

INSTALLATION / WARRANTY INSTRUCTIONS

SMARTSCAN1 and SMARTSCAN2

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- 2. APPROVALS:** The RCM marking of this product applies to AS/NZS CISPR15:2011 (EMC) "Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment". This product is designed to conform to AS/NZS61347 "Lamp Control Gear".
- 3. STORAGE:** Prior to installation products are to be stored in cool and dry conditions.
- 4. APPLICATION:** The installation application and orientation of the product is designed in accordance with the nominated product IP rating, class designation and these installation installations. Installation environments outside these conditions are not recommended.
- 5. INSTALLATION / GENERAL:** Installation of the product is to be completed by an authorized and licenced electrician, in accordance with these instructions, relevant Australia standards and local regulations (where applicable). All cable terminations must be installed in accordance with the designated IP rating of the product. The mounting facilities provided for the transformer (if any), need only be utilized if in the application of the product is required by AS/NZS3000. **For electronic control equipment (when supplied) DO NOT MEGGER between A and N.**

Recessed Flush Mount 360° PIR Presence Sensor



Designed in Australia to meet Australian Standards and installation conditions.

PATENT PENDING/REGISTERED DESIGN



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1. Product Item

This guide provides installation and configuration information for the Pierlite recessed flush mount 360 degree passive infrared (PIR) presence sensor with one and two channel 16A control modules.

Table 1 - part numbers and components

Package Version	Sensor Head	Control Module
SMARTSCAN1	ILSM02-P, 360° PIR Sensor	ILSCM01-P, 1 Channel 16A (screw terminals)
SMARTSCAN2	ILSM02-P, 360° PIR Sensor	ILSCM02-P, 2 Channel 16A (screw terminals)

2. Important Notes and Safety Information

WARNING – Electric shock may result in serious injury or death. Follow all warnings in this guide and on the product while working in accordance with the latest electrical safety practices.

- ❖ The installer must be suitably qualified and should work in accordance with standard safety procedures for mains-powered electrical equipment.
- ❖ There are no user serviceable parts inside the sensor head or control module. Do not attempt to disassemble or operate the presence sensor with any covers removed.
- ❖ The presence sensor is intended for indoor use only.
- ❖ Consult the manufacturer’s instructions for loads connected to the control module output terminals.

3. Product Summary

The presence sensor package consists of two items: a small 360 degree passive infrared (PIR) sensor head and a control/relay module.

The sensor head is recessed into ceilings and has a low profile trim and opaque dome lens for sensing movement across short and long range plus ambient light level. Adjustment sliders for time and light level are discreetly hidden in the patented sensor head which pops out providing configuration after installation without any tools.

One and two channel control modules for switching loads are slim line and easily fit into the ceiling space through the sensor head aperture.

4. Product Capabilities

Designed for both minor and major movement, the sensor head has 864 fields of view (FOV) ensuring reliable operation up to 7m diameter in different applications (e.g. office or corridor installations). Time delay range is 5 min to 25 min plus a walk test setting of 5 seconds.

Control modules are rated at 16A for switching inductive/capacitive loads with volt free relays. The 2 channel model provides a run-on feature whereby Relay 2 will switch off 5 minutes after the time delay expires.

Both control modules have a switch input that allows for manual override off control of the Relay 1 output.

5. Installation and Wiring Connections

Installing the presence sensor requires a cut-out in the plasterboard ceiling to mount the sensor head and adequate clearance to fit the control module up through the hole if there is no ceiling space access.

The sensor head connects to the control module using the supplied 5 core cable with pre-terminated connector.



Note: The presence sensor must be installed/connected by a suitably qualified person and it is the responsibility of the installer to ensure it is completed in accordance with local wiring regulations.

5.1. Control Module

Using a screwdriver, lever the terminal cover on both sides to remove from the housing. Each of the terminals in the control module accommodates 2x1.5mm² or 1x2.5mm² conductors. Figure 1 details the recommended cable strip lengths for terminating TPS cable to the control module.

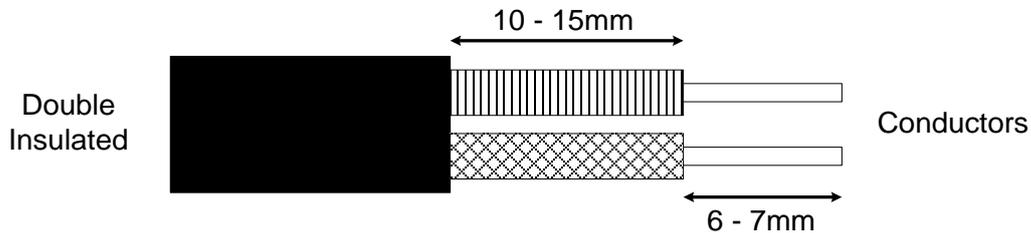


Figure 1 – Conductor strip lengths for control module termination.

The one channel control module has two terminals labelled “Loop”. These terminals have no electrical connection internally and may be used as spare terminals if required. Figures 2 and 3 detail the electrical connections required for the one and two channel control modules respectively.

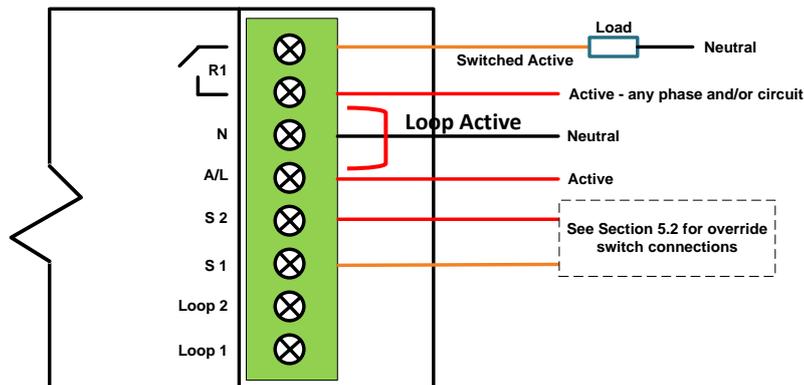


Figure 2 – smartscan1 electrical connections (ILSCM01-D one channel module).

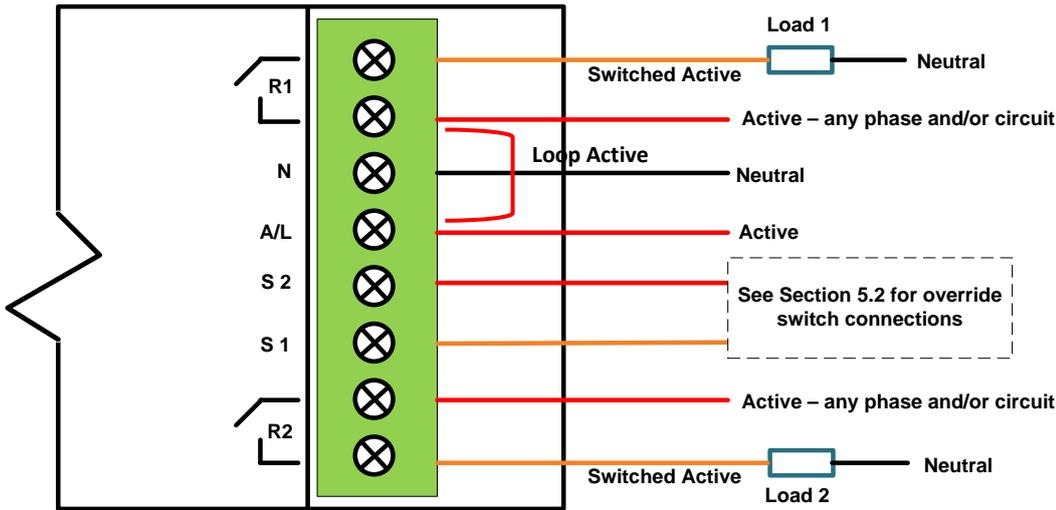


Figure 3 – smartscan2 electrical connections (ILSCM02-D two channel module).

5.2. Override 'OFF'

The presence sensor has an override 'OFF' function that is activated by an external switch connected to the control module. This function only operates Relay 1 for both one and two channel control modules. Relay 2 in the two channel model will continue to operate under presence detection mode.

The override switch has two methods of connection: dry contact switch input across both terminals to make a closed circuit or a switched active input. A latched contact/switch (not momentary/push button) must be used in both methods. Refer to Figure 4 for the electrical connections of the two methods for operating the override function.



Note: Terminals S1 and S2 require a consistent polarity if installing one or more switches to a single or multiple control modules.

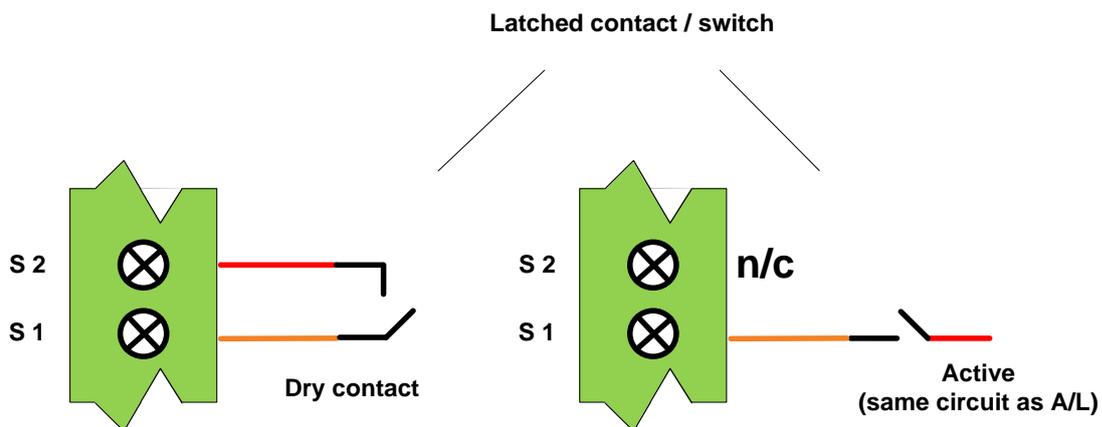


Figure 4 – Override 'OFF' switch connection options.

5.3. Sensor Head

The sensor head is designed to be installed in plasterboard ceiling or ceiling tiles with a thickness of 10mm - 16mm thickness. A 54mm diameter cut-out is required to recess mount the sensor head. Figure 5 shows a cross section of the sensor head installation. A cut-out template is on the presence sensor box for ease of making the cut-out.

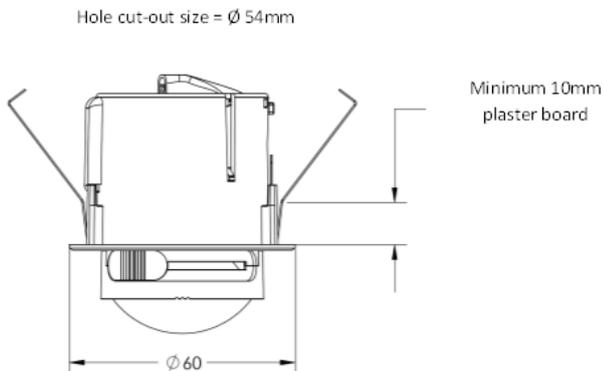


Figure 5 – Installation cross section of sensor head installed in plasterboard ceiling or ceiling tile.



Note: Avoid placing the sensor in positions close to hot or cold air vents and where the field of view extends through doorways. This will reduce the risk of false triggering of the sensor.

The sensor head should be connected to the control module prior to pushing into the ceiling cut-out. Using a screw driver, lift the tab on the control module (refer to Figure 6) to expose the 5 pin connector for the sensor head. Using the supplied 5 core cable with pre-terminated connector, plug the sensor head onto the connector and close the tab, ensuring the cable is gripped properly. The sensor head cable length is 450mm and if required, can be extended to a maximum length of 1 metre.

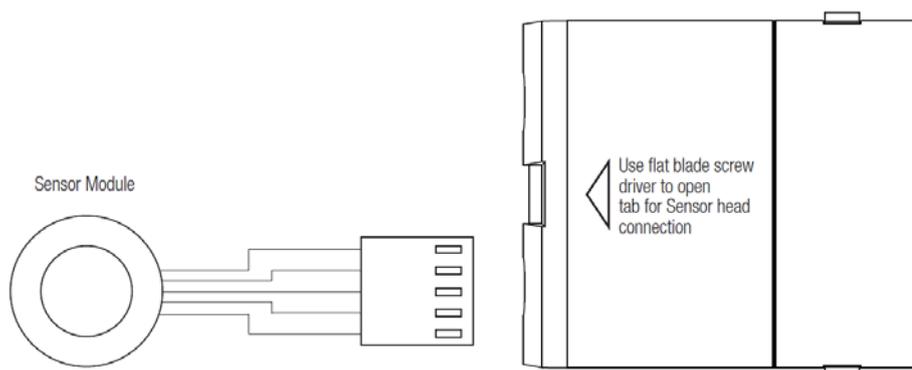


Figure 6 – Lift tab to connect the sensor head to the control module.

Operation and Configuration

Upon power-up the sensor performs an initialisation which will take approximately 45 secs. During this period the relay will close and open forcing the connected load to turn on and off. Once the initialisation has completed, normal operation commences at which full sensitivity is reached after a period of 5 mins.

When the presence sensor is powered and functional, green and red LEDs within the sensor head will indicate mode/operation as defined in Table 2.

Table 2 – LED indicators for each of the operational conditions

Mode	LED Indicator	Condition
Normal Operation	Green LED OFF	Ambient light below threshold setting
	Green LED ON	Ambient light above threshold setting
	Red LED ON	Manual override activated
Walk Test Mode* 	Green LED "Flashing"	Ambient light above threshold setting
	Red LED "Flashing"	Movement detected

*Override mode is disabled during walk test mode.

The time delay and light level threshold settings are easily configured after installation by using the patented push in-pop out mechanism as detailed in Figures 7 and 8.



Figure 7 - Press gently on the lens until a click is heard then release to access sensor adjustment sliders



Figure 8 - Press gently on the head until click is heard to return to normal operating position.

As shown in Figure 8, the adjustable sliders for time delay and light level threshold are accessed when the sensor head is in the out position. Tables 3 and 4 detail the parameters for the time delay and ambient light level adjustable settings.

Table 3 – Settings for adjustable time delay



Position	Time Delay *	Typical Application
	5 Sec	† Walk test: test light level setting and to confirm effective field of view
5	5 Mins	Halls & passages
10	10 Mins	Store rooms
15	15 Mins	Tea rooms
20	20 Mins	Enclosed offices, meeting rooms, bathrooms
25	25 Mins	Open plan offices, reception areas

* Relay 2 will switch off 5 minutes after Relay 1 has switched off (smartscan2 only).

† In Walk Test Mode all relay channels will activate for 5 seconds only.



Table 4 - Settings for adjustable light level threshold

Position	Lux Threshold*	Typical Application
∞	Disabled	Test setting to confirm effective field of view
1	20 Lux	Halls and passages
2	40 Lux	Store rooms, tea rooms, bathrooms
3	80 Lux	Closed offices
4 (Factory default)	160 Lux	Open plan offices, meeting rooms
5	320 Lux	Reception areas

* If the ambient light has exceeded the set threshold, Relay 1 will not switch on. Relay 2 will not be affected by the threshold setting and will operate as per normal (smartsan2 only).



Note: The lux level threshold values shown in Table 4 refer to the minimum light level incident on the sensor. Typical room light levels are considerably larger. Surfaces and materials in the space being controlled will determine the amount of reflected light onto the sensor head.

6. Presence/Occupancy Detection

The Passive Infra-red (PIR) sensor uses an advanced detector and lens array to provide the ultimate coverage in its class. The sensor head has two distinct detection sensitivity zone categories, major movement and minor movement.

Major Movement¹ (Occupancy) is defined as a 60kg person, walking at >1m/s, across the field of view, with a background ambient temperature of 20°C.

The PIR sensor will detect *Major Movement* within a 7m diameter circular area of its position when mounted at 2.7m from the floor as shown in Figure 9.

Minor Movement¹ (Presence) is defined as a hand and forearm at 0.9m from the floor moving through a 90° arc in <1.5 sec with a background ambient temperature of 20°C.

The PIR sensor will detect *Minor Movement* within a 3.5m diameter circular area of its position when mounted at 2.7m from the floor as shown in Figure 9.¹ Referenced from the NEMA Guide Publication WD 7-2011, Occupancy Motion Sensors Standard, National Electrical Manufacturers Association, Virginia, USA, 2012

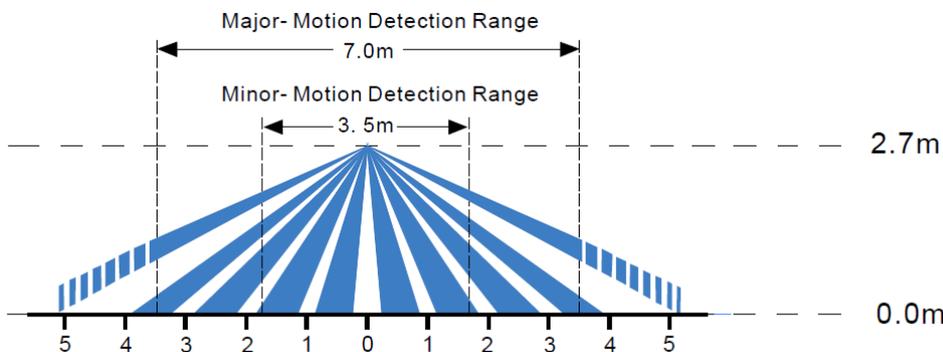


Figure 9 – Detection coverage when mounted at 2.7m



Note: Additional detection outside these areas may be noticed subject to external temperature, mounting height and movement activity.

The advanced lens array of the sensor allows for superior occupancy/presence detection with 864 zones as outlined in Table 5.

Table 5 – Fields of View (FOV)

Range	Long Range	Mid-range	Short-range	Look-down	Total
Fields of view (FOV)	192	384	256	32	864

The FOV patterns in Figures 10 and 11 (top-view) show the dense array of sensitivity available for maximum detection from the advanced lens array at floor and desk level with sensor mounting height of 2.7m.

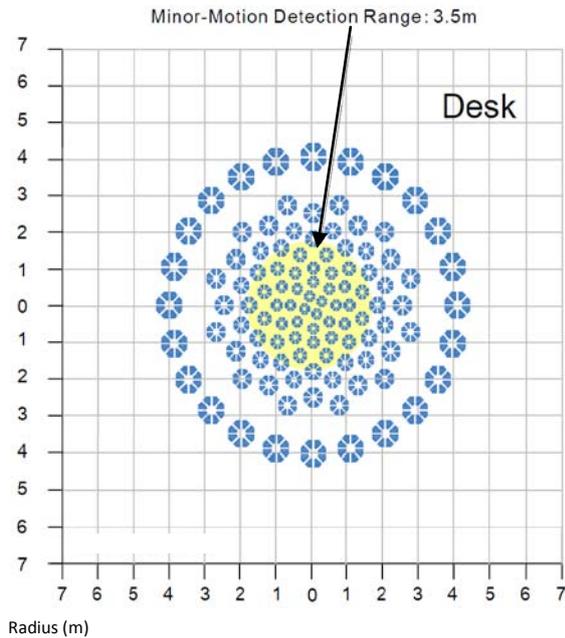


Figure 10 – FOV intersection with desk (0.8m high), top-view, mounted at 2.7m

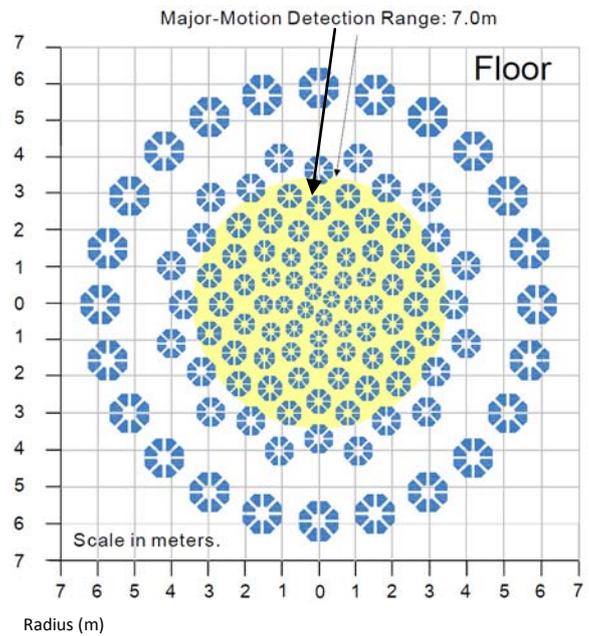


Figure 11 – FOV intersection with floor, top-view, mounted at 2.7m

7. Power Surges

The presence sensor control module should only be connected to a mains supply within the range stated in Section 10. Nominal fluctuations in mains supply voltage will have no effect on the control module as the dc output to the sensor head remains stable. However induced voltages or surges may occur on electrical circuits in an installation as a result of excessive voltages from external influences which can damage electronic equipment. It is strongly recommended that the electrical installation be fitted with suitable over-voltage protection at the electrical switchboard to avoid these situations.

8. Insulation Resistance Testing

Generally it is not a requirement to perform an IR test on the PIR control module. In the event it is required, the PIR control module cables must be disconnected from the mains supply to conduct the test and then reconnected.

9. Product Specifications

Parameter	Specification	
	SMARTSCAN1 (1 channel model)	SMARTSCAN2 (2 channel model)
Input voltage (control/power module)	220 – 240 ac	
Input current (control/power module)	2mA (Relay Off) 11mA (Relay ON)	2mA (Relay Off) 20mA (Relays ON)
Frequency	50/60Hz	
Output rated current (control/power module)	16A per relay channel	
Output voltage (sensor head)	12V dc nominal	
Output current (sensor head)	8mA nominal under normal detection with a single sensor.	
Isolation	≥3.75kV ac (Mains/Sensor Head) / SELV	
Remote Override	A maximum of 10 remote switches can be connected with up to 20m of cable on the same circuit.	
Start-up time	45 sec initialisation (5 mins for full sensitivity)	
Ambient operating temperature	-10°C to +45°C	
Ambient storage temperature	-10°C to +60°C	
Humidity	10% – 95% RH, non-condensing	
Sensor head cable	Factory fitted – 0.45m Maximum custom – 1.0m	
Mains supply terminals (including override)	Screwed – 2 x 1.5mm ² or 1 x 2.5mm ²	
Conductor strip length	6-7mm	
Ingress protection	IP20	
Material	Flame retardant polycarbonate	
Weight	178g	192g
Ceiling cut-out	54mm diameter	
Dimensions	Refer to Figures 12 and 13	
Compliance	    	

10. Standards and Compliance

The SMARTSCANx product is designed to meet/exceed the following Australian and International standards:

Australian/New Zealand EMC and Electrical Safety Frameworks and Standards

Regulation	Standard	Title
Electrical Safety	AS/NZS 61347.1:2002	Lamp controlgear - General and safety requirements (IEC 61347-1:2000, MOD)
	AS/NZS 61347.2.2	Lamp controlgear - Particular requirements for d.c. or a.c. supplied electronic step-down convertors for filament lamps (IEC 61347-2-2, Ed. 1.2 (2006) MOD)
EMC	AS/NZS CISPR 15:2011	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment (CISPR 15, Ed.7.2 (2009) MOD)

Other International Directives and Standards

Regulation	Standard	Title
EMC	EN 55015:2006	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
	EN 61547:2009	Equipment for general lighting purposes - EMC immunity requirements
	EN 61000-3-2:2006	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current $\leq 16A$ per phase)
	EN 61000-3-3:2008	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16A$ per phase and not subject to conditional connection

11. Product Warranty

Pierlite Standard terms and conditions of sale apply, see www.pierlite.com for the latest documentation.