

# INTELLIGENT DOOR INTERLOCK SYSTEM SUPPORT MANUAL

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**Manufactured by:**

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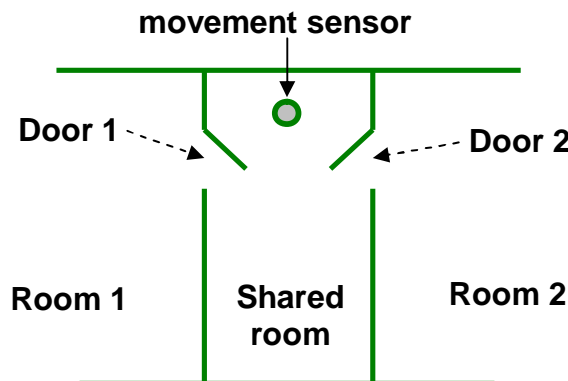
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# DOOR INTERLOCK SYSTEM FOR DUAL ACCESS BATHROOMS

## Model SM108B from Alian Electronics P/L.

### INTRODUCTION

This document describes the operation of an intelligent door control system where a common room must be accessed by two doors. A range of versions are available to suit a variety of residential and commercial situations with special security requirements.



Access doors may be hinged or sliding or both, as electric door latches may be selected to suit different room layouts. All installations are intrinsically safe, operating from low voltage DC and Australian approved power supplies. During emergency events or mains power failures, any locked rooms will automatically unlock.

If the bathroom lighting and/or exhaust fan has been connected to the room controller, then the lights will be automatically activated whenever anyone enters the room. They will remain on as long as the room is occupied and will turn off Door lock one minute after the room is vacated.

Five basic plans are available:

SM108 Model	Plan Description	Requires Door Access buttons?	Walk-through security?	Alarm contacts	Typical uses
PLAN1	Enter via one door, the second door automatically locks. The entry door does not lock.	No	Yes	Yes	Shared bathroom in nursing homes
PLAN2	Enter via one door, the second door automatically locks. If closed, the entry door will lock automatically. Press door-release button of entry door to exit.	Yes	Yes	Yes	Residential bathrooms
PLAN3	Enter via one door, the second door automatically locks. The entry door only locks at the press of a door button. Occupant can only leave via entry door.	Yes	Yes	Yes	Shared bathroom between shops
PLAN4	Both doors manually lock and unlock at the single press of a door button. Occupant can leave via either door.	Yes	No	No	Hotel room ensembles with two doors
PLAN5	Locks are configured to prevent both doors opening simultaneously, like an 'air-lock' configuration. Movement sensor is optional,	Yes	Yes	No	Prevent escape of birds and animals. Prevent major air flow between rooms

## COMPONENTS THAT MAKE UP A WORKING SYSTEM

For the system to function, the following items must be installed

- ◆ An appropriate electric latch for each door
- ◆ One 360° infrared movement sensor (Optional on **Plan 5**)
- ◆ Two 'door locked' indicator lamps for the outside of the bathroom
- ◆ Two door release buttons for the inside of the bathroom (Not req. on **Plan 1**)  
(four buttons are used on Plan 5)
- ◆ An Emergency Release button (Optional on **Plan 1**)
- ◆ An SM108b control unit
- ◆ A 12V DC plug pack that must connect to a nearby 240V outlet

(More details of these items are provided at the end of this document.)



*The room controller unit, model SM108B*

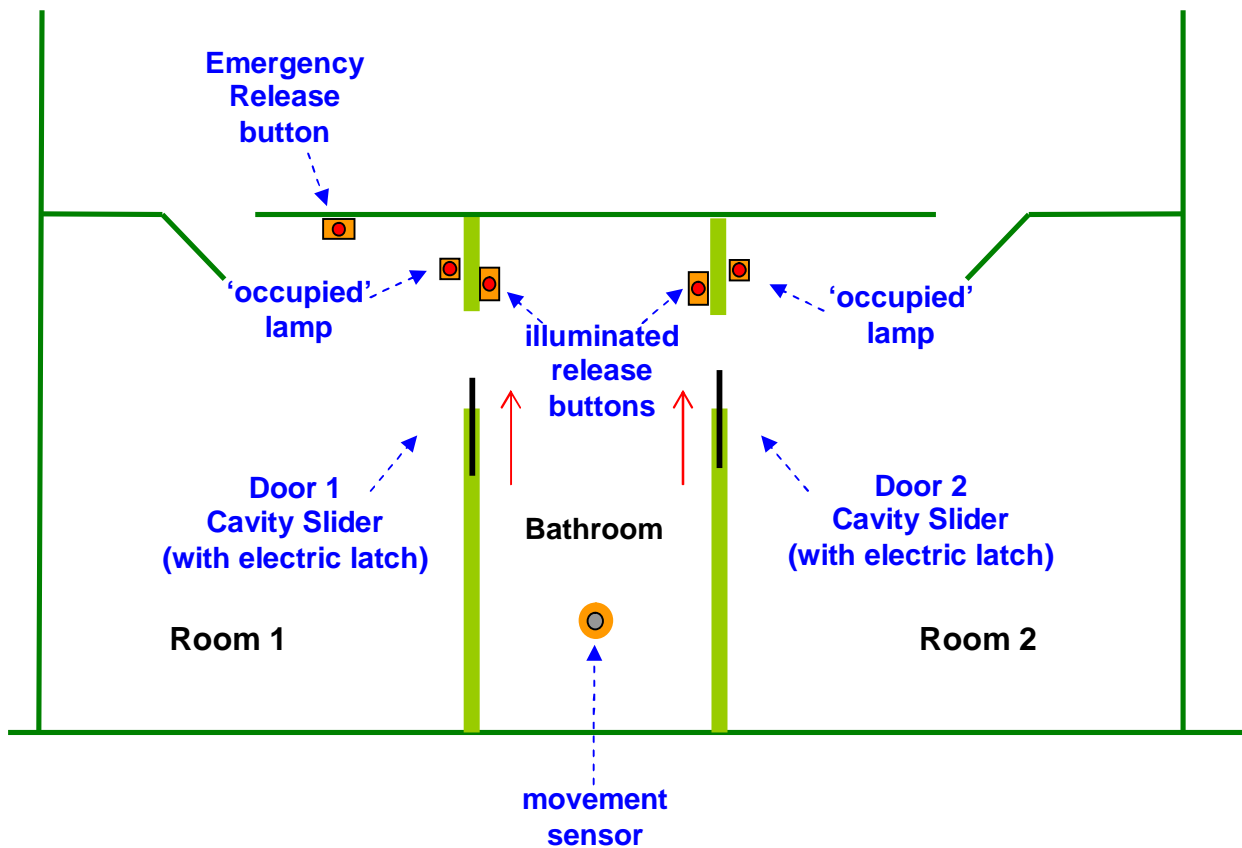
## DOOR LATCH ARRANGEMENTS

The diagram below shows a typical situation where two sliding doors provide access to a common bathroom. The door latches can also be for hinged doors if the correct latches are used, or a combination of hinged and sliding latches. The system programming treats all of the different latch styles in the same way.

The 'occupied' indicator lamps on the outside of each room glow red when that door is locked. It acts as a flag to inform building occupants that the door cannot be opened when this light is on.

The Door Release Buttons have an illuminated outer ring which also glows red when the door is locked. This informs the occupant of the locked room that the door locks are presently active.

The PIR Movement sensor is a ceiling mounted unit that detects movement activity in a 360° radius. It has a single Normally Closed contact that goes 'Open for a minimum of six seconds when movement within the bathroom is detected.



*A typical room arrangement with the electric latch system*

## SELECTION OF THE CORRECT DOOR LATCH

There are four different types of 12V DC electric door latch which may be used with this system. All are 'Fail Safe' meaning if power is removed from the building, any locked doors will automatically unlock to prevent entrapment. The most appropriate latch type for a given installation will depend upon the physical nature of the door and frame.



### 1. HINGED DOOR LATCH (HDL)

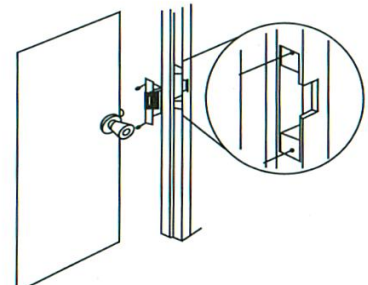
This standard latch can fit into a hinged steel or wood door frame without too much modification.

Unlike external security latches, this version defaults to an unlocked state when power fails.

This latch contains its own feedback switch which is essential to inform the system whether the door is closed or not.

Where this latch is used, the door handle would normally be disabled so that turning the handle will not bypass the latch and open the door.

The face plate is 123mm x 32mm.  
The cavity behind it is 85 x 30mm, 32mm deep



### 2. DROP-PIN LATCH (DPL)

This is a compact latch that can be recessed into a door frame. A pin is driven down into a round strike plate hole in the door. This makes it suitable for hinged and for some sliding doors.

Normally it would be built into the frame above the door so that the pin drops down when energised.

(It may be problematic with sliding doors where there is insufficient space around the roller channel to support the same space needed for the latch.)

It has an integral feedback switch to tell the system when the door is closed.

The face plate is 191mm x 25mm.  
The cavity behind it is 150 x 24mm, 35mm deep  
The pin is 12mm dia. and extends 15mm when energised.



### 3. FLUSH MAGNETIC LATCH (FML)

These latches are essentially a large electromagnet recessed into a door frame that binds to a corresponding metal plate set into the leading edge of a sliding door.

Once energised, the door would require a force in excess of 200kg to break the magnetic lock. They are an excellent option for sliding doors as they can be concealed within the door frame and are not visible when the door is closed.

With some carpentry they would come up flush within a wooden door frame, but may be more difficult to fully recess within a metal frame.

Note that the metal strike-plate that must be set into the door edge is 37mm wide, which is wider than the standard domestic door, (usually around 32mm thick) so that it would only be suitable for thicker doors.

Also note that this style of latch requires the fitting of a separate magnetic feedback switch to tell the system when the door is fully closed. (see the section below on switch options)

The face plate is 232mm x 40mm.

The cavity behind it is 195 x 40mm, 25mm deep

The matching metal strike-plate (for the door) is 178 x 37mm, 12mm thick



### 4. EXPOSED MAGNETIC LATCH (EML)

Like the FML style, these latches are essentially a large electromagnet that binds to a corresponding metal plate attached to a moving door.

This style does lend itself to being fitted to a hinged door where it does not matter if the latch is visible on one side of the door frame

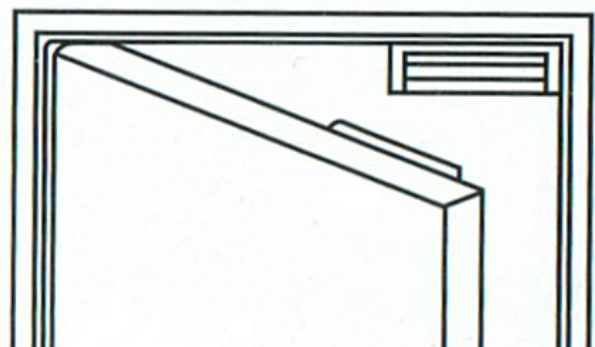
Once energised, the door would require a force in excess of 200kg to break the magnetic lock.

Note that this style of latch requires the fitting of a separate magnetic feedback switch to tell the system when the door is fully closed.

(see the section below on switch options)

The latch is 250mm x 48mm, 27mm deep.

The matching metal strike-plate (for the door) is 178 x 37mm, 12mm thick





## MAGNETIC FEEDBACK SWITCHES FOR FML & EML LATCHES

Both the **FML** and **EML** styles of latch require a separate door-closed detection switch. The requirement is for a contact to be closed whenever the door is shut.

(The FML and EML latches do have integral sensors, but these just confirm door-locked status and do not work when the latch is not energised.

The optimal door switch selection will depend upon the nature of the door frame.



*Recessed ball-type  
door closed detection*



*Surface mounted  
door-closed detection*

These door sensors are not required for the **HDL** and **DPL** latches, as they have integral contacts for door closed signalling that is compatible with the SM108 system

Where sufficient space exists above the door, the recessed ball-type is a good choice as it remains concealed when the door is closed.

Some door frames lack the space for this option and the surface mounted switch is a better fit. Both styles perform the same electrical function.

## PRELIMINARY NOTES ON SYSTEM OPERATION

- 1. MOVEMENT SENSOR** When power is first applied to the system, the PIR movement sensor has an integral warm-up time of approximately 25 seconds. During this time the sensor behaves as though movement in the room has taken place. To prevent doors from inadvertently locking during this time, the controller freezes operation for the first 30 seconds after activation. (or earlier if the sensor warms up fast and closes its output contact early.) The sensor should be ceiling mounted some distance into the bathroom to prevent it from sensing people in an adjacent room via an open door. On Plan 5 installations this sensor is optional and only drives light/fan operation. It does not affect door lock operation.



- 2. BEEPER FEATURE** The controller can be made to sound various beeps with different locking/unlocking events. The beeper feature can be disabled or enabled by pressing and holding both Door buttons simultaneously for 7 seconds. When this feature is successfully enabled or disabled, rapid 4 beeps will be heard. The setting is stored in permanent memory of the controller and the setting will be retained, even after a period of extended disconnection of power. (Beeper feature not supported on **Plan 1**)
- 3. POWER OUTAGES** The latches used in this system require energy to keep doors locked. During a power failure event, any locked doors will unlock and the room will behave as a conventional bathroom where doors may be opened at any time. When power returns, the controller will wait 30 seconds, then resume normal operation.
- 4. FIRE INPUT CONNECTIONS** A 2-way FIRE INPUT terminal normally has a wire loop inserted between the terminals. This is part of the operate path for relays controlling door lock switching. This wire loop may be extended to a fire alarm panel with a Normally Closed contact that goes Open during emergency events.

- 5. EMERGENCY ACCESS** A latching Normally-closed contact mushroom style switch should be placed within one of the rooms. When pressed, it will force the release of any locked bathroom doors. It may be wired in series with the Fire Alarm input, or the 12V DC supply that powers the control unit. If the latter option is used, a 30 second 'warm up' time will apply when this switch is restored and the power is returned to the system. (This feature is not normally required for Plan 1 as only one door at a time is ever locked)



### 6. DOOR CONTROL BUTTONS

On Plans 2 to 5, each door has an illuminated Door Control Button that can be used to manually lock or unlock the door that was used to enter the bathroom.

When the associated door is locked, the Door Control Button will glow red.

- 7. BATHROOM LIGHT & CEILING FAN** A 240VAC, 10A contact on the controller will *Close* whenever there is movement within the bathroom. It will release 1 minute after room movement ceases. It can be wired in series with bathroom lighting and/or the bathroom exhaust fan, so that one minute of additional ventilation will occur after the room has been vacated. If the installer chooses to use manual lighting & fan control instead, it will not affect the operation of the door controls. On Plan 5 this delay is reduced to 30 seconds.



## PLAN 1 – GENERAL DESCRIPTION

Plan 1 is an intrinsically secure arrangement, as it will not permit access to a second door through a shared room. This is an ideal arrangement for a nursing home facility where one bathroom is shared between two residents. As the system is fully automatic and there are no door lock/unlock buttons to be pushed, it is not going to confuse residents not comfortable working with door automation. As the occupant enters the shared room, the door is not locked behind them. This is important where nursing staff may need to follow them into the bathroom to provide assistance.

If the room lighting and/or exhaust fan has been connected to the SM108 room controller, then the lights will automatically activate whenever anyone enters the room. They will remain on as long as the room is occupied and will unlock all doors one minute after the room is vacated.

It is fail-safe as during a building power failure, the doors will automatically unlock. This feature can be extended to a building fire alarm system to force doors unlocked during an emergency.

## PLAN 1 IN DETAIL

For reference purposes, the detailed behaviour of the system is described here as a series of statements. This level of information is provided for installation and service personnel.

Note that Door 1 and Door 2 are logically identical. They have been described as 1 & 2 to assist with this detailed description of operation.

Unlike Plans 2,3 & 4, this plan has door latches configured in such a way that it is electrically impossible for both door latches to energise simultaneously.

### System Warmup time

1. When the system is first powered up, there is a single beep, then a waiting time of up to 25 seconds is applied for the PIR movement sensor to settle. During this time the yellow LED on the controller will flash slowly and no controls or latches will be active. At the end of the warmup time a single long beep will sound to signify that this delay period is over.
2. When **Door 1** is Opened, **Door 2** is immediately locked. It remains locked as long as **Door 1** remains open,

### Occupancy check

3. When **Door 1** is closed, **Door 2** is *still* locked. After a two second pause, the Yellow led will continue to flash rapidly for a further **25 Seconds**. (this will happen *every time* after a **Door 1** closing event)
4. If during this Yellow Led flashing phase any movement is detected within the bathroom, the system will deem the room to be **occupied** and **Door 2** will remain locked.
5. If during this **25 Second** period **No** movement is detected, then it is deemed that the room is **empty** and **Door 2** will be unlocked.
6. The same process happens in reverse with **Door 2** activity.
7. A red indicator lamp wired electrically in parallel with each door latch indicates outside the room that the door is presently locked.

### Door Alarm feature

8. If the second door is 'somehow' opened by the room occupant, (and this should not happen) an additional relay on the SM108 controller labelled ALARM will operate for the duration of the incursion. The contact from this relay can signal an external system that an unauthorised access has taken place.

(Note that there are no beep tones associate with PLAN 1 installations)

## PLAN 2 – GENERAL DESCRIPTION

Plan 2 is an intrinsically secure arrangement, as a person entering the shared room from one room cannot depart via the second room. It is similar to Plan 3, except the door locks automatically (not manually) behind the occupant as they enter the shared room, hence the door buttons perform a 'door release' function only.

Once locked, the door button on the inside of the entry must be pressed to unlock that door. This makes the system suitable for situations like shared bathroom or toilet facilities between bedrooms in a large home.

## PLAN 2 IN DETAIL

For reference purposes, the detailed behaviour of the system is described here as a series of statements. This level of information is provided for installation and service personnel.

Note that Door 1 and Door 2 are logically identical. They have been described as 1 & 2 to assist with this detailed description of operation.

### System Warmup time

1. When the system is first powered up, there is a single beep, then a waiting time of up to 25 seconds is applied for the PIR movement sensor to settle. During this time the yellow LED on the controller will flash slowly and no controls or latches will be active. At the end of the warmup time a single long beep will sound to signify that this delay period is over.

### Standby State

1. As a default 'standby' position, these notes assume that the room is unoccupied and both doors are closed. (Extended *Door Open* situations are described separately)

### Entering the room

2. As **Door 1** begins to OPEN a single beep will sound and **Door 2** will immediately lock. The red **Door 2** 'Occupied' indicator lamp will come on. The Light/Fan does not activate yet. (Had **Door 2** been opened first, the controller would have beeped and **Door 1** would have been locked instead.)
3. If the door is CLOSED again without anyone entering the room, or simply left OPEN, the controller will wait 8 seconds, check the movement sensor for activity, conclude that the room is empty, then unlock **Door 2** and return to a Standby state.
4. If **Door 1** is OPENED and a person enters the room, the movement sensor will detect this action, then automatically turn on the Light/Fan and lock **Door 2**. As long as the person remains in the room, **Door 2** will remain locked and show its 'occupied' indicator lamp.

### Locking the Door

5. When a person fully enters the room and closes the door behind them, that door will automatically lock. This action will sound a single-beep, lock the door and illuminate the **Door Lock Button**. Pressing the **Door Button** will unlock that door and sound a double-beep.
6. Pressing the **Door Lock button** while the associated door is open will fail to lock that door and sound a 6-beep error code instead.
7. If a **Door Lock Button** is pressed before movement had been detected within the room, it will fail to lock that door and sound a 6-beep error code instead.

### Leaving the room

8. When a door transits from CLOSED to OPEN, the controller records which of the two doors was the last one to cycle. This detail is used as an exit reference as when the

room is occupied and both doors are locked. To leave the room, the person must briefly press the **Door Lock Button** associated with the door they used for entry.

9. When the **Door Lock Button** is pressed on the entry door, the beeper will sound a double-beep, that door will unlock and the occupant may open the door and leave.
10. If the person tries to leave the room via the opposite door of entry by pressing the *other* **Door Lock Button**, the controller will preserve the privacy of that room and not unlock that door. The beeper will sound an error to show that this action is not permitted.

### Occupancy check

11. Once the door has closed, the controller will wait 8 seconds for the movement sensor to settle, after which there is an additional 12 second window where the movement sensor tries to determine if the room is still occupied. (during this occupancy check time the yellow LED on the controller flashes rapidly.) If a person is still present in the room, it will re-lock the door. If no person was detected in the room, then both doors will unlock and the controller returns to its standby state.

### If doors are left open

12. If the occupant chooses to leave one door open for an extended period of time, then the controller will vary its behaviour to suit. For example, **Door 1** opens to a lounge area and has been left open indefinitely. **Door 2** opens to a bedroom and has been left closed. No one has entered the shared bathroom for some minutes and its lights & fan are OFF. A person wanders into the bathroom through the open door (**Door 1**). Immediately they are detected. The Light/Fan comes ON, **Door 2** is immediately locked. The **Door 2** 'occupied' lamps come on.
13. If they simply wonder out again via **Door 1**, the controller will wait 1 minute, then unlock **Door 2** again and turn OFF the ceiling light/fan.  
If they try to leave via **Door 2** and press the **Door 2 Unlock Button**, they will just get the 6- beep error code and **Door 2** will remain locked. This preserves the privacy of anyone in the second room.
14. If as previously described, the **Door 1** to the lounge had been left open and **Door 2** to the bedroom was left closed, then provided the bathroom is vacant, **Door 2** can be opened. The controller will beep once. If the bedroom occupant proceeds into the bathroom and the lights and fan will come on.
15. The controller will never attempt to lock a door that has been left in the OPEN position.

### Power interruption safety feature

16. If AC power was cut while someone was in the room with both doors closed, then power is restored a short time later, then movement in the room will reactivate the light, but won't attempt to lock a door until Door1 or Door2 has gone through a complete Open and Closed cycle.

### Movement in 'empty' room safety feature

17. The controller guards against a rare situation where there may have been two people in the room but one has left and the other occupant has been very still for more than a minute. Fresh movement in the room will automatically activate the light and will re-lock the opposite of the last door that was used. (this gives the remaining occupant the ability to leave via the same door as the last person who had left the room.)

## A SUMMARY OF PLAN 2 BEEPER SOUNDS

This table summarises the various beep tones that can be heard where the BEEP feature has been enabled.

SYSTEM EVENT	BEEP SOUNDS
Power was just applied to the Controller	Single beep
10-25 seconds after power-up (while PIR sensor warms up)	Long beep
A door is opened	Single beep
A door is successfully locked	Single beep
A door is successfully unlocked	Double beep
Unlock attempted on door other than the entry door	6-beeps (error)
Both door lock buttons held for 7 seconds (enable/disable beeper)	4-beeps (ok)

The beeper feature can be disabled or enabled by pressing and holding both Door buttons simultaneously for 7 seconds. When this feature is successfully enabled or disabled, rapid 4 beeps will be heard and the setting is preserved in long-term memory.

## PLAN 3 – GENERAL DESCRIPTION

Plan 3 is an intrinsically secure arrangement, as a person entering the shared room from one room cannot depart via the second room. The door of entry will only lock when the entry button is pressed. (This differs from PLAN2 where the entry door automatically locks when it is closed.) Once locked, the door button on the inside of the entry must be pressed to unlock that door. This makes the system suitable for situations like shared toilet facilities between two shops, or perhaps a conference room shared between a foyer area and an executive office.

From a client's perspective, it is an intuitive system requiring no special knowledge. It should not interfere with their access to the room whenever they wish, provided another person hasn't entered the room before them.

If room occupants choose to leave one or both doors open for extended periods, the system will let them do it. The system also supports room privacy. If a person within an adjacent room desires privacy and leaves their adjoining door closed, the system won't allow a person to enter their room via the common room.

When a client wishes to leave the room, they can leave via the door that they entered from by briefly pressing the illuminated 'Exit' button next to that door.

If the room lighting and/or exhaust fan has been connected to the SM108 room controller, then the lights will automatically activate whenever anyone enters the room. They will remain on as long as the room is occupied and will unlock all doors one minute after the room is vacated.

It is fail-safe as during a building power failure, the doors will automatically unlock. This feature can be extended to a building fire alarm system to force doors unlocked during an emergency.

## PLAN 3 IN DETAIL

For reference purposes, the detailed behaviour of the system is described here as a series of statements. This level of information is provided for installation and service personnel.

Note that Door 1 and Door 2 are logically identical. They have been described as 1 & 2 to assist with this detailed description of operation.

### System Warmup time

2. When the system is first powered up, there is a single beep, then a waiting time of up to 25 seconds is applied for the PIR movement sensor to settle. During this time the yellow LED on the controller will flash slowly and no controls or latches will be active. At the end of the warmup time a single long beep will sound to signify that this delay period is over.

### Standby State

18. As a default 'standby' position, these notes assume that the room is unoccupied and both doors are closed. (Extended *Door Open* situations are described separately)

### Entering the room

19. As **Door 1** begins to OPEN a single beep will sound and **Door 2** will immediately lock. The red **Door 2** 'Occupied' indicator lamp will come on. The Light/Fan does not activate yet. (Had **Door 2** been opened first, the controller would have beeped and **Door 1** would have been locked instead.)
20. If the door is CLOSED again without anyone entering the room, or simply left OPEN, the controller will wait 8 seconds, check the movement sensor for activity, conclude that the room is empty, then unlock **Door 2** and return to a Standby state.
21. If **Door 1** is OPENED and a person enters the room, the movement sensor will detect this action, then automatically turn on the Light/Fan and lock **Door 2**. As long as the person remains in the room, **Door 2** will remain locked and show its 'occupied' indicator lamp.

### Locking the Door

22. When a person fully enters the room and closes the door behind them, that door will remain unlocked until the **Door Lock Button** next to the door is briefly pressed. This action will sound a single-beep, lock the door and illuminate the **Door Lock Button**. Pressing the **Button** a second time will unlock that door and sound a double-beep.
23. Pressing the **Door Lock button** while the associated door is open will fail to lock that door and sound a 6-beep error code instead.
24. If a **Door Lock Button** is pressed before movement had been detected within the room, it will fail to lock that door and sound a 6-beep error code instead.

### Leaving the room

25. When a door transits from CLOSED to OPEN, the controller records which of the two doors was the last one to cycle. This detail is used as an exit reference as when the room is occupied and both doors are locked. To leave the room, the person must briefly press the **Door Lock Button** associated with the door they used for entry.
26. When the **Door Lock Button** is pressed on the entry door, the beeper will sound a double-beep, that door will unlock and the occupant may open the door and leave.
27. If the person tries to leave the room via the opposite door of entry by pressing the *other* **Door Lock Button**, the controller will preserve the privacy of that room and not unlock that door. The beeper will sound an error to show that this action is not permitted.

### Occupancy check

28. Once the door has closed, the controller will wait 8 seconds for the movement sensor to settle, after which there is an additional 12 second window where the movement sensor tries to determine if the room is still occupied. (during this occupancy check time the yellow LED on the controller flashes rapidly.) If a person is still present in the room, it will re-lock the door. If no person was detected in the room, then both doors will unlock and the controller returns to its standby state.

### If doors are left open

29. If the occupant chooses to leave one door open for an extended period of time, then the controller will vary its behaviour to suit. For example, **Door 1** opens to a lounge area and has been left open indefinitely. **Door 2** opens to a bedroom and has been left closed. No one has entered the shared bathroom for some minutes and its lights & fan are OFF. A person wanders into the bathroom through the open door (**Door 1**). Immediately they are detected. The Light/Fan comes ON, **Door 2** is immediately locked. The **Door 2** 'occupied' lamps come on.
30. If they simply wonder out again via **Door 1**, the controller will wait minute, then unlock **Door 2** again and turn OFF the ceiling light/fan. If they try to leave via Door 2 and press the **Door 2 Unlock Button**, they will just get the 6- beep error code and Door 2 will remain locked. This preserves the privacy of anyone in the second room.
31. If as previously described, the **Door 1** to the lounge had been left open and **Door 2** to the bedroom was left closed, then provided the bathroom is vacant, **Door 2** can be opened. The controller will beep once. If the bedroom occupant proceeds into the bathroom and the lights and fan will come on.
32. The controller will never attempt to lock a door that has been left in the OPEN position.

### A SUMMARY OF PLAN 3 BEEPER SOUNDS

This table summarises the various beep tones that can be heard where the BEEP feature has been enabled.

SYSTEM EVENT	BEEP SOUNDS
Power was just applied to the Controller	Single beep
10-25 seconds after power-up (while PIR sensor warms up)	Long beep
A door is opened	Single beep
A door is successfully locked	Single beep
A door is successfully unlocked	Double beep
Lock attempted on an open door	6-beeps (error)
Lock attempted without room movement	6-beeps (error)
Unlock attempted on door other than the entry door	6-beeps (error)
Both door lock buttons held for 7 seconds (enable/disable beeper)	4-beeps (ok)

### PLAN 4 – GENERAL DESCRIPTION

Plan 4 is not appropriate not for secure situations, as a person entering the shared room from one door can exit via the second door if they wish. The doors do not lock automatically and will only lock when a door button is manually pressed. This makes it suitable for a controlled space, such as a hotel room joint bathroom that can open into both a bedroom and a lounge area. It is also friendly for children, as if they do not initially press a Lock button for privacy, they do not have to unlock a door in order to leave

When a client wishes to leave a locked room, they can leave via either door by briefly pressing the illuminated 'Lock/Unlock' button next to that door, whereby both doors will unlock

If the bathroom lighting and/or exhaust fan has been connected to the room controller, then the lights will be automatically activated whenever anyone enters the room. They will remain on as long as the room is occupied and will turn off Door lock **one minute** after the room is vacated.



It is fail-safe as during a building power failure, the doors will automatically unlock. This feature can be extended to a fire alarm system to force doors unlocked during an emergency. As with other plans, an Emergency Access button can be fitted to provide access to the locked room.

### The Plan 4 in Detail:

For reference purposes, the detailed behaviour of the system is described here as a series of statements. This level of information is provided for installation and service personnel.

Note that Door 1 and Door 2 are logically identical. They have been described as 1 & 2 to assist with this detailed description of operation.

#### System Warmup time

3. When the system is first powered up, there is a single beep, then a waiting time of up to 25 seconds is applied for the PIR movement sensor to settle. During this time the yellow LED on the controller will flash slowly and no controls or latches will be active. At the end of the warmup time a single long beep will sound to signify that this delay period is over.

#### Standby State

4. These notes assume that in a 'standby' state, the room is unoccupied and both doors are closed. (Extended *Door Open* situations are described separately)

#### Entering the room

5. As **Door 1** begins to OPEN a single beep will sound. When a person enters the room, the movement sensor will detect this action, then automatically turn on the Light/Fan
6. If the door is CLOSED again without anyone entering the room, the controller will check the movement sensor for activity, conclude that the room is empty, and return to a Standby state. If the light/fan were activated they would turn off after a 1 minute delay.

#### Locking the Door

7. When a person fully enters the room and closes the door behind them, both doors will remain unlocked until such time as a **Door Lock Button** next to a door is briefly pressed. This action will sound a single-beep, lock **both** doors and illuminate the **Door Lock Buttons**. (Pressing the **Button** again will unlock both doors and sound a double-beep.)
8. Pressing the **Door Lock button** will be ignored by any door that is open.

#### Leaving the room

9. When a **Door Lock Button** is pressed, the beeper will sound a double-beep, **both** doors will unlock and the occupant may then open one of the doors and leave the room.

#### Occupancy check

10. Whenever a door has closed, the controller will wait 8 seconds for the movement sensor to settle, after which there is an additional 12 second window where the movement sensor tries to determine if the room is still occupied. (during this *occupancy check* time the yellow LED on the controller flashes rapidly.)  
If no person was detected in the room, then both doors will unlock (if not already unlocked) and the controller returns to its standby state.

#### If doors are left open

11. If the occupant chooses to leave one door open for an extended period of time, then the controller will vary its behaviour to suit. For example, **Door 1** opens to a lounge area and has been left open indefinitely. **Door 2** opens to a bedroom and has been left closed. No one has entered the bathroom for some minutes and its lights & fan are OFF.

A person wanders into the bathroom through the open door (**Door 1**). Immediately they are detected. The Light/Fan will come ON.

12. If they simply wonder out again via **Door 1**, the controller will wait 1 minute, then turn OFF the ceiling light/fan.

## A SUMMARY OF PLAN 4 BEEPER SOUNDS

This table summarises the various beep tones that can be heard where the BEEP feature has been enabled.

SYSTEM EVENT	BEEP SOUNDS
Power was just applied to the Controller	Single beep
10-25 seconds after power-up (while PIR sensor warms up)	Long beep
A door is opened	Single beep
A door is successfully locked	Single beep
A door is successfully unlocked	Double beep
Both door lock buttons held for 7 seconds (enable/disable beeper)	4-beeps (ok)

## PLAN 5 – GENERAL DESCRIPTION

Plan 5 is not appropriate not for secure situations where access to the second room must be prevented. It is intended for a controlled situation where both doors can never be opened at the same time, simulating an airlock effect. This makes it suitable for situations where two doors are used to access a secure area where there is a possibility that birds/animals may escape, or an air pressurised clean room where uncontrolled air movement through doors must be prevented.

With Plan 5 situations the PIR movement sensor is not essential for system operation, but may be added to ensure that a light/fan remains on if a person is in the centre room with both doors closed. This sensor does not affect the operation of door locks.

When the central room is entered via either direction, the opposite door is immediately locked and remains locked as long as the first door is open. Once both doors are closed, the button on the locked door may be pressed to unlock that door. This action also locks the door behind the person entering, again preventing both doors from being open simultaneously.

It is fail-safe as during a building power failure and both doors will automatically unlock. This feature can be extended to a fire alarm system to force doors unlocked during an emergency. As with other plans, an Emergency Access button can be fitted to provide access to the locked room.

### The Plan 5 in Detail:

For reference purposes, the detailed behaviour of the system is described here as a series of statements. This level of information is provided for installation and service personnel.

Note that Door 1 and Door 2 are logically identical. They have been described as 1 & 2 to assist with this detailed description of operation.

### System Warmup time

1. When the system is first powered up, there is a single long-beep and the door controls are active. If a PIR sensor is fitted it may take an additional 20 seconds to warm up, but this does not affect door operation.

### Standby State

2. These notes assume that in a 'standby' state, the room is unoccupied and both doors are closed.

### Entering the room

3. As **Door 1** begins to OPEN a single beep will sound. Door 2 will immediately lock and the indicator lamp around the **Door 2** buttons will assume a constant glow to show that the door is locked.
4. When a door is opened from either direction, the Light/Fan relay is activated. As long as either door is open, the Light/Fan circuit will remain ON.
5. If the door is CLOSED again without anyone entering the room, the controller will check the movement sensor (if present) for activity, conclude that the room is empty, and return to a Standby state where **Door 2** is unlocked again and the light/fan is deactivated after a 30 second delay.

### Locking the Door

6. When a person fully enters the room and closes the door behind them, **Door 2** remains locked and **Door 1** remains Unlocked.
7. If the button on **Door 2** is pressed while **Door 1** is still open, the rapid error beep sounds and **Door 2** remains locked. (**Both doors can never be opened at the same time**)

### Leaving the room

8. Once **Door 1** has been closed behind the person entering the room, there is no visible change, except now the **Door 2** button can be pressed without tripping an error beep. Pressing the **Door 2** button trips a confirmation double-beep, causes **Door 1** to lock and **Door 2** to Un-lock. The person may now exit via **Door 2**.
9. 30 seconds after both doors are closed the Light/Fan will go off, both doors will unlock and the standby state is resumed. This delay may be extended indefinitely if the movement sensor is fitted and there is ongoing movement in the central room.
10. Some Plan 5 installations may be fitted with an illuminated push button on both sides of Door 1 and Door 2. (4 buttons in total) If a person outside the central transit room presses a button on a door that is locked while the opposite door is still open, the rapid error beep will sound and that door would remain locked. If both doors were closed, then pressing the outside button on a locked door would trip a swap event where the present door is unlocked and the opposite door is re-locked.

## A SUMMARY OF PLAN 5 BEEPER SOUNDS

This table summarises the various beep tones that can be heard where the BEEP feature has been enabled. No beep tones will be heard if the BEEP feature has been disabled

SYSTEM EVENT	BEEP SOUNDS
Power was just applied to the Controller	Long beep
A door is opened	Single beep
A door is successfully locked	Single beep
A door is successfully unlocked	Double beep
Unlock attempted on door while opposite door is still open	6-beeps (error)
Both door lock buttons held for 7 seconds (enable/disable beeper)	4-beeps (ok)

## SETTING UP THE PIR SENSOR

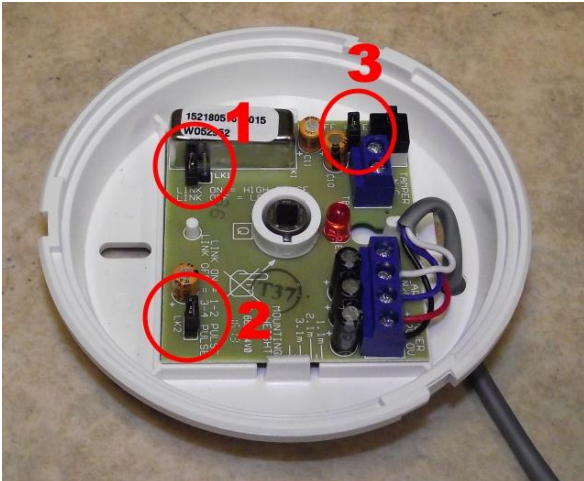
The preferred sensor for this system is the NESS Quantum 360, as it is conveniently ceiling mounted and has good reaction time. It has three jumper links.

**Link 1** sets unit sensitivity and unless there are special issues of poor sensitivity, it should be left in the 'open' position.

**Link 2** sets the reaction time of the sensor. As we require rapid reaction time, this link should be placed in the 'closed' position.

**Link 3** enables/disables the red LED indicator within the sensor. Generally, this is a useful feature for installers and the link should be left in its default 'closed' position.

The tamper switch and tamper terminals are not used.



*The Quantum 360 showing the 3 option links.*



*PIR sensor with cover in place*

- ◆ When the system is first activated, the PIR sensor takes approx 25 seconds to warm up. The controller will allow for this time and blocks normal operation until it is ready.
- ◆ Once movement is tripped, the PIR output contact goes OPEN for a minimum of 6 seconds and the red activity LED indicator will be ON.

## THE DOOR LOCK / UNLOCK BUTTON

A wall plate adjacent to the inside of each bathroom door requires a **Door Control Button**. This is a Normally Open contact that goes **CLOSED** when the button is pushed.

The switch has an illuminated outer-ring that glows red when the door lock is energised. Like the outside 'Occupied' lamp, the switch lamp is connected in parallel with the coil of the door latch.

When the button is pressed to unlock, the light will go out, indicating that the door may be pulled open.

Note that its operation is inhibited if the door is not first fully closed.



## THE DOOR LOCKED (OCCUPIED) INDICATOR LAMP

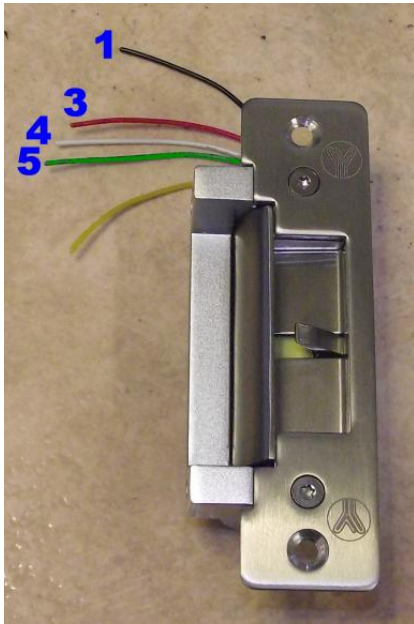
On the outside of each door a small red lamp can be placed to indicate that the door is locked. This is useful to the occupant of a distant room, as if the lamp is on, then they can see that there is no point to trying to open that door.

The lamp is electrically wired in parallel with the coil of the magnetic latch so that the light is on whenever the coil is energised to lock that door.





## SETTING UP THE HINGED DOOR LATCH (HDL)



Where the bathroom door is hinged, a Hinged Door Latch (HDL) may be the best option.

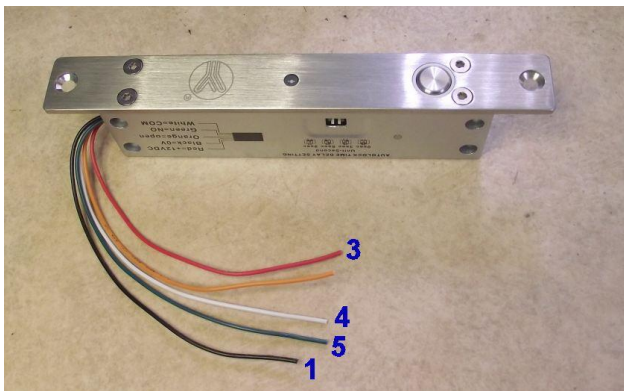
The latch must default to Unlocked when de-energised, the lock coil must have a continuous rating on a 12V supply and the home-position for the door tongue must activate an integral sensor switch that **CLOSES** a contact when the door is closed.

With the latch shown here, the coil wires are the conductors labelled **1** and **3**.

The Normally Closed switch contacts are the green and white conductors labelled **4** and **5**.

Doors should be fitted with a passive pull-handle to allow the door to be drawn open when the latch is deactivated by the Exit button.

## SETTING UP THE DROP PIN LATCH (DPL)



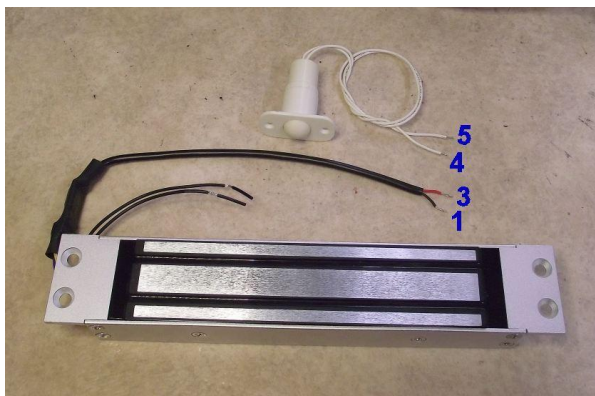
Where the drop-pin style of latch is more appropriate the connections remain similar.

The supplied latch plate for the door places a magnet near the latch which **CLOSES** a contact when the door is fully closed and the latch pin can drop.

With the latch shown here, the coil wires are the conductors labelled **1** and **3**.

The Normally Closed switch contacts are the green and white conductors labelled **4** and **5**.

## SETTING UP THE MAGNETIC LATCH (EML, FML)



With the Exposed and Flush style magnetic latches a separate door-closed switch is required.

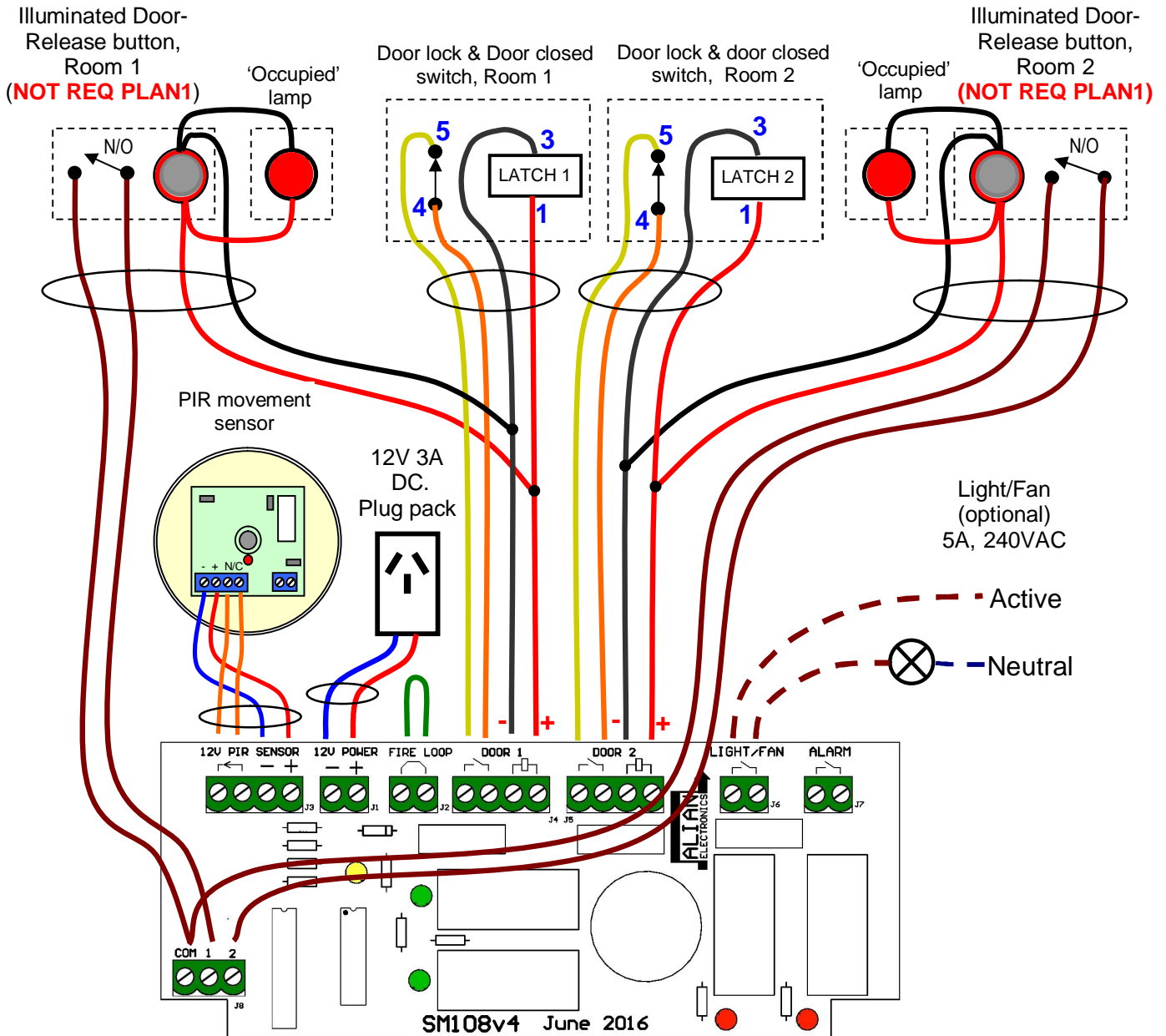
With the latch shown here, the coil wires are the red and black conductors labelled **1** and **3**.

The Normally Closed door switch contacts are the conductors labelled **4** and **5**.

The black contact wires from the latch are ignored.

## ELECTRICAL CONNECTIONS WITHIN A COMPLETE SYSTEM.

- ◆ Note that the Door Release (Exit) Button in each room is a **Normally Open** contact.
- ◆ The numbers on the latch match the BQT screw terminal numbers. Polarity is important.
- ◆ Latch Coil wires (1 + 3) should be 0.33 sq mm per conductor, other wires may be smaller.



### TEST PLUG TOOL

The installer may find it convenient to prepare a Test Plug tool. This is a simple 4-way plug with a small 12V lamp and a switch. It can fit into either of the Door Lock sockets or the PIR sensor socket. When connected to the SM108b the lamp simulates power being connected to a door lock coil and the switch imitates the behavior of the door position sensing switch. The lamp is ON when the lock would be energized.

When fitted to the PIR sensor, the lamp indicates the 12V that powers the sensor. The switch simulate movement activity. With 3 such Test Plugs a complete installation can be simulated and the behavior of the controller can be checked.

