POLYMER OPTICS LTD™
intelligent engineering with light

CAP LENS RANGE

FOR PIR MOTION SENSING

LENSES FOR PASSIVE INFRARED (PIR) MOTION DETECTION

FEATURES

- Designed to press onto standard T05 pyro
- Horizontal curtain and circular beam patterns
- Choice of profile shape to suit product styling
- Designed using optical ray-tracing software
- Compact shape with clearance for components
- Available in natural, white and black colours

APPLICATIONS

- Office and household lighting control
- Motion detection for security applications
- Individual luminaire switching
- Fan and air conditioning control
- Control panel illumination for appliances
- Vending machines, ATM's, streetlights

Dome Cap Lens HC

For applictions where a horizontal curtain detection pattern is preferred. For example, wall mounted or placed on a bookshelf. Dome shape gives superior performance.

Dome Cap Lens 360

For applictions where a 360 degree detection pattern is preferred. For example, ceiling or pole mounted. Compact detection zones with high sensitivity to small movements.

Dome Cap Lens WA

For ceiling or pole mounted applictions where a wider detection is required. For example, to detect all targets within the room, especially those moving across the edge of the room.

Flat Cap Lens HC

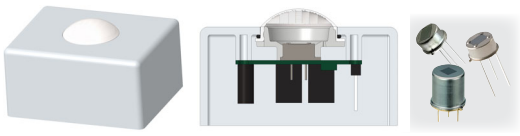
For applications requiring a horizontal curtain pattern, usually wall mounted, but with the emphasis being on aesthetic appearance.

Flat Cap Lens 360

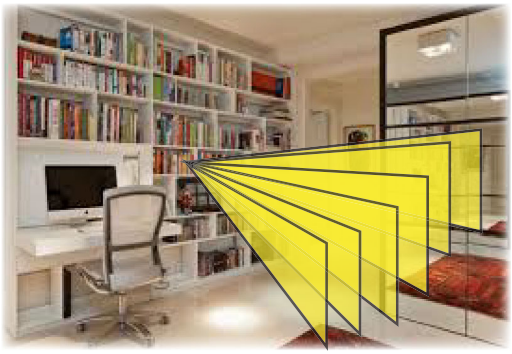
For ceiling or pole mounted applications requiring a 360deg beam pattern, but with the emphasis being on aesthetic appearance.

Flat Cap Lens HC+

For wall mounted applications requiring a volumetric beam pattern. The lens will capture longer distace targets and those closer to the lens.



Lens pushes onto TO5 pyro. Slot in flange ensures correct orientation with pyro. Casing traps lens flange so that lens is held securely. 'O' ring can be used to seal. Lens has clearance for PCB components. Sealed lens environment prevents false detections from contamination and air movement. Indicator LED can project light through lens.



Small and compact, these lenses are suitable for numerous security and lighting applications, in the office, or around the home. Available in FOUR beam pattern versions, horizontal curtain (HC), 360deg ceiling, wide angle and HC Plus, there is a lens suitable for every application.

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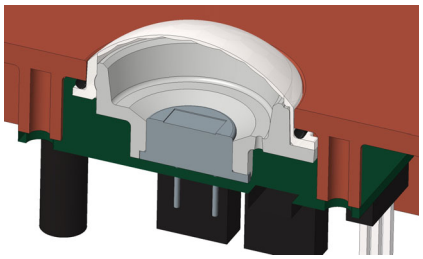
DOME CAP LENS HORIZONTAL CURTAIN (HC)

FOR PIR MOTION SENSING

OVERVIEW

High performance motion detection lens for security and lighting applications. Horizontal curtain (HC) beam pattern with 100deg FOV and up to 12m range. Ideal for portable security devices where pet immunity is required. Pyro not included.

Dome Cap Lens HC

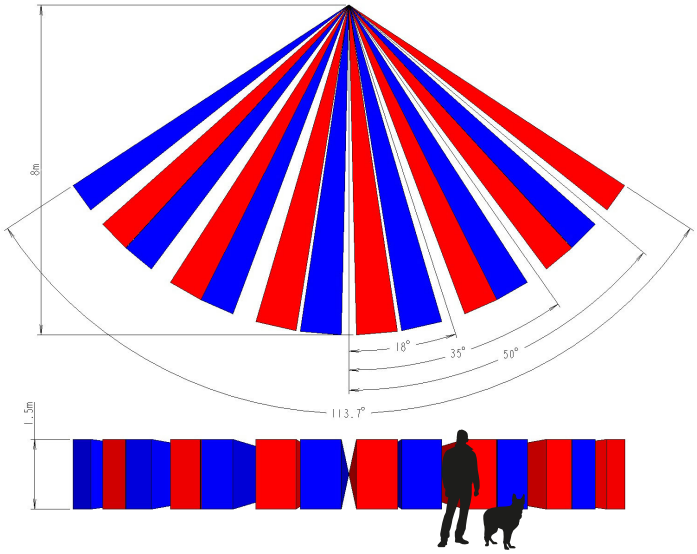


Typical mounting method: 20x1mm o-ring stretched around lens flange. PCB screwed to housing via pillars. Orientation tab sits in channel next to fixing pillar.

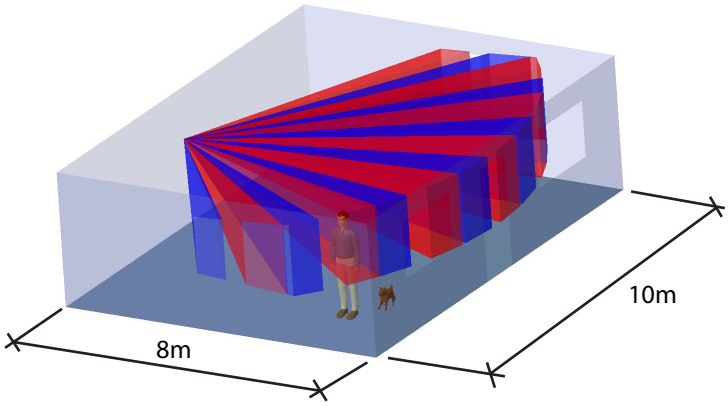
FEATURES

- Designed to press onto standard T05 pyro
- Automatically sets correct focal distance
- Fresnel lenses fo maximise IR collection
- Spherical shape creates natural rigidity
- Designed using optical ray-tracing software
- Compact shape with clearance for pcb components
- Available in natural, white and black colours

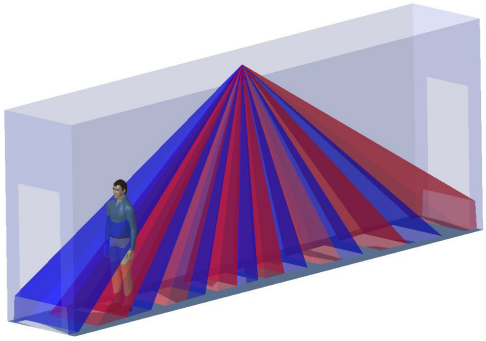
Part Number	Drawing	Colour
707-N	A3-10707	Natural
707-W	A3-10707	White
707-B	A3-10707	Black



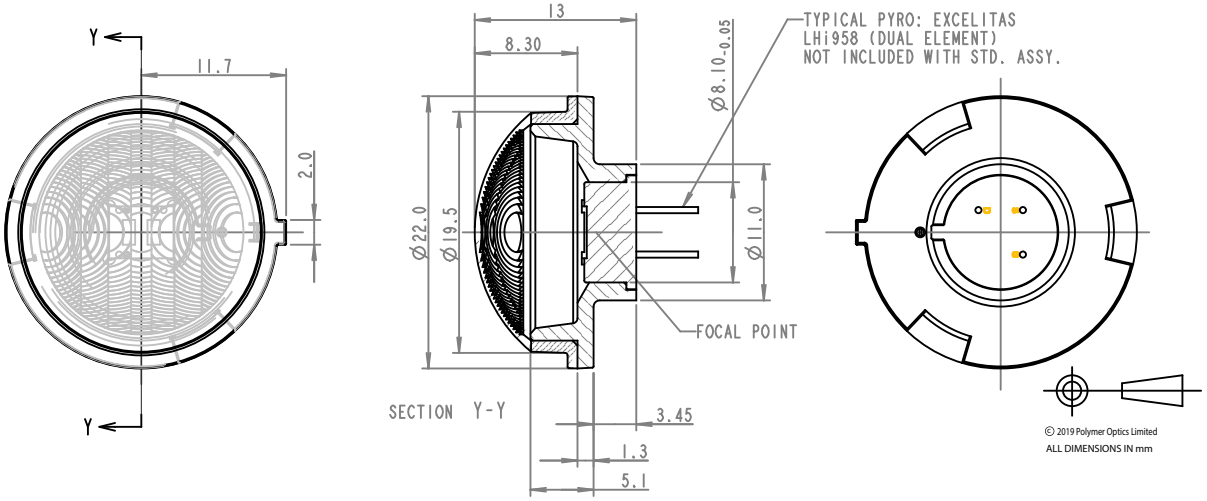
Theoretical zone plot. Optimum range is 8m.
Maximum Range 12m depending on electronic gain



Typical application 1: Bookshelf device, mounted 1.5m above floor, detects humans, immune to pets.



Typical application 2: Ceiling mounted corridor detection. Ideal for ceiling mounted luminaires. Detector is immune from air movement around windows and doors.



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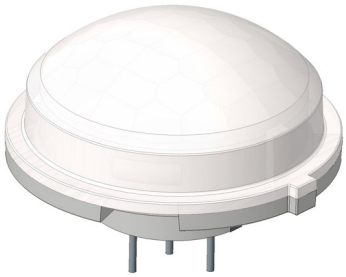
DOME CAP LENS CEILING 360

FOR PIR MOTION SENSING

OVERVIEW

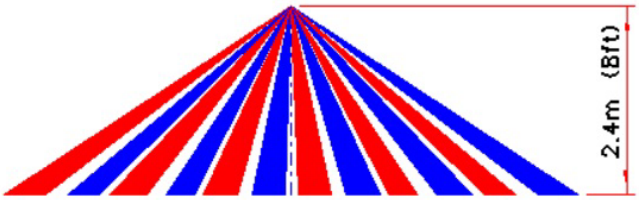
High performance motion detection lens for security and lighting applications. 360deg beam pattern with 100deg FOV and up to 7m field at 2.4m mounting height, ideal for ceiling mount applications. Tightly packed zones for minor motion detection.



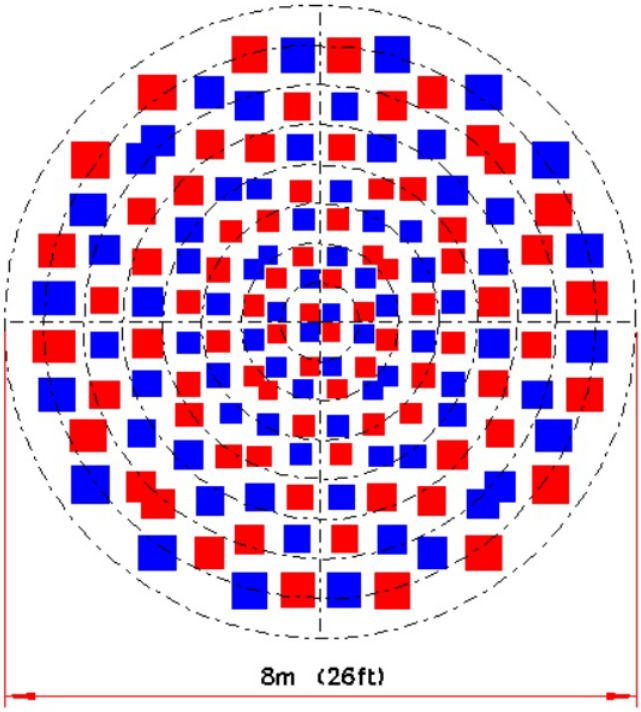
Dome Cap Lens 360

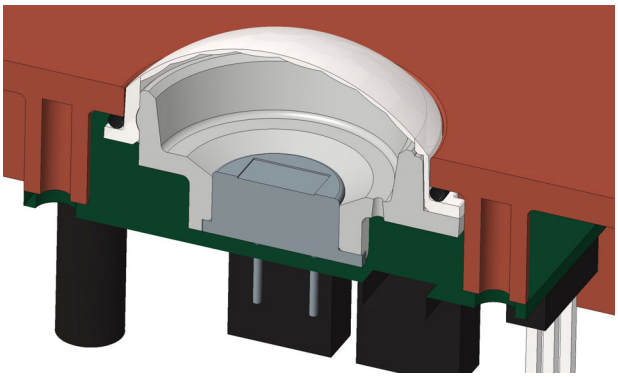
FEATURES

- Designed to press onto standard T05 pyro
- Automatically sets correct focal distance
- Designed using optical ray-tracing software
- Compact shape with clearance for pcb components
- Available in natural, white and black colours

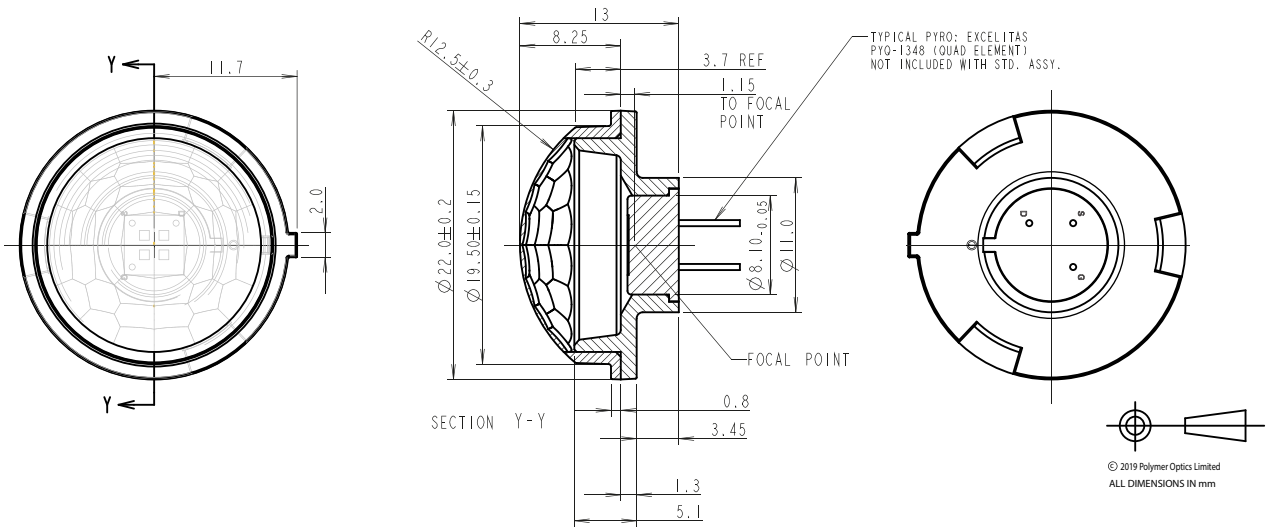


Part Number	Drawing	Colour
709-N	A3-10709	Natural
709-W	A3-10709	White
709-B	A3-10709	Black





Typical mounting method: 20x1mm o-ring stretched around lens flange. PCB screwed to housing via pillars. Orientation tab sits in channel next to fixing pillar.



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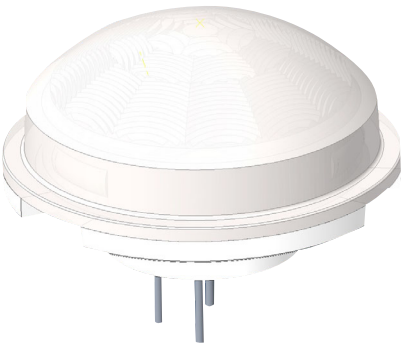
DOME CAP LENS WIDE ANGLE (WA)

FOR PIR MOTION SENSING

OVERVIEW

Wide angle motion detection lens, recommended for lighting applications. Used in ceiling or pole mounted configurations up to 4m high. Ideal for detecting targets moving around edge of room rather than directly beneath the sensor.

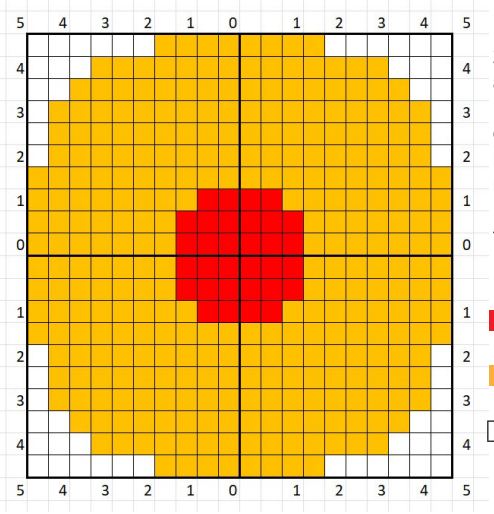


Dome Cap Lens WA

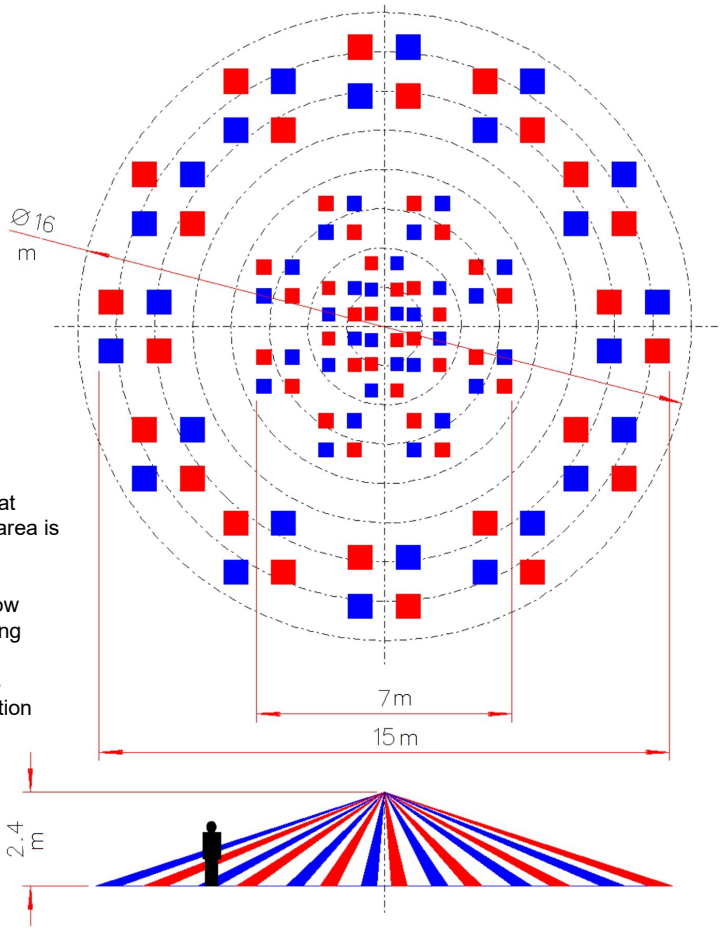
FEATURES

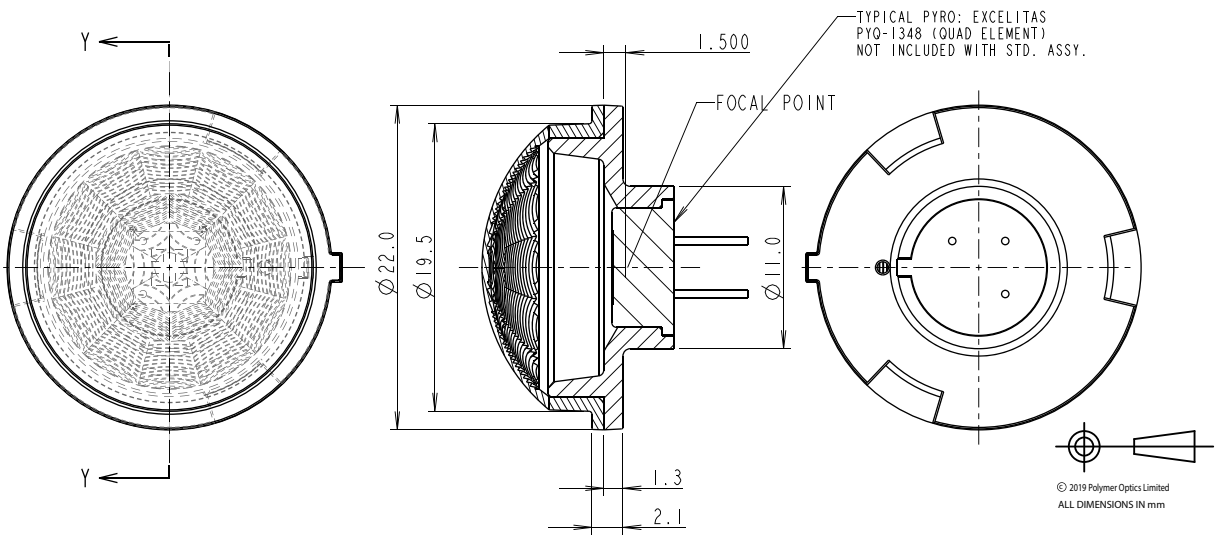
- Designed to press onto standard T05 pyro
- Automatically sets correct focal distance
- Designed using optical ray-tracing software
- Compact shape with clearance for pcb components
- Available in natural, white and black colours

Part Number	Drawing	Colour
1243-N	A3-11243	Natural
1243-W	A3-11243	White
1243-B	A3-11243	Black



Note: When mounted at 2.4m, typical sensing area is a 10m diameter circle. Beyond this area, the detection beam is below knee height and sensing may be less reliable. Diagram on left shows typical walk test detection





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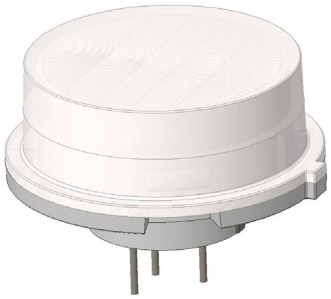
FLAT CAP LENS HORIZONTAL CURTAIN (HC)

FOR PIR MOTION SENSING

OVERVIEW

Motion detection lens for security and lighting applications. Horizontal curtain (HC) beam pattern with 100deg FOV and up to 8m range. Ideal for portable security devices where pet immunity is required. Lens can be mounted flush with product housing which is ideal for devices where aesthetic appearance is important. Pyro not included.

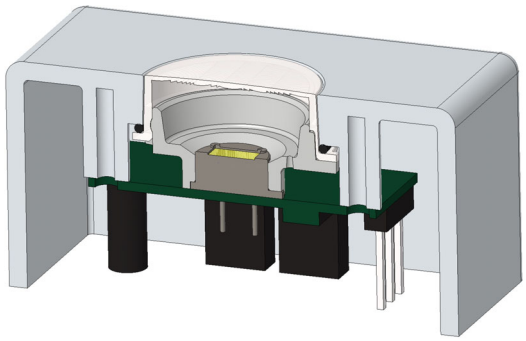


Flat Cap Lens HC

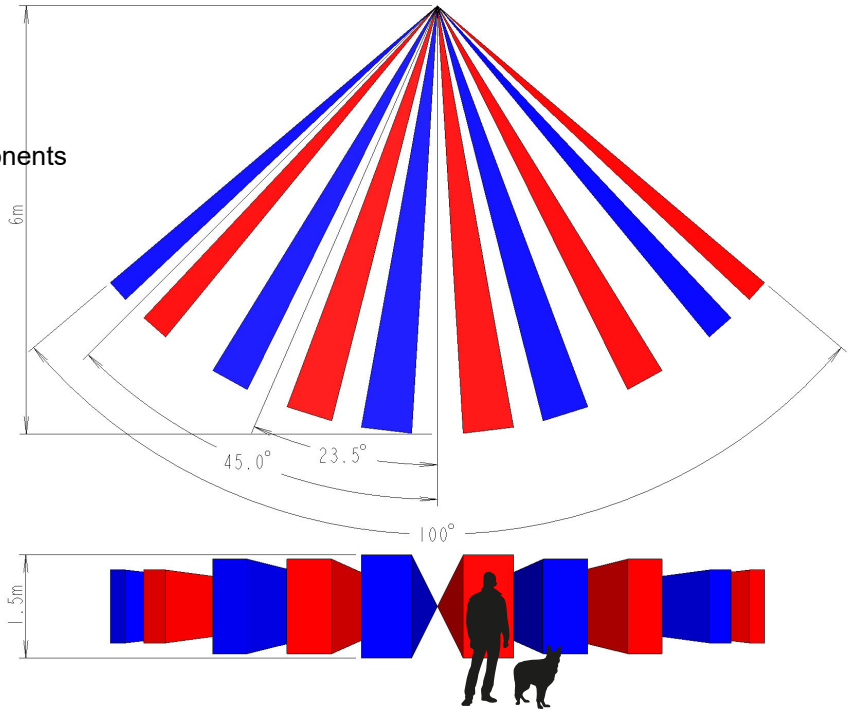
FEATURES

- Designed to press onto standard T05 pyro
- Automatically sets correct focal distance
- Fresnel lenses fo maximise IR collection
- Designed using optical ray-tracing software
- Compact shape with clearance for pcb components
- Available in natural, white and black colours

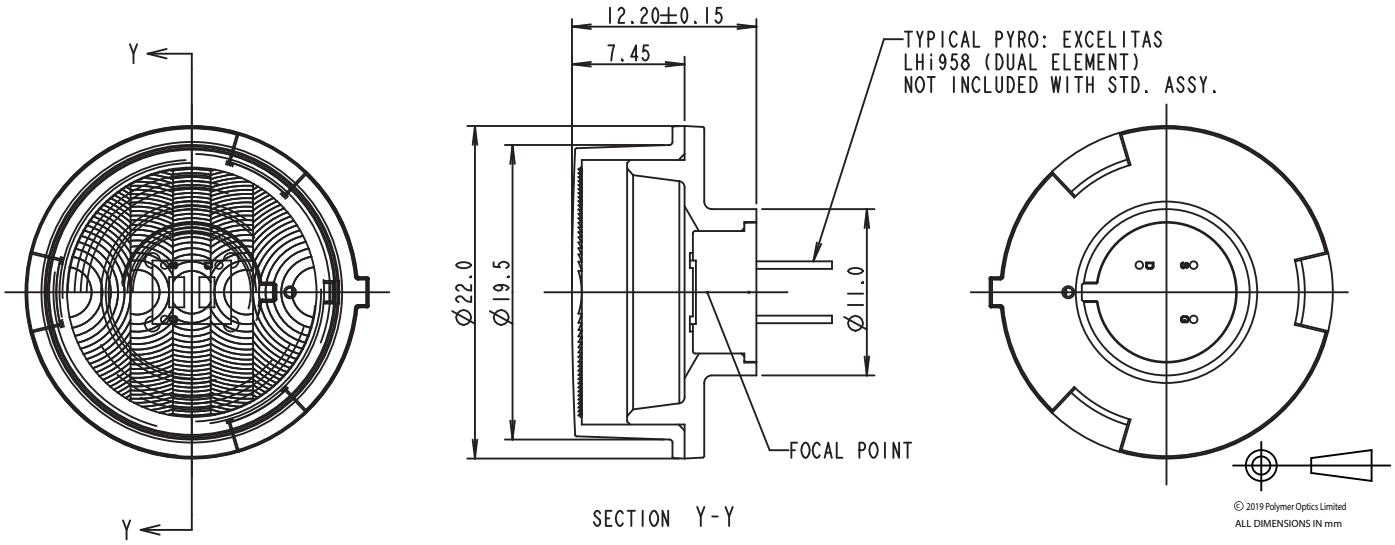
Part Number	Drawing	Colour
711-N	A3-10711	Natural
711-W	A3-10711	White
711-B	A3-10711	Black



Typical mounting method: 20x1mm o-ring stretched around lens flange. PCB screwed to housing via pillars. Orientation tab sits in channel next to fixing pillar.



Theoretical zone plot. Optimum range is 6m.
Maximum Range 8m depending on electronic gain



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FLAT CAP LENS
CEILING 360

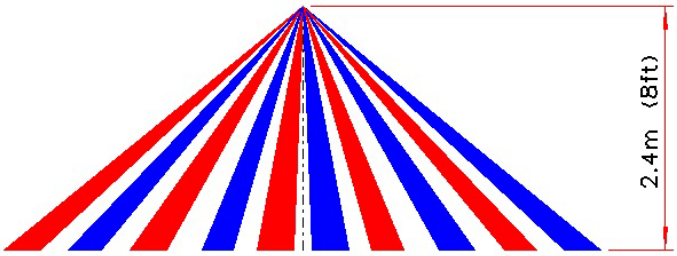
FOR PIR MOTION SENSING

OVERVIEW

Motion detection lens for security and lighting applications. 360deg beam pattern with 100deg FOV within 6m diameter area. Lens can be flush mounted with product housing - ideal for devices where strong aesthetic appearance is important.

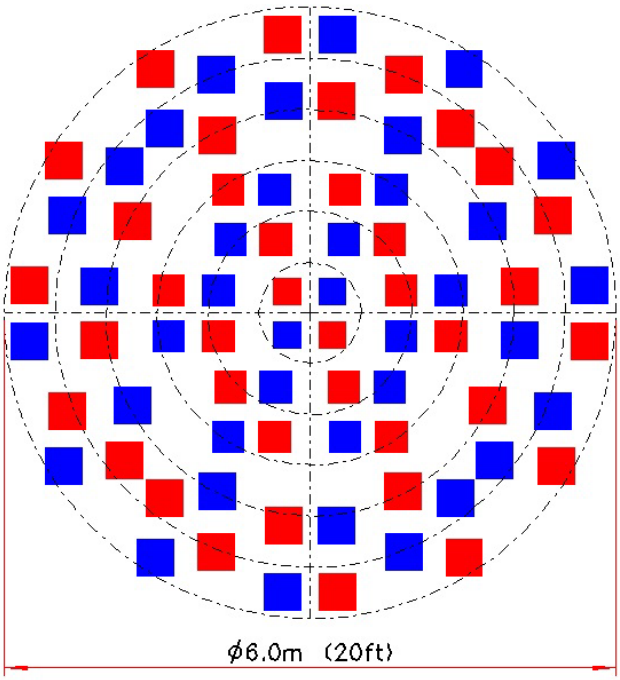
FEATURES

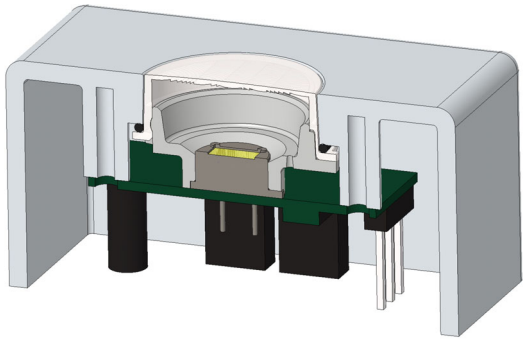
- Designed to press onto standard T05 pyro
- Fresnel lenses fo maximise IR collection
- Uses POL's unique free-form Fresnel system
- Designed using optical ray-tracing software
- Compact shape with clearance for pcb components
- Available in natural, white and black colours



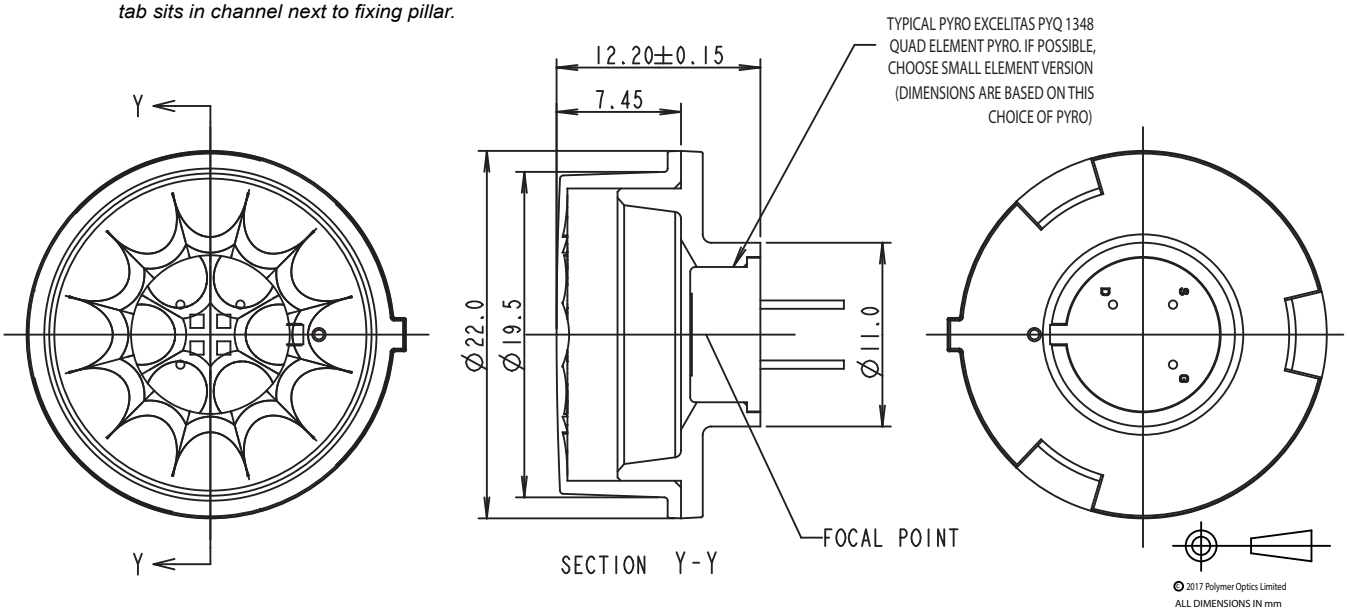
Part Number	Drawing	Colour
713-N	A3-10713	Natural
713-W	A3-10713	White
713-B	A3-10713	Black

Note: White material has 25% lower IR transmission than natural material.
Black material has 35% lower IR transmission than natural material.





Typical mounting method: 20x1mm o-ring stretched around lens flange. PCB screwed to housing via pillars. Orientation tab sits in channel next to fixing pillar.



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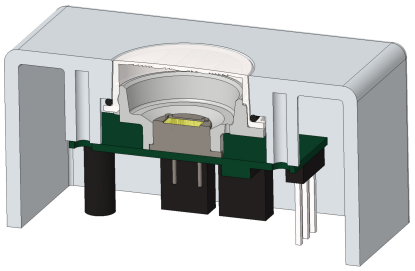
FLAT CAP LENS HC PLUS

FOR PIR MOTION SENSING

OVERVIEW

Motion detection lens for security and lighting applications. Volumetric beam pattern with 100deg FOV and 10m range*. With mid-range and creep zones. Ideal for portable security devices. Lens can be mounted flush with product housing which is ideal for devices where aesthetic appearance is important. Pyro not included.

Flat HC Plus Lens



Typical mounting method: 20x1mm o-ring stretched around lens flange. PCB screwed to housing via pillars. Orientation tab sits in channel next to fixing pillar.

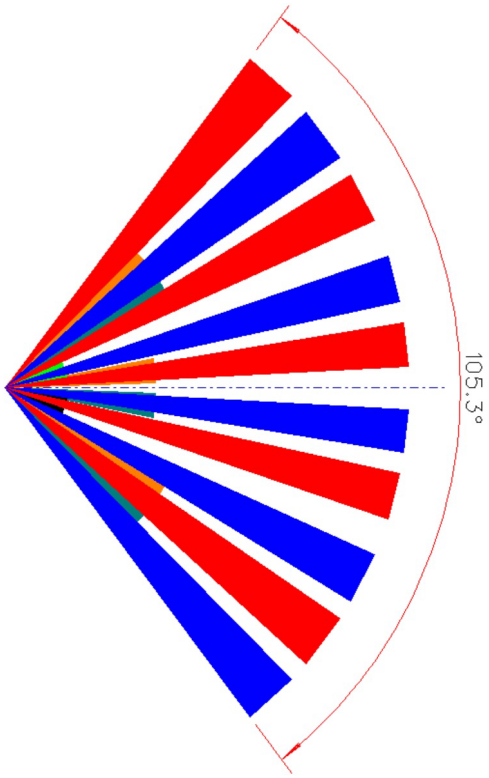
FEATURES

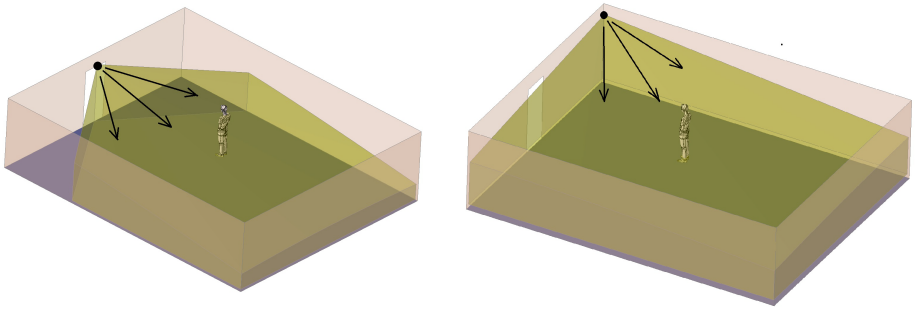
- Designed to press onto standard T05 pyro
- Included holder, automatically sets correct focal distance
- Free-form Fresnel lenses fo maximise IR collection and reduce distortion
- Designed using optical ray-tracing software and manufactured in UK
- Compact shape with clearance for pcb components
- Available in natural, white and black colours, HDPE material

* In tests, >10m range has been achieved, however range is also subject to environmental conditions and quality of electronics and software.

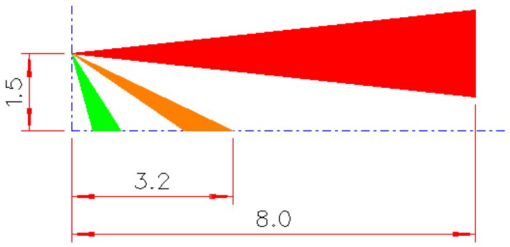
Part Number	Drawing	Colour
1125-N	A3-11125	Natural
1125-W	A3-11125	White
1125-B	A3-11125	Black

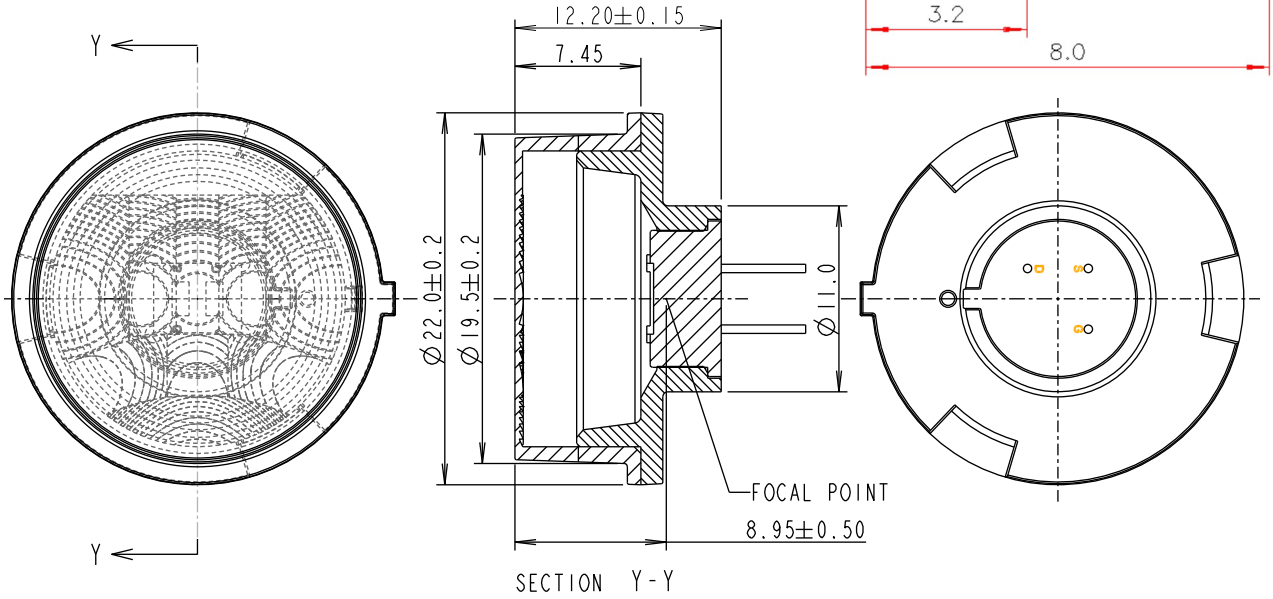
Note: White material has 25% lower IR transmission than natural material.
Black material has 35% lower IR transmission than natural material.





When mounted at 2.1m with a 15deg downward tilt, then any movement of less than 2m in any direction will cause detection within this area of an 8x5m room





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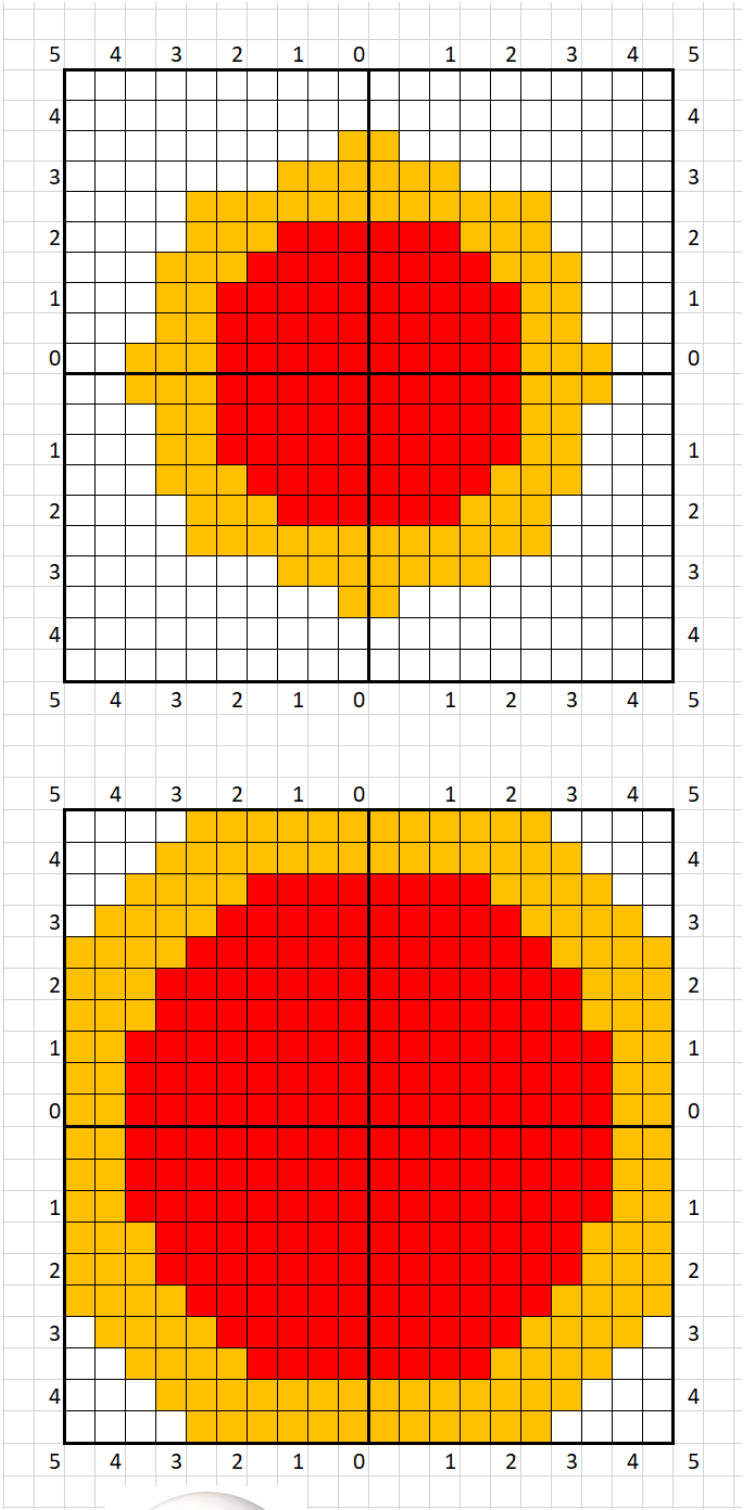
Walk Test Results for DOME Cap Lens 360 (ceiling version)

Walk Test with detector mounted at 2.4m height



Each square is 0.5m x 0.5m.
Overall grid size is 10m x 10m.

Minor motion detection.
Hand or leg movements within each 0.5m square are enough to trigger the sensor.

Major motion detection.
Sensor is triggered when human target moves from one 0.5m square to an adjacent 0.5m square.

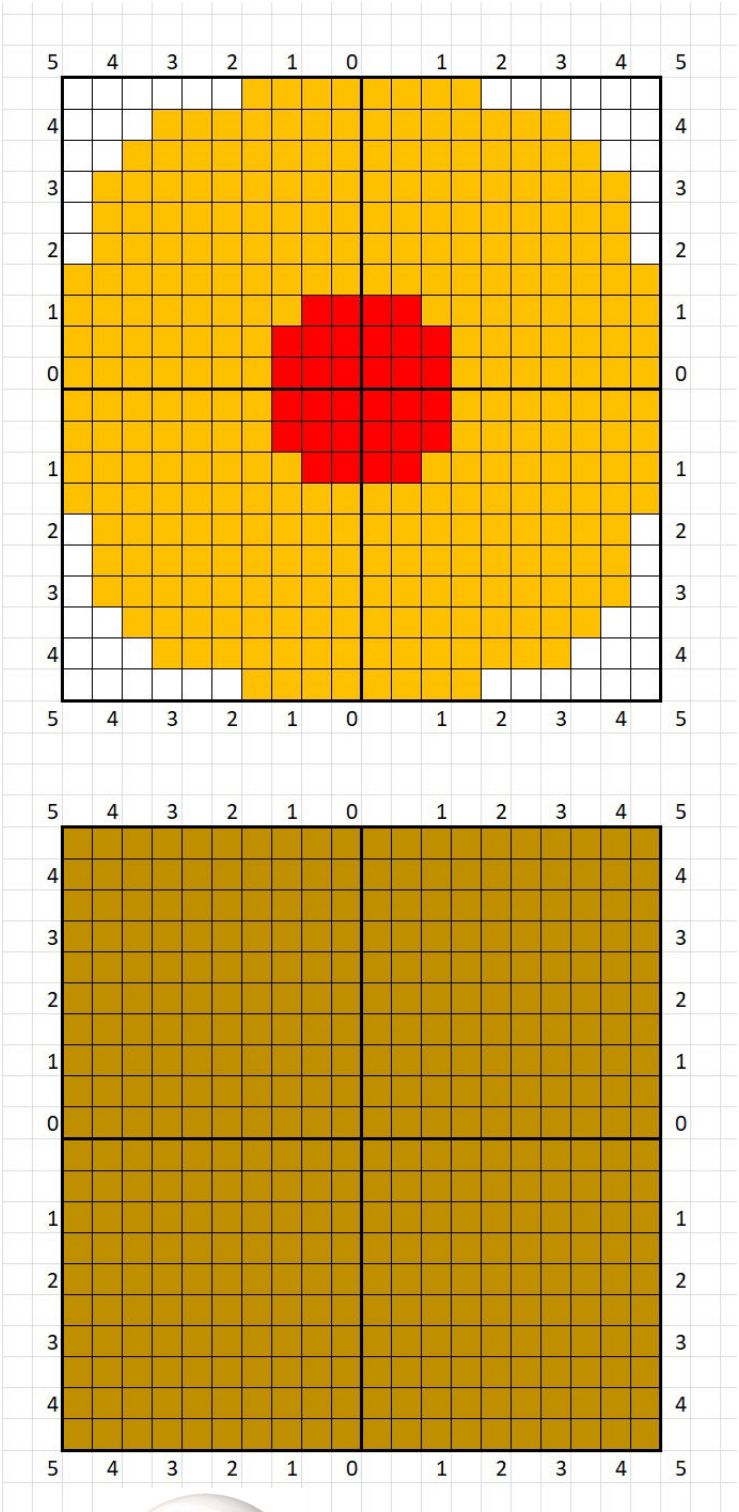
No detection.
Sensor was not triggered in this area

Walk Test with detector mounted at 4m height

Notes:-
1. Sensor was set on low-sensitivity mode.
2. Dual element pyro used for both tests. Performance would be better with quad pyro.
3. Room temperature 21degC
4. Performance will vary depending on type of pyro and electronic circuit. Diagrams represent likely performance with typical sensor devices used for lighting control.
5. Lens moulded in natural (clear) material.

Walk Test Results for DOME Cap Lens WA (ceiling version)

Walk Test with detector mounted at 2.4m height



Walk Test with detector mounted at 4m height (as pictured)

Each square is 0.5m x 0.5m.
Overall grid size is 10m x 10m.

Minor motion detection.
Hand or leg movements within each 0.5m square are enough to trigger the sensor.

Major motion detection.
Sensor is triggered when human target moves from one 1m square to an adjacent 1m square.

Motion detection.
Sensor is triggered when human target moves less than 2m from the previous detection.

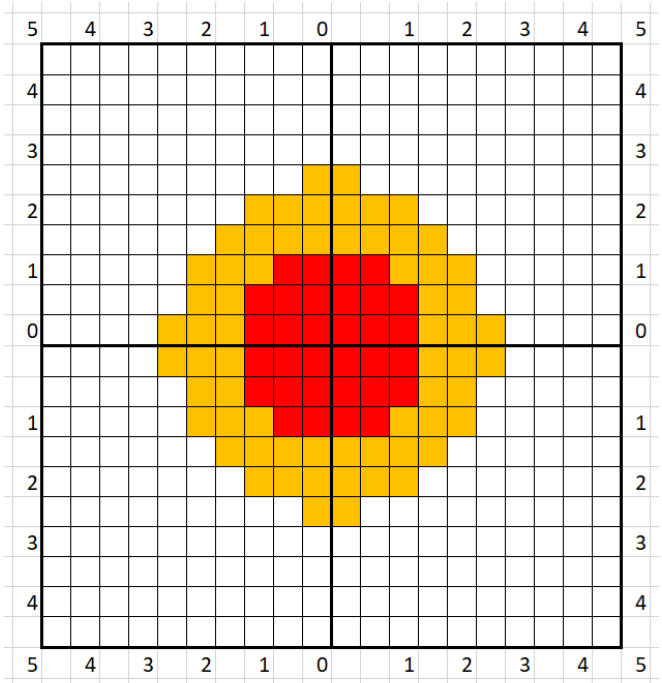
No detection.
Sensor was not triggered in this area

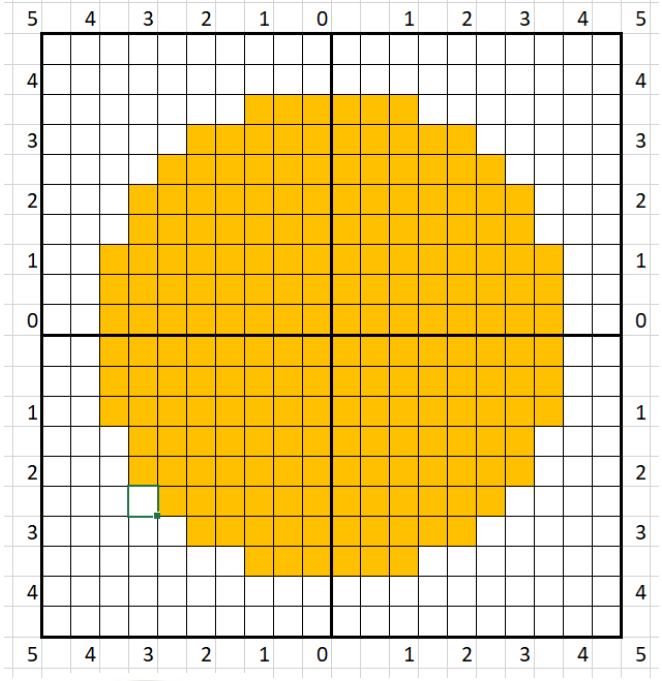
Notes:-

1. Quad element pyro used for both tests.
2. Room temperature 21degC
3. Performance will vary depending on type of pyro and electronic circuit. Diagrams represent likely performance with typical sensor devices used for lighting control.
4. Lens moulded in natural (clear) material.

Walk Test Results for FLAT Cap Lens 360 (ceiling version)

Walk Test with detector mounted at 2.4m height





Walk Test with detector mounted at 4m height

Each square is 0.5m x 0.5m.
Overall grid size is 10m x 10m.

Minor motion detection.
Hand or leg movements within each 0.5m square are enough to trigger the sensor.

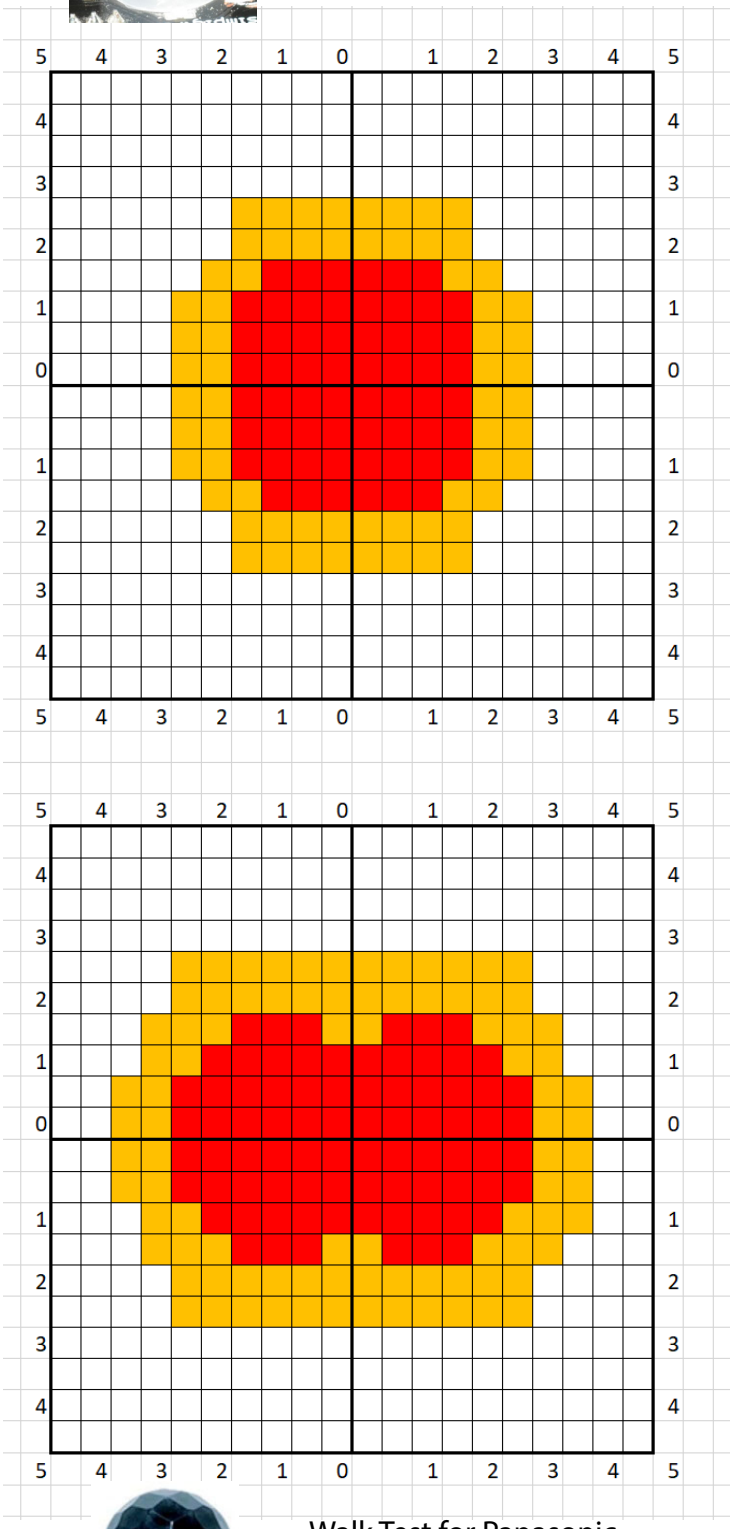
Major motion detection.
Sensor is triggered when human target moves from one 0.5m square to an adjacent 0.5m square.

No detection.
Sensor was not triggered in this area

Notes:-
1. Sensor was set on low-sensitivity mode.
2. Dual element pyro used for both tests. Performance would be better with quad pyro.
3. Room temperature 21degC
4. Performance will vary depending on type of pyro and electronic circuit. Diagrams represent likely performance with typical sensor devices used for lighting control.
5. Lens moulded in natural (clear) material.

Walk Test Results for Similar Competitor Lenses

Walk Test for Carclo Diamond 37 Lens with detector mounted at 2.4m height



Walk Test for Panasonic Napion 10m Lens with detector mounted at 2.4m height

Each square is 0.5m x 0.5m.
Overall grid size is 10m x 10m.

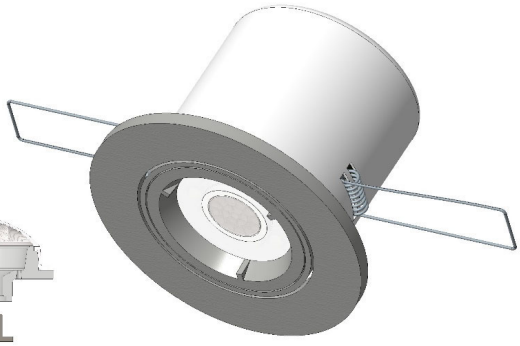
Minor motion detection.
Hand or leg movements within each 0.5m square are enough to trigger the sensor.

Major motion detection.
Sensor is triggered when human target moves from one 0.5m square to an adjacent 0.5m square.

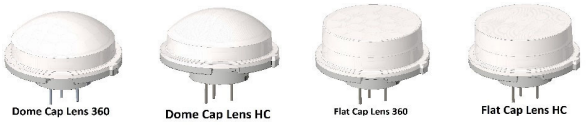
No detection.
Sensor was not triggered in this area

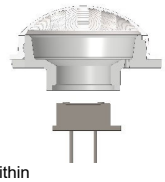
Notes:-
1. Carclo sensor was set on low-sensitivity mode.
2. Dual element pyro used for for Carclo test.
3. Napion lens uses Panasonic quad pyro.
4. Room temperature 21degC
5. Performance will vary depending on type of pyro and electronic circuit. Diagrams represent likely performance with typical sensor devices used for lighting control.
6. Both lenses moulded in natural (clear) material.

Case Study: Ceiling Downlight



The Polymer Optics Cap Lens is designed for passive Infrared (PIR) motion detection. The lens is available in two versions (i) domed and (ii) flat, and each variant has two beam configurations (a) 360 circular pattern and (b) horizontal curtain pattern.

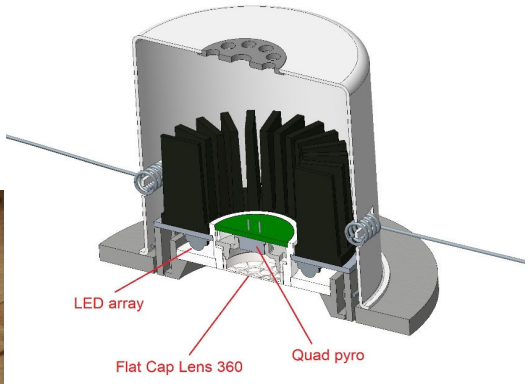




There are numerous applications for these lenses, but one of the most interesting is within ceiling downlighters.

The PIR lens assembly is small and compact, and can easily fit between an LED array. The self-contained nature of the PIR assembly shields the pyro from unwanted heat and dust particles.

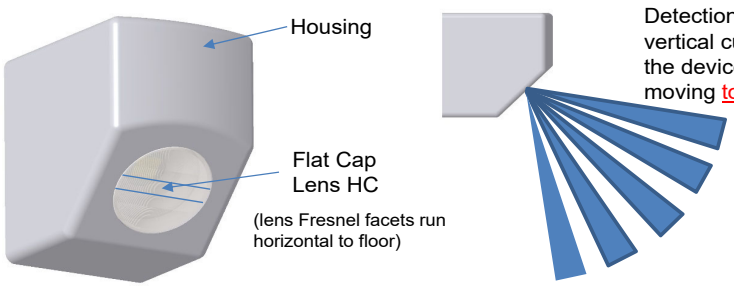
While the domed lens provides superior performance, the flat lens solution provides an aesthetic advantage, and for most downlight applications it would be the preferred choice.



Case Study: Automatic Door Control

The Polymer Optics Cap Lens is designed for passive Infrared (PIR) motion detection. The lens is available in two versions (i) domed and (ii) flat, and each variant has two beam configurations (a) 360 circular pattern and (b) horizontal curtain pattern HC.

The Cap Lens HC is designed for wall or shelf mounted devices, but one of the most interesting applications is door entry control systems. When used for this purpose the lens should be rotated through 90deg so that the lens projects a series of zones in a vertical curtain pattern.



CAP LENS PRODUCT LIST

FOR PIR MOTION SENSING

					Lens Only
 DOME HC	Natural	707-N	Dome Cap Lens HC (Natural)	A3-10707	708-N
	White	707-W	Dome Cap Lens HC (White)		708-W
	Black	707-B	Dome Cap Lens HC (Black)		708-B
 DOME 360	Natural	709-N	Dome Cap Lens 360 (Natural)	A3-10709	710-N
	White	709-W	Dome Cap Lens 360 (White)		710-W
	Black	709-B	Dome Cap Lens 360 (Black)		710-B
 FLAT HC	Natural	711-N	Flat Cap Lens HC (Natural)	A3-10711	712-N
	White	711-W	Flat Cap Lens HC (White)		712-W
	Black	711-B	Flat Cap Lens HC (Black)		712-B
 FLAT 360	Natural	713-N	Flat Cap Lens 360 (Natural)	A3-10713	714-N
	White	713-W	Flat Cap Lens 360 (White)		714-W
	Black	713-B	Flat Cap Lens 360 (Black)		714-B
 FLAT HC+	Natural	1125-N	Flat Cap Lens HC+ (Natural)	A3-11125	1124-N
	White	1125-W	Flat Cap Lens HC+ (White)		1124-W
	Black	1125-B	Flat Cap Lens HC+ (Black)		1124-B
 WIDE ANGLE	Natural	1243-N	WA Dome Cap Lens (Natural)	A3-11243	1244-N
	White	1243-W	WA Dome Cap Lens (White)		1244-W
	Black	1243-B	WA Dome Cap Lens (Black)		1244-B

Holder: Part No. 720, drg: A3-10720