag and/or Painted Bow	C
Electronic Code Type	
Standard Code	S
Teach Code	T

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Tag Colour (if specified)	
No tag	
Viton (Black) Tag	V
Green Tag	L
Yellow Tag	Y
Orange Tag	O
Gold Tag	G
Red Tag	R
White Tag	W
Blue Tag	B
Bow Colour (if specified)	
Painted Black Bow	VB
Painted Green Bow	GB
Painted Yellow Bow	YB
Painted Orange Bow	OB
Painted Red Bow	RB
Painted White Bow	WB
Painted Blue Bow	BB

Important:

The RSK POD 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 Device or guarded machinery 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 the Device.

The Device is not to be used as a Mains Isolator or Emergency Stop.

The Device is a component to be added to a permanent electrical installation meeting the requirements of the applicable IEC/EN standards.

All the voltages used within the connected circuits must be derived from a Safety Extra Low Voltage or Protected Extra Low Voltage power supply (SELV or PELV).

The Device contains a single electrical circuit: all inputs outputs and power supply have a common voltage reference, 0V.

If an RSK Teach Key is used during device installation or commissioning, then it must be securely controlled and stored after use. **DO NOT LEAVE RSK TEACH KEY IN PLACE!**

Any misuse of an RSK Teach Key could make it possible to bypass the function and safety of a system resulting in a dangerous operation or situation.

Note: The RSK device can be taught new coded keys via the use of a Teach Token. The user must have a system in place to manage and secure Teach Tokens.

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

The installation and operation of the RSK POD and the complete machine guarding application must take into account the requirements of EN ISO 14119, in particular Section 7 - Design for minimising defeat possibilities.

In order to maintain device safety rating, overall system must be validated to BS EN ISO 13849-2 and/or evaluated in accordance with BS EN 62061.

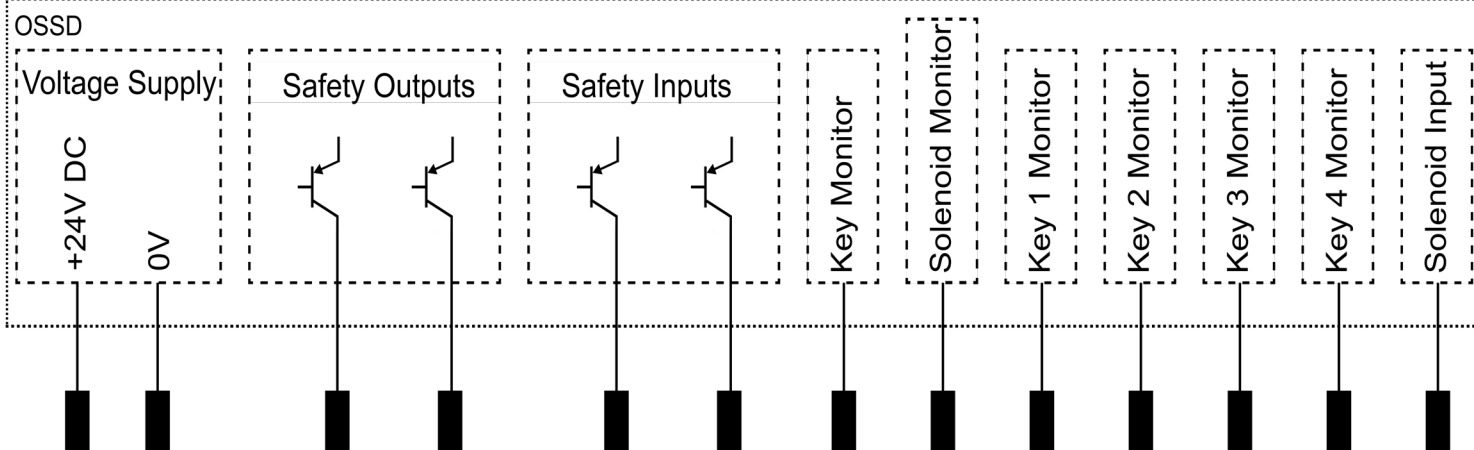
IF YOU HAVE ANY QUESTIONS OR QUERIES OF ANY NATURE WHATSOEVER PLEASE CONTACT THE SUPPLIER WHO WILL BE PLEASED TO ADVISE AND ASSIST.

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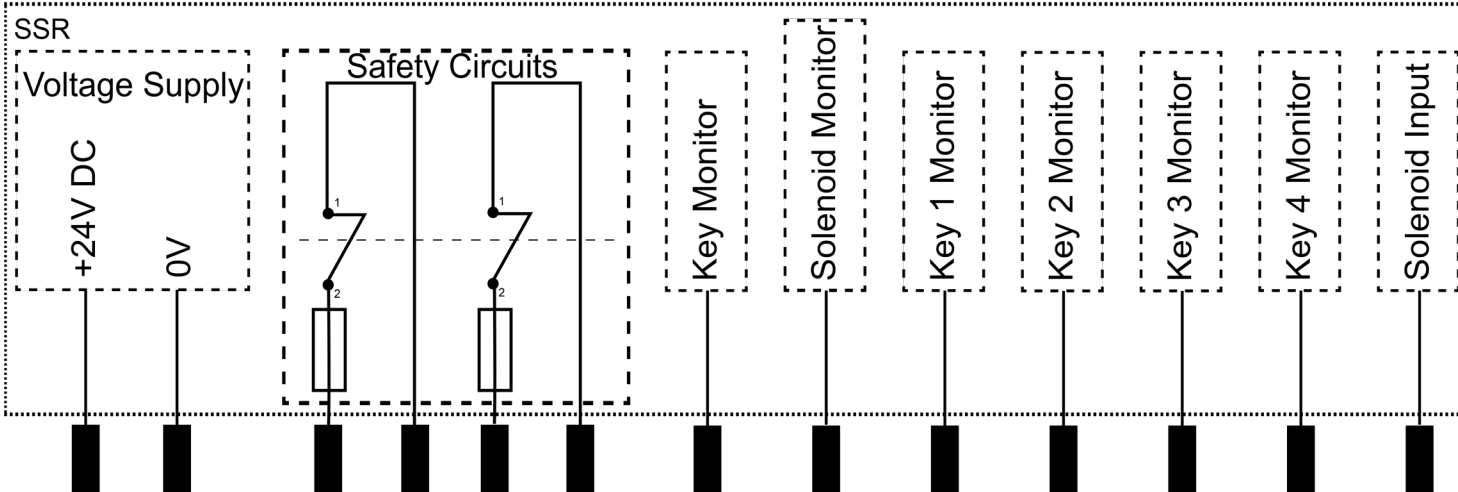
Technical Specification	Power-To-Unlock	Power-To-Lock
Housing Materials	Passivated and painted Zinc Alloy to BSEN12844 ZA3 and Stainless Steel to BS3146-2:1975 (ANC4B)	
Mechanical Life	>1,000,000 Switching Cycles	
Holding Force of locked Key		
Holding Force of unlocked Key		16.33 N
Operating / Key Insertion force		13.34 N
Maximum Actuating Speed		
Maximum Actuating Frequency	720 Operations per Hour	
Frequency of Operating Cycles, f		
Ingress Protection	IP65 and IP67	
Ingress Protection if Pushbuttons or Control Elements are selected	IP65 only	
Environment Type	Indoor	
Operational Pollution Degree (IEC 664)	3	
Ambient Temperature	-25°C * to +60°C (-13°F to +140°F)	
Maximum Relative Humidity	95% at 55°C	
Maximum Altitude	2000m	
Vibration	Tested in accordance with BS EN 60947-5-2	
*The RSK Device will only continue to work below freezing point (0°C) where it can be guaranteed that ice will not form on or in the device as it could cause the mechanical parts to bind and jam.		
Note: Environmental data above is for RSK as a Standalone product only. If RSK is to be fitted to an amGard pro LOK device, data may vary depending on rating of LOK device and any other elements of an amGard pro product stack. See appropriate Operating Instructions for further detail.		

Electrical Data	
Operating Voltage, U_e	24V DC (+10% -15%)
Rated Insulation Voltage, U_i	60V
Rated Impulse Withstand Voltage, U_{imp}	500V
Overvoltage Category	Type 2
Electromagnetic Compatibility (EMC)	Conforms to BS EN 60947-5-3
Rated Operating Currents	400mA
Minimum Operational Current	100mA
Outputs current rating	50mA
Voltage Drop, U_d	<3.5V
Off-State Current	<0.5mA
Rated Conditional Short-circuit Current	100 A
RFID Sensor Data (as defined in EN 60947-5-2)	
Coding Type (as per BS EN ISO 14119)	High
Safety Output Timing Data	
Safety Response Time	<200ms
Safety Input Low to Safety Output Low	<25ms
Key removed to Safety Output Low	<200ms

Wiring Diagram - OSSD



Wiring Diagram - SSR



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Two Safety Outputs Dual channel OSSD outputs with “low” voltage to indicate the safe state. Must be connected to the next OSSD Device or an external evaluation device. The External Evaluation Device must: <ul style="list-style-type: none"> • Monitor both signals are high before it can leave its safe state. • Monitor that both signals are synchronous. • Have a Diagnostic Coverage of at least 99%. 	Two Safety Inputs Dual channel safety inputs with “low” voltage to indicate the safe state. Must be connected to the previous OSSD device or 24V. A fault will be detected if the inputs are not synchronous (see timing fault diagram). A full input cycle is needed to clear the fault.
Two Solid State Relay Safety Circuits Dual channel SSR safety circuits with “open circuit” to indicate the safe state. Must be connected to an external evaluation device. The safety evaluation device must be protected against short circuit. The External Evaluation Device must: <ul style="list-style-type: none"> • Monitor both signals are high before it can leave its safe state. • Monitor that both signals are synchronous. • Have a Diagnostic Coverage of at least 99%. 	Monitor Outputs Solenoid Monitor Outputs Control output with “high” voltage to indicate unit is unlocked Key Monitor Output Control output with “high” voltage to indicate a key has been removed Individual Key Monitor (1-4) Control output with “high” voltage to indicate the specified key has been removed
Solenoid Drive Input Solenoid Drive input with “high” voltage to activate the solenoid. For Power-to-Unlock (PTU) devices the solenoid will unlock the unit. For Power-to-Lock (PTL) devices the solenoid will lock the unit. For Safety-on-Guard-Locking (SoGL) devices the input must be driven from a safe and monitored source to be able to achieve PLe.	

RSK Product Type			
Safety Data		OSSD type RSK	SSR type RSK
Safety Function 1	Monitor Safety Inputs are High	X	
Safety Function 2	Monitor all Keys are present	X	X
Safety Function 3	Provides E-Stop function (Only if E-Stop is fitted)	X	X
Safe State 1	1 OSSD output is low	X	
Safe State 1	1 SSR is open circuit		X
Performance Level (EN ISO 13849-1:2015)		Up to PLe	
Category (EN ISO 13849-1:2015)		Up to Cat.4	
SIL (according to IEC 62061)		Up to SIL CL3	
Diagnostic Coverage		A maximum DC of 99% can be achieved with suitable monitoring.	
PFH		4.16x10 ⁻⁹	
Demand mode (according to IEC 62061)		High	
Applicable Standards		ISO 14119 , EN ISO 13849 , IEC 61508 , EN 60947-5-2, BS EN 62061	

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Functionality
Power-to-Lock
Inserting Keys RSK Keys are to be inserted by sliding them into their respective Key Holders. Keys can be inserted in any position within the RSK POD to which they have been coded and 'taught'. For more details see Coded Key commissioning instructions sections, page 9.
Locking Keys When all correct Keys have been inserted, all Keys will be locked when voltage is applied to the Solenoid Drive pin.
Unlocking Keys All Keys will be unlocked when voltage is removed from the Solenoid Drive pin.
Removing Keys Once unlocked, each Key can be removed by sliding them up and away from their individual Holders.
Note: There is no auxiliary release or manual release function on a Power-to-Lock type RSK POD.
Power-to-Unlock Type RSK
Inserting and Locking Keys RSK Keys are to be inserted by sliding them into their respective Key Holders. Once inserted, Keys will be mechanically trapped and locked in place. Keys can be inserted in any position within the RSK POD to which they have been coded and 'taught'. For more details see Coded Key commissioning instructions sections, page 9.
Unlocking Keys All Keys within an RSK POD will be unlocked when voltage is applied to the Solenoid Drive pin.
Removing Keys Once unlocked, each Key can be removed by sliding them up and away from their individual holders. Note; there is no auxiliary release or manual release function to remove mechanically trapped Keys. In the event of power outage, Keys will remain mechanically trapped within a Power-to-Unlock RSK POD.
Non-Locking Type RSK
Inserting and Removing Keys Keys can be inserted and removed by sliding up and down within their respective Key Holders. Note; Keys are never mechanically or electronically trapped or locked but do have a small retention force of 16N to help latch and retain Keys when used in vibrating applications.

Figure 1: Dimensional Drawing

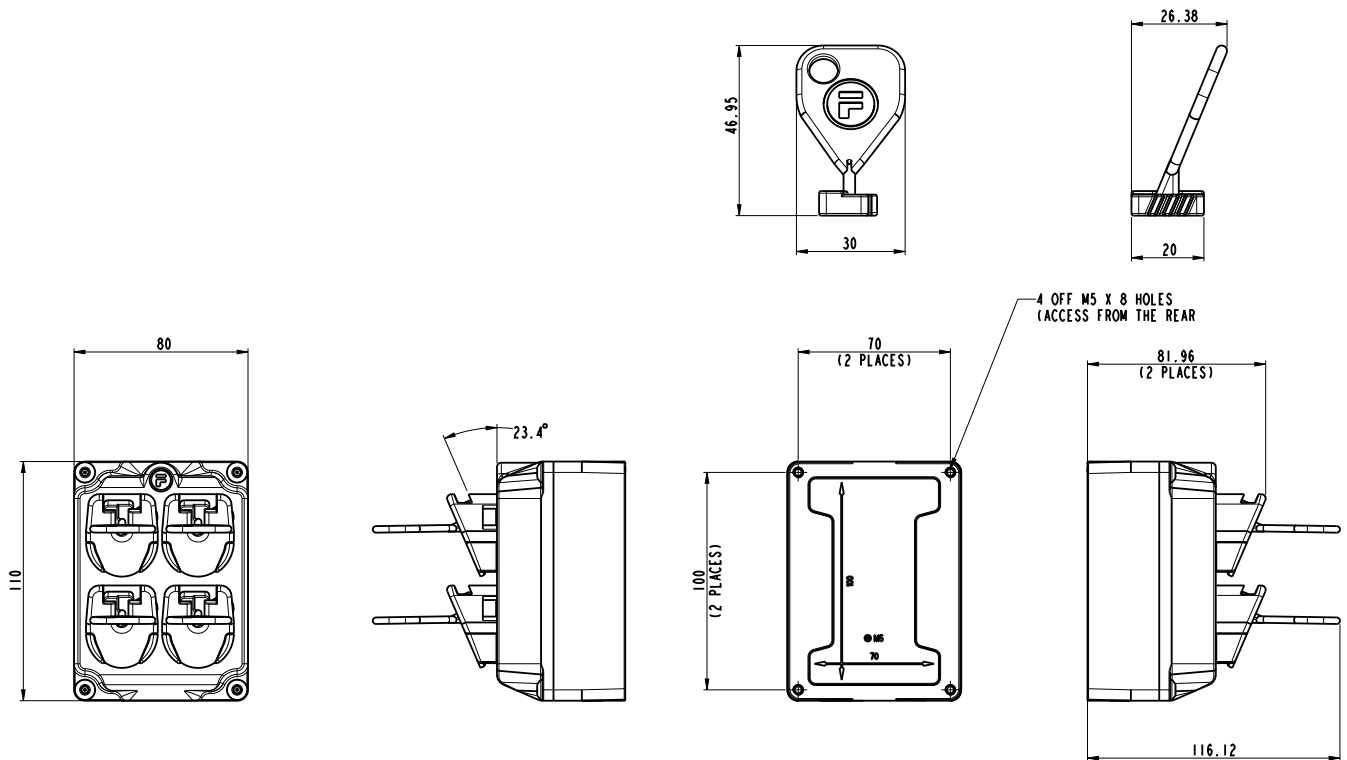
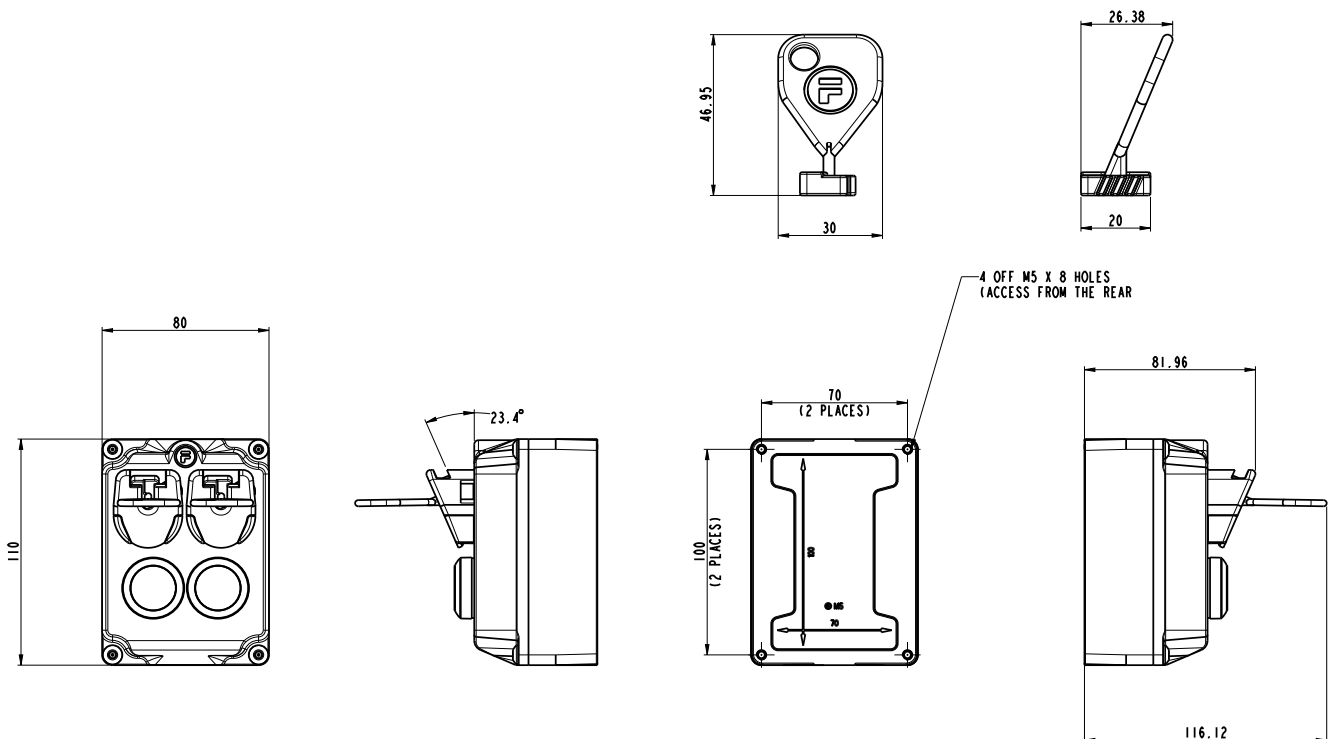


Figure 2: Dimensional Drawing



Tools and Fixings Required

4 x M5 Screws

- Screws must be suitable length for a minimum of 5mm thread engagement.
- Screws must be security type to prevent unauthorised removal or tampering, for example pin-hex or pin-torx anti-tamper security screws.
- Required torque setting: 8-12 Nm.

Driver suitable for securing M5 fixing screws.

Adhesive Threadlocker to secure mounting fixings from loosening due to vibration.

Mechanical Mounting Instructions

For a standalone RSK POD:

1. Locate the RSK POD so that Keys can be easily removed and inserted without obstruction and so that Functional testing, Electrical testing, Scheduled Inspection and Maintenance and final unit replacement are all easily possible.
2. Prepare the mounting surface to which the RSK POD is to be assembled.
 - a. If mounting to a solid plate or guard, prepare by cutting 4 x clearance holes suitable for appropriate M5 screws. See Fig. 1 for mounting hole positions.
 - b. If mounting to an open mesh fencing or similar, no hole-cutting is required, but ensure that suitable washers and fixing plates are used.
3. Mount the RSK POD by fixing through the mounting surface into the 4 x M5 threaded holes accessed from the rear of the POD.

Mount the complete RSK product only in the correctly assembled condition.

For RSK POD fitted below an amGardpro LOK device:

1. Review all relevant Operating Instruction documents for each module of complete amGardpro product and follow all mounting instructions accordingly.
2. Locate the complete amGardpro product so that full operation and all functions can be performed without obstruction and so that all Functional testing, Electrical testing, Scheduled Inspection and Maintenance and final unit replacement are all easily possible.
3. Prepare the mounting surface(s) of the RSK POD and complete amGardpro product as per recommendations in all applicable Operating Instructions documents. See Fig.1, and all other relevant amGardpro module drawings, for mounting hole positions.
4. Mount the complete amGardpro product as per recommendations in all applicable Operating Instructions documents.
5. Secure the RSK POD portion of the complete amGardpro product by fixing through the mounting surface into the 4 x M5 threaded holes accessed from the rear of the POD.
 Note: if the complete amGardpro product to which the RSK POD belongs has a Mounting Plate fitted, steps 4 and 5 can be ignored and the product should be mounted as per the mounting instructions in the Mounting Plates Operating Instructions document.

Mount the complete amGardpro product only in the correctly assembled condition.

Additional points if RSK POD is used within an amGardpro product as a Guard Interlock Device:

- 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 closed and locked (Safety Outputs High) must not exceed the limits specified in BS EN 294 & BS EN 953.
- All fixing screws used to mount the complete Interlock Device 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.
- The complete Interlock Device 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 Device.

Electrical Connection Instructions

1. Make sure the electrical supply is isolated and safe before any installation.
2. Insert appropriate Connector cabling into base of RSK POD Enclosure assembly.
 - Note: suitable connectors and cabling must be used to maintain IP65 and IP67 sealing.
3. Perform Electrical Function tests before completing installation and commission. See Electrical Function test section.
 - Ensure that all circuits connected to the RSK POD are derived from a Safety Extra Low Voltage or Protected Extra Low Voltage power supply (SELV or PELV).
 - Ensure the electrical connection and installation of the RSK POD (and remainder of amGardpro product if fitted) is performed according to all relevant local standards and guidelines.

Coded Key Commissioning and Teaching Instructions

RSK Pods are delivered paired with a full set of keys. In the case that a key is lost, the RSK Pod can be taught new keys through the following process:

1. Insert the Teach Token into any key holder of the RSK Pod. After a short delay, the red indicators of the key holders will flash quickly, indicating that the device is ready to pair with new keys.
2. The teach token can now be removed from the key holder.
3. If a key is present in every key holder of the RSK Pod within 60 seconds it will learn those keys. The flashing will stop, and after a short delay the unit will restart and continue its normal operation.

If 60 seconds pass after removing the Teach Token before each key is present, the red indicators will flash slowly. In this state, the RSK Pod will not learn keys, and the Teach Token will need to be re-inserted to reset the 60 second timer.

In the unlikely event that a fault occurs after attempting to teach new keys, the Teach Token can be re-inserted to begin the process anew.

Note: The user must have a system in place to manage and secure Teach Tokens.

Testing

Mechanical Function Test (Unpowered)

Power-to-Lock and Non-Locking RSK POD Types:

1. Insert RSK Key into Key Holder.
 - **Key must not lock into position.**
2. Remove RSK Key from Key Holder.

Power-to-Unlock RSK POD Type:

1. Insert RSK Key into Key Holder.
 - Key must lock into position.

Note: Keys can be inserted in any position within the RSK POD to which they have been coded and 'taught'. Therefore, it is recommended to repeat all steps listed above with each Key in each Key Holder.

Electrical Function Test (Powered)

Power-to-Lock RSK POD Type:

1. Insert all RSK Keys into their Key Holders.
 - Note, Keys are coded and the RSK POD will only work correctly with the Keys to which it has been 'taught' during commissioning. See Coded Key commissioning instructions, page 9 section for detail on Key Coding and Teach processes.
2. Apply power to the RSK POD. See page 4 and 5 for wiring and connection information.
3. Apply voltage to the Solenoid Drive pin to lock the Keys in place.
 - **It must not be possible to remove any RSK Key.**
 - **The Safety Outputs should be High.**
4. Remove voltage from the Solenoid Drive pin to unlock the Keys.
 - **The Safety Outputs should remain High.**
 - **The Yellow LED of each Key Holder should illuminate.**
5. One-by-one remove the Keys from their Holders.
 - **The Safety Outputs should be Low.**
 - **The Yellow LED of each Key Holder should remain illuminated.**
 - **The Red LED of each Key Holder should illuminate when the Key is taken.**

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Power-to-Unlock RSK POD Type:

1. Insert all RSK Keys into their Key Holders.
2. Apply power to the RSK POD. See page 4 and 5 for wiring and connection information.
 - It must not be possible to remove any RSK Key.
 - The Safety Outputs should be High.
3. Apply voltage from the Solenoid Drive pin to unlock the Keys.
 - The Safety Outputs should remain High.
 - The Yellow LED of each Key Holder should illuminate.
4. One-by-one remove the Keys from their Holders.
 - The Safety Outputs should be Low.
 - The Yellow LED of each Key Holder should remain illuminated.
 - The Red LED of each Key Holder should illuminate when the Key is taken.

Non-Locking RSK POD Type:

1. Insert all RSK Keys into their Key Holders.
2. Apply power to the RSK POD. See page 4 and 5 for wiring and connection information.
 - The Safety Outputs should be High.
3. One-by-one remove the Keys from their Holders.
 - The Safety Outputs should be Low.
 - The Red LED of each Key Holder should illuminate when the Key is taken.

Note: Keys can be inserted in any position within the RSK POD to which they have been coded and 'taught'. Therefore, it is recommended to repeat all steps listed above with each Key in each Key Holder.

Maintenance and Inspection

Regular inspection of the following is necessary to ensure trouble-free, lasting operation:

- Secure mounting of components. (See Mechanical Mounting Instructions).
- Debris and wear.

If used on an infrequent basis, the RSK POD must be functionally tested at least once every month. See Mechanical and Electrical Function tests listed above for test requirements.

WD40 lubricant, or equivalent, should be applied to the Key Holder every 10,000 operations.

- The RSK POD must be replaced after 1 million switching operations.

There are no user serviceable parts in this product. If any damage or wear is found with a device, please contact your local Fortress stockist.

Note: If RSK POD is fitted below an amGardpro LOK module then the Maintenance and Inspection procedures of all other amGardpro product modules within the complete amGardpro product must also be regularly performed. See all other relevant Operating Instruction documents.

Disposal

The RSK POD 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 and electrical connection not performed by authorised personnel.
- Non-implementation of functional checks.

Protection Against Environmental Influences:

- In order to maintain full mechanical and electrical performance, the RSK POD must be protected against the ingress of all foreign bodies such as swarf, sand, blasting shot etc.
- The RSK POD is not suited for use in corrosive environments.
- The RSK POD is only suitable for dusty environments where careful consideration has been given to environment Requirements, product selection and mounting positions. Contact your local Fortress stockist for guidance and details.
- Where possible the RSK POD must be mounted away from the guarded machine or by the use of anti-vibration mountings in order to avoid the effects of vibration, shock and bump.

The manufacturer reserves the right to modify the design at any time and without notice.

This guide should be retained for future reference.