



# **INSTALLATION MANUAL**

## **FSS1 HIGH SECURITY DOOR MONITORING SENSOR**

### **1. INTRODUCTION**

The FSS1 is a patented device designed to provide a high security door position monitoring solution. It is the ideal higher security alternative for traditional balanced magnetic reed switches on hinged doors. Space is provided inside the sensors housing for the inclusion of an end of line module.

### **2. DESIGN FEATURES**

The products consist of two main components, the sensor on the door frame, and the magnetic array plate on the door. The product is designed for installation on hinged doors.

The FSS1 consists of 7 magnetic sensors that are used to detect the magnetic footprint from an array of magnets on the magnetic array plate. One sensor is used to detect the position of the magnetic array plate in relation to the FSS1, while the other 6 sensors are used to determine the polarity, size, strength and position of the magnets on the magnetic array plate in relation to the memorized recorded pattern.

The FSS1 is calibrated with the first closing of the door, storing the magnetic measurements into the devices memory. The FSS1 can be re-calibrated to allow for potential door drop or door warp.

Using 4 magnets in different positions, strength and polarity in the magnetic plate provides 1,820 permutations. In addition the magnetic plate position, orientation, door gap and surrounding material adds more door specific variables, greatly expanding on the base permutation. These door unique parameters and magnetic matrix are learnt by the sensor during the calibration procedure.

This far exceeds the Australian Government requirement of 8 permutations of magnets.

The FSS1 is not factory calibrated (mated) to its supplied magnetic array plate, and only learns the magnetic matrix when first powered and upon the first door closure.

Three models are available:

**FSS1-F** Flush mounted into the door frame with the magnetic array plate in the top of the door. The FSS1 must be fully mortised into door frame using tabs to the door frame to ensure **Australian Government compliance**.

**FSS1-S** Surface mount with side conduit entry. The FSS1-S provides a conduit entry of 20mm (1/2" BSP pipe thread) to enable retro and new installation compatibility. The sensor housing is not handed and can be used in either left or right hand conduit entry. Slight conduit realignment on retrofit installations may be necessary.

**FSS1-S-NC** Surface mount with rear cable entry - NC stands for No Conduit. This is the same product as the FSS1-S but does not provide a conduit entry. Cable entry is via a hole drilled in a predetermined location to suit the cable size being used.

Both surface mount models are supplied with a 1.5mm and a 3mm spacer to cater for door / frame horizontal misalignment. Additional spacer kits are available.

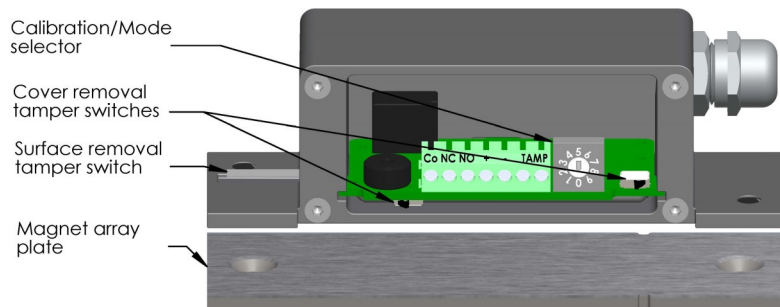
# FSS1 - High Security Door Monitoring Sensor

## 3. TECHNICAL DATA

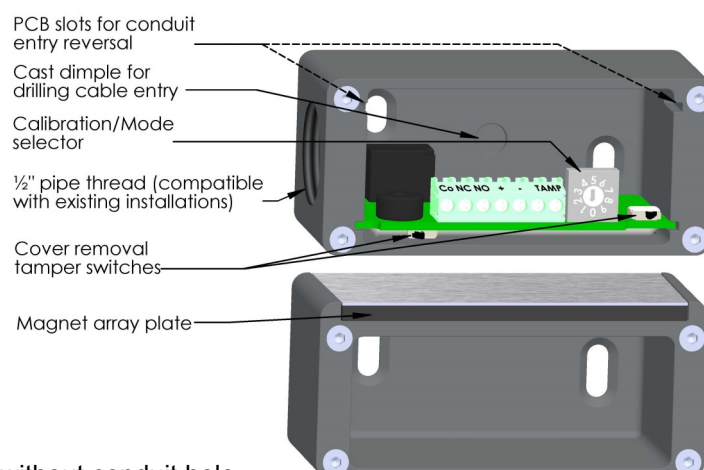
|  |  |
|--|--|
| Operating Voltage                                | 10 – 30 volts DC   |
| Max Current (12VDC) - reduces at higher voltages | 75mA - alarm with buzzer<br>35mA - alarm<br>50mA - secure  |
| Security level and tamper proof level            | Highest (SL4)  |
| Operating temperature / humidity / IP Rating     | Temperature -20 to +60 degrees C<br>Humidity 0 to 90%<br>IP Rating IP67  |
| Tamper contacts                                  | N.C. common, 0.2A @ 30V  |
| Alarm contacts                                   | N.C. common N.O., 0.5A @ 30V   |
| Door gap   | 1 – 7mm vertical on a hinged door  |
| End of line compatibility                        | Space for type 1 & 2 modules   |
| Mounting   | FSS1-F - Flush mount<br>FSS1-S - Surface mount with conduit entry<br>FSS1-S-NC - Surface mount without conduit   |
| Approvals / Patents                              | <ul style="list-style-type: none"> <li>SCEC Security Level 4 (SL4) approved</li> <li>Listed in the Security Equipment Evaluated Product List (SEEPL)</li> <li>Patented design</li> </ul> |

## 4. MODELS

### FSS1-F Flush Mount



### FSS1-S Surface Mount



### FSS1-S-NC Surface Mount No Conduit

Not shown, same as FSS1-S but without conduit hole

### 5. INSTALLATION

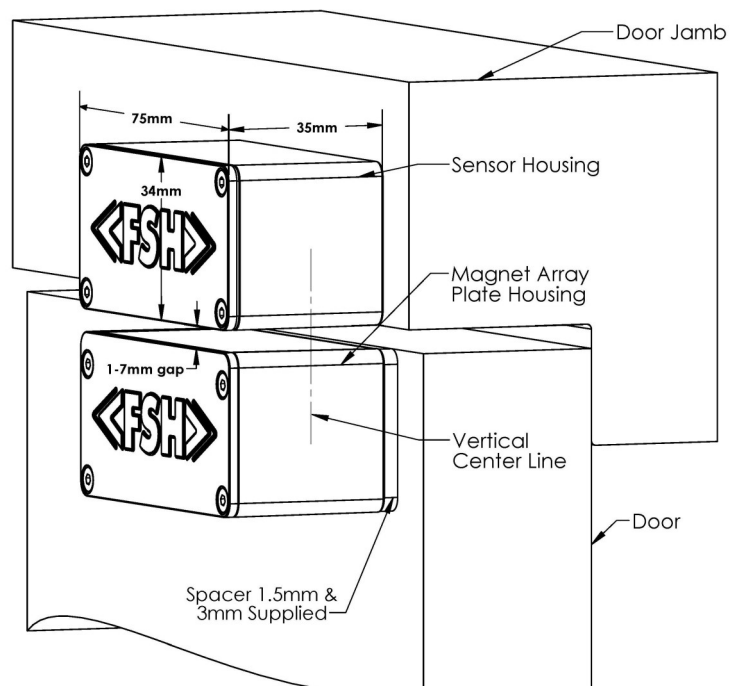
Two models are available of the surface mount FSS1 - one with a conduit fitting, and the other without a conduit fitting, designed for rear cable entry.

#### FSS1-S-NC Surface Mount without conduit fitting

- a) Mount the two housings on the door frame and door at a point farthest from the hinge.
- b) The magnet housing is installed on the door with the magnet plate facing upwards.
- c) The sensor housing is to be installed directly above the magnet housing using the side of both housings for alignment. Maximum gap between the two housings is 7mm, however a smaller gap is preferable to allow for possible door drop.
- d) The operational trigger distance (causing an alarm to be triggered) from the vertical centreline is  $\pm 6$ mm. If a larger distance is required then the magnetic housing can be offset away from the closing direction of the door. For example if the magnetic housing was offset by 2 mm the effective operational distance would increase to 8mm. Use the supplied spacers to adjust the vertical centreline alignment. (1.5mm and 3mm supplied - additional spacers available)
- e) A cast dimple is provided in the back of the sensor housing as a cable drilling guide. The drilled hole must not be 1mm larger than the cable diameter and sealed with a suitable water-proofing sealant. Ensure no foreign material or swarf is left in the sensor housing. A strain relief cable tie (supplied) is to be fitted to the cable on the inside of the sensor housing. Apply the supplied stick-on rubber gasket behind the sensor housing. **Hole diameter and strain relief is a Australian Government compliance requirement.** Use of a sealant such as Sikaflex 291 is required to seal the cable entry in external applications, and on the rear surface of the housing when the surface the sensor housing is attached to is not flat i.e. a brick wall to prevent water ingress.

#### FSS1-S Surface Mount - conduit version additional note

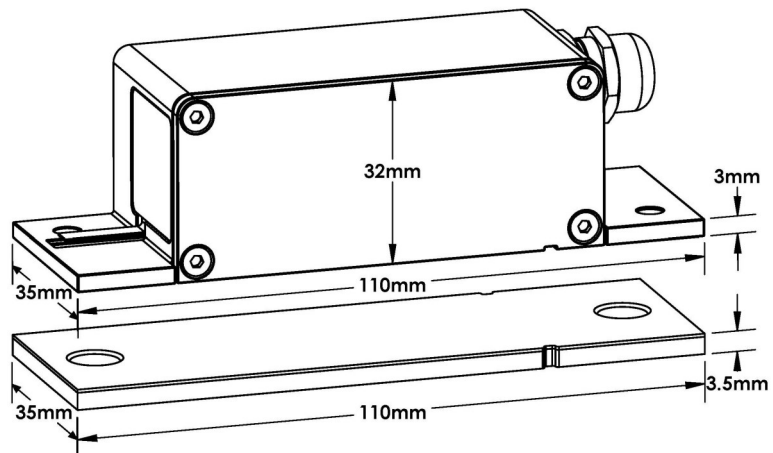
- f) Take care when screwing an existing or new conduit into the housing. Ensure the threaded conduit does not screw beyond the inner wall of the housing. Use a suitable thread tape for external use. If the conduit is existing it may be necessary to slightly lower the conduit to suit the FSS1-S conduit entry.
- g) To convert to the required handing remove the cover Allen key screws and slide the circuit board out of the housing. Reinstall the circuit board into the opposite slots.
- h) The conduit model requires a 20mm BSP conduit fitting. Use of a water sealing thread tape is required for external applications.



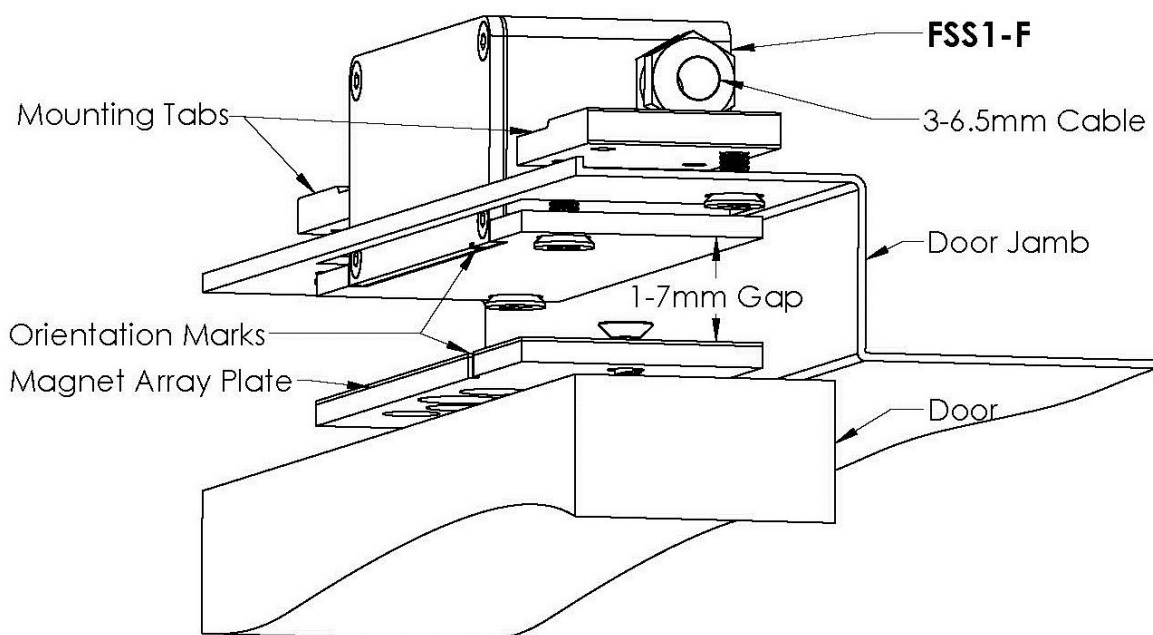
## 5. INSTALLATION (continued)

### FSS1-F – Flush Mount

The flush mount model of the FSS1 is designed to be recessed into the door frame with the magnetic array plate recessed into the top of the door adjacent to the sensor. The flush mount model is non handed.



- The sensor housing is to be installed using the supplied mounting tabs such that the face of the sensor is reasonably flush with the door frame. **The tabs and flush mounting is a Australian Government compliance requirement.**
- Mount the sensor housing and magnet array plate on the door frame and door at a point farthest away from the hinge side as possible.
- The magnet plate is normally recessed into the top of the door adjacent to the sensor housing with the countersunk fixing holes facing upwards. If space permits the magnetic plate can be surface mounted. Please note the alignment marks on both the sensor and the magnet plate are to be aligned.
- The vertical centreline alignment of the sensor housing and the magnet array plate centre lines is critical, see Additional Installation Notes on page 6.
- Run cable through the side of the sensor housing through the cable gland and tighten to retain IP67 rating.



### 6. NEW CALIBRATION

The FSS1 is supplied ready to be calibrated when it is first powered on.

- a) To start calibration the rotary selection switch must be set at 0,1,2, or 3 and the door must be open. See rotary switch positions below.
- b) If there is a foreign magnetic field present then slow beeping will occur until the magnetic field is removed.
- c) With the sensor power connected slowly close the door.
- d) At ~20mm from being closed the beeping will get faster, keep **slowly** closing the door.
- e) The beeping will get faster as the door get to its fully closed position.
- f) Pressure should be applied on the door near the FSS1 and held until the beeping gets more rapid. This will ensure that the full door travel will be calibrated.
- g) After several seconds the beeping will stop and the FSS1 is successfully calibrated.

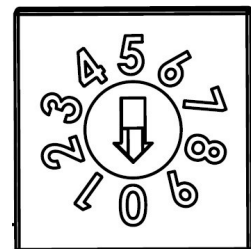
### 7. RECALIBRATION

In the circumstance of a door dropping more than 2mm, or a magnetic plate has been replaced, then the sensor will need to be re-calibrated, as follows:

- a) Open the door (to remove the magnetic field) and remove the sensor from the case.
- b) With the power connected, set the rotary switch to position 9 for 2 seconds
- c) Set the rotary switch back to a position between 0, 1, 2, or 3 depending on the operation required.
- d) After ~ 2 seconds the buzzer will continually beep at ~ 1 second intervals and is ready for calibration.
- e) Reinstall the sensor into the header, or the cover in the case of the surface mount
- f) Slowly close the door to allow the door to recalibrate.
- g) Refer to the “New Calibration” section above for more details on calibration.

### 8. ROTARY SWITCH POSITIONS

0. Immediate alarm. No buzzer
1. Immediate alarm. Buzzer when in alarm.
2. Door can be out of position for 0.2 seconds before alarm is activated. No buzzer
3. Door can be out of position for 0.2 seconds before alarm is activated. Buzzer when in alarm mode.
- 4-8. No function.
9. Clear memory for recalibrate mode - set for 2 seconds.



### 9. DOOR GAP CONSIDERATIONS

The maximum gap between the sensor and magnet array plate is 7mm for both the surface and flush mounted products, however a smaller gap is preferable to allow for possible door drop. If this measurement is exceeded in the flush mount model it is recommended that a suitable packing piece be installed under the magnet plate to maintain this gap.

In the case of the surface mount model the fixing holes are vertical slots to allow a small vertical adjustment.

### 10. ADDITIONAL INSTALLATION NOTES

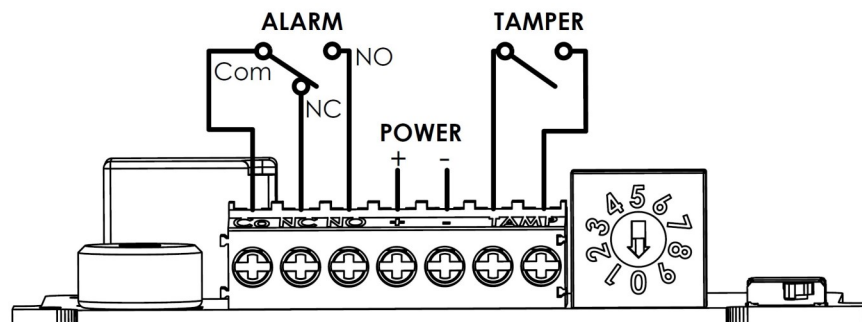
As is the case with a flush mounted conventional reed switch on a swing door, the vertical centrelines of the FSS1 sensor and its magnetic array plate should be aligned along their vertical centrelines. This is relatively easily achieved with the surface mount product using the supplied packing pieces. With the flush model however care must be taken with the vertical centreline alignment taking note of where the door stops within the door frame. The magnet array plate can be installed such that its vertical centreline is towards the door jamb by as much as 3mm. Conversely the sensor will not work or calibrate if magnet centreline is outside (away from the door jamb) of the sensor vertical centreline.

The FSS1 is designed for installation on a hinged door. Other applications may be possible but may require additional brackets etc. to ensure correct alignment. Sliding doors for example often have vertical movements outside the scope of this product and may require additional custom fittings.

### 11. WIRING

Alarm wiring must be connected to Com (Common) and N.O. (Normally Open). The N.O. will close (short) when the door is secure and power is applied to the sensor. Power failure or alarm will cause the N.O. contact to open. The N.O. contacts are closed when power is applied and door is sealed.

Tamper contacts are N.O. when the device is in tamper and closed when the is not tampered.



### 12. F.A.Q.

The sensor won't calibrate.

- Check voltage and polarity
- Check that magnet array plate is in the correct orientation—facing up and the orientation marks are lined up. (applies to flush mount model only)

I have a loop-in loop-out cable requirement and require two cables to enter the housing.

- Provision is made for a single cable only in the FSS1-F flush model. The FSS1-S conduit model will allow for two cables. The FSS1-S-NC surface mount without the conduit entry normally requires one hole to be drilled. A second hole can be drilled in both the surface and flush models.
- Please note the position of circuit boards and tamper switches when drilling additional holes. The FSS1-F flush model will require careful removal of the circuit board taking care not to damage the tamper switch cables attached to the circuit board prior to drilling the housing.
- If the sensor is installed in an external environment please use the supplied stick on rubber gasket behind the sensor box.