

# Evacuate everyone

## Sonos Pulse & Nexus Pulse



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## EN54-23 Fire Beacons

In a fire, everyone matters. Sonos Pulse and Nexus Pulse fire beacons ensure that all personnel are notified of fire emergencies. With Pulse Alert Technology, buildings are evacuated quicker, evacuation requirements are unambiguous and everyone is made to feel safe and secure.

Sonos Pulse are LPCB, NF & VdS approved, Nexus Pulse approvals pending.

**Pulse Alert**  
TECHNOLOGY 



**klaxon**<sup>®</sup>

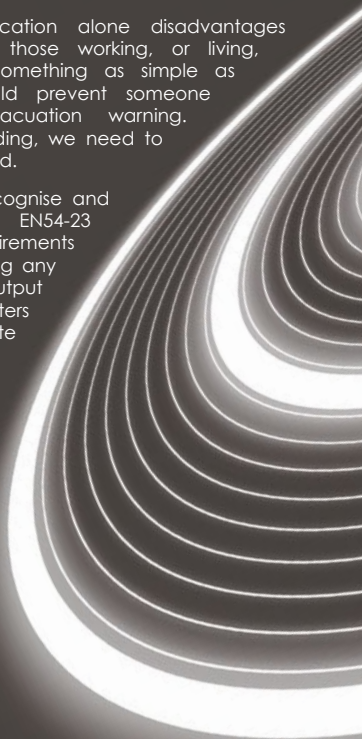
# Evacuate Everyone

Klaxon Signals believe that all fire alarm systems should be able to evacuate everyone – systems past, present and future.

Relying on audible fire alarm notification alone disadvantages people with hearing impairments or those working, or living, in sound reducing conditions. Even something as simple as wearing a pair of headphones could prevent someone from hearing an audible fire evacuation warning. To truly evacuate everyone from a building, we need to signal effectively using light as well as sound.

New European fire system standards recognise and legislate for these new requirements. EN54-23 specifies the minimum performance requirements for Visual Alarm Devices (VADs), removing any previous ambiguity regarding the light output requirements or system design parameters involved with using light to evacuate buildings.

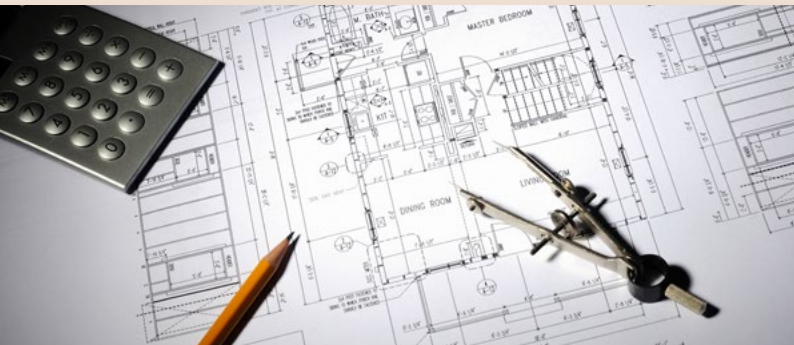
At Klaxon Signals we have surpassed these expectations, and taken them even further. We believe that all buildings deserve the latest fire evacuation technology, that all fire alarm systems should be able to be upgraded and that everyone deserves to feel safe and secure.





**Pulse Alert**<sup>™</sup>  
TECHNOLOGY 

The result is Klaxon's new Pulse Alert<sup>™</sup> Technology. This new beacon warning system produces a light output that can protect most rooms with just a single device. New optical systems disperse light evenly, ensuring the most efficient distribution of light to maximise effectiveness. Our new LED lighting technology is derived from automotive applications, with a proven pedigree of reliability and performance in the harshest of environments. Advanced electronic design maximises electrical efficiency, reducing current consumption to minimise the cost of ownership and allowing more devices to be installed on a single alarm system. Pulse Alert Technology provides all the benefits an EN54-23 compliant system can bring, whilst answering all of the design challenges in doing so.



This Best Practice Guide highlights key factors for consideration during system design and installation for compliance with EN54-23. Please refer to CoP 0001, BS 5839 or any other regulatory or legislative document for a comprehensive guide to all aspects of VADs and VAD system installations.

## External Factors

System designers need to consider any factors within the application environment which may affect the visual impact of VAD illumination. Some of the factors for consideration are,

1. Level of ambient light – Take into account both artificial and natural light levels.
2. Reflectivity surfaces – Identify any permanent shiny, glossy surfaces.
3. Field of view – Consider the presence of any obstructions (furniture, partitions) that could affect VAD coverage.
4. Tinted eye protection – VADs should be bright enough to be noticed in industrial environments where personal protective equipment may be in use.
5. Environmental conditions – IP21C for indoor use (Type A) and IP33C for outdoor use (Type B).

The IP (Ingress Protection) rating for Sonos and Nexus Pulse VADs more than surpass the requirements of EN54-23 making them suitable for a wide variety of environmental conditions.

## General Rules for Selection and Siting of VADs

- Wall mounted VADs are likely to be effective in a wide range of applications, including those with high ambient light levels.
- Ceiling mounted VADs can be used as an alternative to wall mounted VADs and are more suitable for large open areas.

- Where there is continuous surveillance in a specific direction, for example in a seated auditorium or broadcasting studio, widespread coverage may not be necessary. In this instance VAD(s) positioned so as to be visible in the direction of surveillance could be sufficient.
- VADs should be sited such that all occupants have a clear line of site of the device. Where this is not possible, VADs should be sited so that the required level of illumination is provided on adjacent surfaces, taking into account the reflectivity of these surfaces.
- Where the area to be covered is larger than the coverage area of the devices, sufficient number of VADs should be sited as required.

With up to 11.3m (wall) and up to 15m (ceiling) coverage distances, Klaxon's Sonos and Nexus Pulse VADs are designed to provide the necessary level of illumination with a single device for most rooms. A wider coverage area reduces both the number of devices required and expensive cabling requirements.

- Care should be taken to minimise the dependence on direct line of sight where deaf or hard of hearing people, or those wearing ear defenders, are likely to be alone for long periods of time. (e.g. hotel bedrooms, environments where people focus closely on a computer screen or a specific activity such as electronics assembly)
- Unless measures can be taken to control the ambient light (e.g. blinds or curtains) in a room, the maximum anticipated ambient light level should be considered. A light meter complying with BS667 should be used to determine the ambient light level.
- In the case of stairwells, the illumination from a VAD should satisfy the EN54-23 illumination requirements across the area of each landing. Compliance may not be necessary throughout the stairs.
- All VADs used for indication of a fire alarm should be of the same colour throughout the site.
- VADs cannot be confused with any other visual alarm signal within the building.
- Where multiple VADs are visible from any single point, they should meet the synchronisation requirements of sub-clauses 4.33 (g) and 4.5.5 of CoP 0001.

People with photosensitive epilepsy that are exposed to flashing lights (at certain intensities or to certain visual patterns) can trigger seizures. To avoid this from happening, the Pulse Series of VADs provide a synchronised flash with a flash rate in accordance with EN54-23.

## Power Supplies

- Both the normal and standby supply should each be independently capable of supplying the maximum alarm load imposed by the system, taking into account high peak current loads imposed by VADs.

Pulse Alert Technology from Klaxon enables VADs to emit the required minimum illumination of 0.4lux over the coverage area whilst keeping current draw to a minimum, and eliminating the need for additional power supplies in most applications.



## EN54-23 Fire Beacon Standard

At Klaxon, we view regulatory compliance as a minimum requirement for any of our products. We strive to provide the ultimate in fire evacuation devices and invest in the latest technologies, the most talented people and manufacturing excellence to achieve this goal, every day. Our customers expect Klaxon products to exceed international standards and Pulse Alert Technology is no exception.

Pulse Alert Technology is compliant with EN54-23, the European Standard for Visual Alarm Devices (VADs). This standard specifies the minimum requirements for VADs, providing performance criteria and test methods in a uniform and consistent way. This provides manufacturers a mechanism to specify VAD device performance, allowing system designers to choose the most appropriate device for a particular application.

## Categories

EN54-23 specifies three different classification categories for Visual Alarm Devices: Wall, Ceiling and Open. Wall and Ceiling mount categories are specified at designated mounting heights and particular coverage pattern areas, as detailed by EN54-23. Open classification allows the manufacturer to specify the coverage volume and coverage shape, and does not restrict mounting height.

Pulse Alert Technology has been designed to exceed the requirements of both Wall and Ceiling classifications, providing system designers with simple device performance specifications.

## Wall Classification

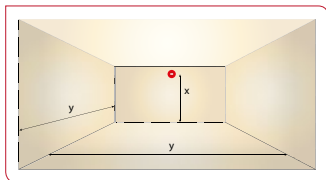
Wall mounted devices provide a rectangular prism of light. The coverage volume is classified as a code in the form of W - X - Y, where W designates Wall classification, X is the maximum mounting height and Y is the width and length of the coverage area. All distances are measured in meters, and the minimum mounting height allowable by EN54-23 is 2.4m.

Wall classification devices containing White Flash Pulse Alert Technology all have the following performance criteria:

**W - 3.1 - 11.3**

Wall classification devices containing Red Flash Pulse Alert Technology all have the following performance criteria:

**W - 2.4 - 7.5**



This means that Wall classification - White Flash devices with Pulse Alert Technology can be mounted up to 3.1m in height and cover an 11.3m x 11.3m square area.

## Ceiling Classification

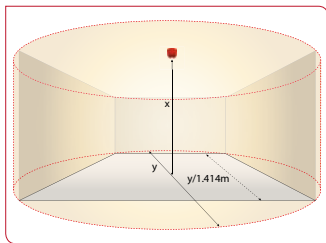
Ceiling mounted devices provide a cylinder of light. The coverage volume is classified as a code in the form of C - X - Y, where C designates Ceiling classification, X is the maximum mounting height and Y is the diameter of the coverage area. All distances are measured in meters, and ceiling mounted products are specified for maximum mounting heights of 3m, 6m or 9m.

Ceiling classification devices containing White Flash Pulse Alert Technology all have the following performance criteria:

**C - 3 - 15**

Ceiling classification devices containing Red Flash Pulse Alert Technology all have the following performance criteria:

**C - 3 - 8.9**



This means that Ceiling classification - White Flash devices with Pulse Alert Technology can be mounted up to 3m in height and cover a 15m diameter area.

## Open Classification

Open classification allows manufacturers to specify their own specific coverage volume and coverage shape, without restricting mounting height. Pulse Alert Technology is not specified in this way, as it has been designed to exceed the requirements of the more specific device classifications.

## Seeing is Believing

Klaxon are experts in fire evacuation signalling, and are trusted by customers the world over to provide the latest technological advancements in fire safety. Using light to evacuate more people, quicker, safer and easier, without compromising on system performance or reliability, simply was not possible with previous evacuation technologies. To achieve our desired levels of product performance required something new, something different, something innovative. The result? Pulse Alert Technology – simply the most powerful and energy efficient visual alarm signalling technology ever invented.

Pulse Alert Technology provides EN54-23 compliant visual alarm signalling without any increase in power consumption due to 3 technological breakthroughs:



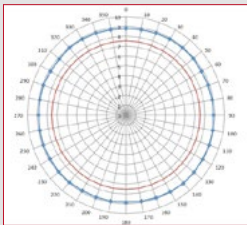
## Intelligent Power Management

Pulse Alert Technology converts power intelligently, minimising power usage and presenting a near-perfect current source to fire alarm panels. With Pulse Alert Technology, Sonos Pulse and Nexus Pulse VADs require less power than previous models, while also exceeding EN54-23 light output requirements.

Sonos Pulse and Nexus Pulse provide maximum coverage with minimal current consumption.

	Beacon Current @ 0.5Hz	Beacon Current @ 1.0Hz
Sonos Pulse Wall - White Flash	20mA	40mA
Sonos Pulse Ceiling - White Flash	20mA	40mA





### Lens Technology

The optics for both ceiling mount and wall mount versions are optimized to produce an even light dispersion over the covered area. These systems minimise 'hot spots', ensuring that all the available light is contributing to alerting people of a fire emergency.

This diagram shows a perfectly circular coverage pattern from the ceiling mount version (blue line), exceeding the EN54-23 performance requirements for 15m coverage (red line).

### Advanced LED Drive Circuitry

Featuring the latest high power LED technology, Pulse Alert Technology contains advanced LED drive circuitry, further improving efficiency, light output performance and long term device reliability. Sonos Pulse and Nexus Pulse LED circuits are designed to exceed 5 years continual operation, without degradation of light output.

Pulse Alert Technology provides exceptional light output with minimal power.



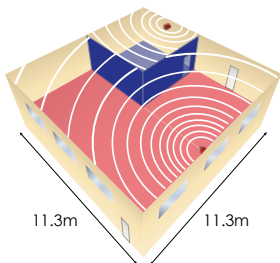
**Pulse Alert**<sup>®</sup>  
TECHNOLOGY

- Available in white & red flash versions
- EN54-23 compliant beacon technology
- Wall and ceiling mount light orientations
- Wide coverage pattern - one device can protect most rooms
- Energy efficient, low current consumption
- Available in Sonos Pulse and Nexus Pulse VADs

# Increased Coverage

## Pulse Alert Technology Increases Device and System Coverage:

- Up to 15m diameter ceiling mount coverage
- Up to 11.3m x 11.3m wall mount coverage
- One device can cover most rooms
- Maximise performance by requiring fewer devices
- Easy to upgrade existing systems – no additional cabling
- Protects more people

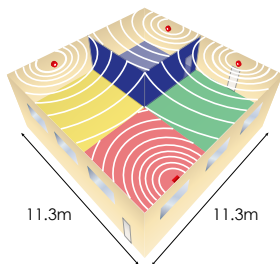


## Pulse Alert Technology Coverage

With up to 15m diameter coverage and up to 11.3m x 11.3m square coverage for ceiling and wall mounted versions respectively, Pulse Alert Technology can cover most rooms with a single device. This increased coverage allows fire systems to use the minimum number of devices and therefore maximise the performance of the system.

This is particularly useful for upgrading existing systems as it avoids the need to add additional devices. Fewer devices also reduces the total power consumption, allowing the system to be powered directly from the fire control panel and avoiding unnecessary additional power supplies.

Fewer devices is also more intuitive to end users. Pulse Alert Technology ensures that evacuation signals are clear and unambiguous.



## Standard VAD Coverage

Standard VAD devices typically have coverage patterns of 7.5m diameter or less. This results in more devices required for open areas, increasing both wiring and product costs.

Most fire alarm systems will require additional power supplies to meet the same level of system performance.

## Maximum Performance

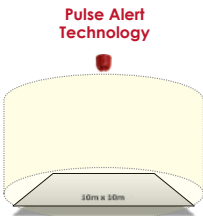
Klaxon believe that there is only one device configuration permissible when it comes to saving lives – maximum performance. Sonos Pulse and Nexus Pulse VADs require such low current that the coverage pattern is fixed to the optimum performance level, removing the possibility of an incorrect coverage pattern being selected and maximising system performance.

## Pulse Alert Technology is Energy Efficient

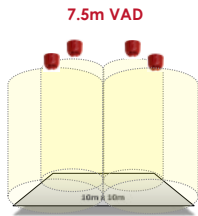
- 20mA beacon current @ 0.5Hz flash rate
- Lower installation costs
- Fewer devices required
- Energy efficient
- Reduces need for additional power supplies

## Reduced Number of Devices

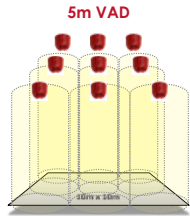
With a greater the coverage pattern, fewer devices are needed to cover open areas. Sonos Pulse ceiling mount devices have up to 15m coverage diameter, which can cover a 10m x 10m room with a single device. A 7.5m diameter product would require 4 devices to cover the same area; 5m diameter coverage would require 9 devices.



**C-3-15**  
1 Beacon



**C-3-7.5**  
4 Beacons



**C-3-5**  
9 Beacons

10m x 10m Room	C-3-15	7.5m VAD	5m VAD
Coverage Distance (diameter)	15m	7.5m	5m
Current Consumption per Device	20mA	20mA	12mA
Number of Devices Required	1	4	9
Total Current Consumption	20mA	80mA	108mA
Cabling Required	5m	20m	30.5m
Additional Power Supplies Required	No	Yes	Yes
Additional Labour Costs	No	Yes	Yes

## Familiar Product Families

When it comes to protecting lives and livelihoods, trust is everything. Klaxon Pulse VADs are built on the heritage of the industry leading Sonos and Nexus Series' of fire evacuation products. These products are trusted and used the world-over, with a proven pedigree of performing when it matters most.

## Simple to Upgrade

All buildings deserve the latest fire evacuation technology, and Klaxon believes that upgrading should be a simple quick and easy process. Sonos Pulse and Nexus Pulse products share the same base mounting and wiring as previous versions, making the transition to 'Pulse' versions as simple as possible.

## Freedom of Positioning

Each and every room deserves comprehensive fire evacuation, and system designers require flexibility in device location and positioning options. A superior coverage pattern has an added advantage in smaller rooms, whereby the freedom of positioning is greater as the device can be located anywhere within the room, rather than the coverage pattern dictating where the device is located.

## Pulse Alert Technology Provides Design Flexibility

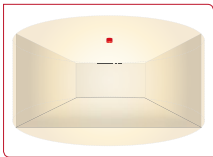
- Increased coverage pattern allows flexibility in positioning devices in smaller rooms
- A C-3-15 ceiling mount device can be mounted anywhere within a 5m x 5m room, and still provide EN54-23 notification performance
- Increased design flexibility makes it easy to upgrade existing systems
- Cabling considerations and differing room architecture can be accommodated

## Standard VAD Positioning

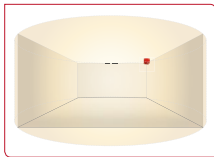
Standard VADs, with 7.5m diameter coverage or less, offer little design flexibility on device location. In a 5m x 5m room, a standard VAD may be able to cover the area with a single device, but only if the device is mounted in the center of the room.

If the room architecture, cabling or usage requirements dictate that the device cannot be mounted in the center of the room, a standard VAD would not be able to provide sufficient coverage in alternative locations. Multiple standard VADs would be required to provide adequate evacuation signalling performance.

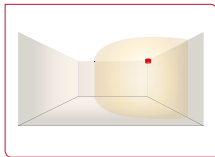
**7.5m VAD in 5 x 5m room**



**15m VAD in corner of 5 x 5m room**



**7.5m VAD in corner of 5 x 5m room**



## Pulse Alert Technology Positioning

VADs incorporating Pulse Alert Technology offer greater coverage performance and provide greater flexibility on device positioning. A C-3-15 coverage pattern can be mounted at any point within a 5m x 5m room, delivering comprehensive evacuation signalling without compromising design flexibility.

## Red Pulse Versions

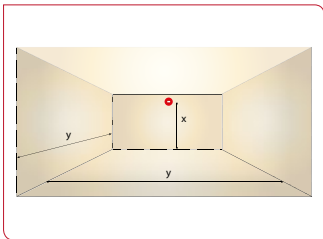
Sonos Pulse and Nexus Pulse products are also available with red flash light outputs. EN54-23 stipulates that either white flash or red flash light outputs are permitted, and Klaxon are proud to offer red flash alternatives to every model.

Featuring Pulse Alert Technology, the red flash versions maximize the efficiency of dispersing red light. The current consumption characteristics are the same for red flash versions as their white flash counterparts.

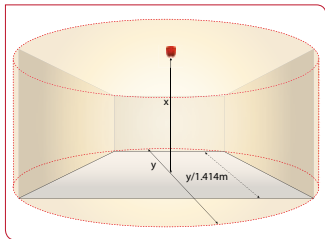
## Pulse Alert Technology Red Flash

- 8.9m diameter ceiling mount coverage
- 7.5m x 7.5m wall mount coverage
- Available in Sonos Pulse and Nexus Pulse models
- Easy to upgrade existing systems
- Same power consumption as white flash alternatives

### Wall Classification - Red Flash



### Ceiling Classification - Red Flash



Wall classification devices containing red flash Pulse Alert Technology all have the following performance criteria:

**W – 2.4 – 7.5**

This means that Wall classification devices with Pulse Alert Technology can be mounted up to 2.4m in height and cover a 7.5m x 7.5m area.

Ceiling classification devices containing red flash Pulse Alert Technology all have the following performance criteria:

**C – 3 – 8.9**

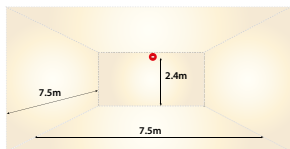
This means that Ceiling classification devices with Pulse Alert Technology can be mounted up to 3m in height and cover an 8.9m diameter area.

# Sonos Pulse - Red Flash

## Sonos Pulse Wall

Sonos Pulse wall mounted Visual Alarm Devices are available as fire beacons or combined sounder beacons. With an EN54-23 approved coverage pattern of W-2.4-7.5, each Sonos Pulse wall mounted device can be mounted up to 2.4m high and can cover a 7.5m x 7.5m square room with a single device.

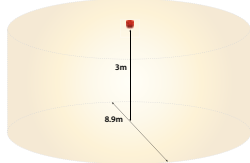
EN54-23 Coverage: W-2.4-7.5



## Sonos Pulse Ceiling

Sonos Pulse ceiling mounted Visual Alarm Devices are also available as fire beacons or combined sounder beacons. With an EN54-23 approved coverage pattern of C-3-8.9, each Sonos Pulse ceiling mounted device can be mounted up to 3m high and provide a 8.9m cylinder diameter coverage, which can cover a 6.3m x 6.3m square room with a single device.

EN54-23 Coverage: C-3-8.9



Specifications	Beacons	Sounder Beacons
Voltage	17-60V DC	17-60V DC
Current @ 0.5Hz	20mA	25mA
Current @ 1Hz	40mA	45mA
Flash Colour	Red	Red
Body Colour	White or Red	White or Red
Ingress Protection	IP65 (Deep base)	IP65 (Deep base)
Operating Temp.	-25°C to +70°C	-10°C to +55°C
Sound Output	N/A	97dB(A)



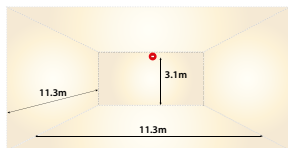
Feature	Benefit
Conforms to EN54-23	Exceeds the illumination requirements of EN54-23
Pulse Alert™ Technology	Patented electronic design maximises system efficiency by minimising power consumption
8.9m Coverage Volume	Reduces the number of devices required; most rooms can be protected with a single device
Wire to Base Technology	Installation is quick and simple with mounting and wiring made only to the base, the head clicks on to the base during commissioning
Simple Upgrade	Sonos Pulse VADs share the same base mounting and wiring as previous versions, making the transition to 'Pulse' versions as simple as possible
Optimum Performance Level	Pulse Alert™ Technology enables the coverage pattern to be fixed at the optimum performance level
Synchronised Flash	Sonos Pulse VADs protect everyone including people prone to photosensitive epilepsy
No Surge Current	Eliminates power surges during system start up
Weatherproof to IP65	Surpasses the Ingress Protection requirements of EN54-23 making them suitable for a wide variety of environmental conditions

# Sonos Pulse - White Flash

## Sonos Pulse Wall

Sonos Pulse wall mounted Visual Alarm Devices are available as fire beacons or combined sounder beacons. With an EN54-23 approved coverage pattern of W-3.1-11.3, each Sonos Pulse wall mounted device can be mounted up to 3.1m high and can cover an 11.3m square room with a single device.

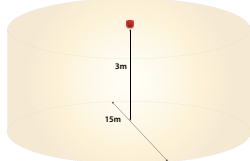
EN54-23 Coverage: W-3.1-11.3



## Sonos Pulse Ceiling

Sonos Pulse ceiling mounted Visual Alarm Devices are also available as fire beacons or combined sounder beacons. With an EN54-23 approved coverage pattern of C-3-15, each Sonos Pulse ceiling mounted device can be mounted up to 3m high and provide a 15m cylinder diameter coverage, which can cover a 10.6m square room with a single device.

EN54-23 Coverage: C-3-15



Specifications	Beacons	Sounder Beacons
Voltage	17-60V DC	17-60V DC
Current @ 0.5Hz	20mA	25mA
Current @ 1Hz	40mA	45mA
Flash Colour	White	White
Body Colour	White or Red	White or Red
Ingress Protection	IP65 (Deep base)	IP65 (Deep base)
Operating Temp.	-25°C to +70°C	-10°C to +55°C
Sound Output	N/A	97dB(A)





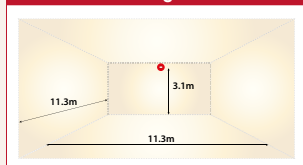
Feature	Benefit
Conforms to EN54-23	Exceeds the illumination requirements of EN54-23
Pulse Alert™ Technology	Patented electronic design maximises system efficiency by minimising power consumption
15m Coverage Volume	Reduces the number of devices required; most rooms can be protected with a single device
Wire to Base Technology	Installation is quick and simple with mounting and wiring made only to the base, the head clicks on to the base during commissioning
Simple Upgrade	Sonos Pulse VADs share the same base mounting and wiring as previous versions, making the transition to 'Pulse' versions as simple as possible
Optimum Performance Level	Pulse Alert™ Technology enables the coverage pattern to be fixed at the optimum performance level
Synchronised Flash	Sonos Pulse VADs protect everyone including people prone to photosensitive epilepsy
No Surge Current	Eliminates power surges during system start up
Weatherproof to IP65	Surpasses the Ingress Protection requirements of EN54-23 making them suitable for a wide variety of environmental conditions

# Nexus Pulse 105/110

## Nexus Pulse 105/110 - White Flash

Nexus Pulse 105/110 are high output combined sounder beacons. With an EN54-23 approved coverage pattern of W-3.1-11.3, each Nexus Pulse wall mounted device can be mounted up to 3.1m high and can cover an 11.3m x 11.3m square room with a single device.

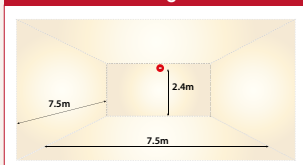
### EN54-23 Coverage: W-3.1-11.3



## Nexus Pulse 105/110 - Red Flash

Nexus Pulse 105/110 are high output combined sounder beacons. With an EN54-23 approved coverage pattern of W-2.4-7.5, each Nexus Pulse wall mounted device can be mounted up to 2.4m high and can cover an 7.5m x 7.5m square room with a single device.

### EN54-23 Coverage: W-2.4-7.5



Specifications	Nexus Pulse 105	Nexus Pulse 110
Voltage	17-60V DC	17-60V DC
Current @ 0.5Hz	50mA	65mA
Current @ 1Hz	70mA	85mA
Flash Colour	White or Red	White or Red
Body Colour	Red	Red
Ingress Protection	IP66	IP66
Operating Temp.	-25°C to +70°C	-25°C to +70°C
Sound Output	105dBA	110dBA



Feature	Benefit
Conforms to EN54-23	Exceeds the illumination requirements of EN54-23
Pulse Alert™ Technology	Patented electronic design maximises system efficiency by minimising power consumption
11.3m Coverage Volume	Reduces the number of devices required; most rooms can be protected with a single device
Wire to Base Technology	Installation is quick and simple with mounting and wiring made only to the base, the head clicks on to the base during commissioning
Simple Upgrade	Nexus Pulse VADs share the same base mounting and wiring as previous versions, making the transition to 'Pulse' versions as simple as possible
Optimum Performance Level	Pulse Alert™ Technology enables the coverage pattern to be fixed at the optimum performance level
Synchronised Flash	Nexus Pulse VADs protect everyone including people prone to photosensitive epilepsy
No Surge Current	Eliminates power surges during system start up
Weatherproof to IP66	Surpasses the Ingress Protection requirements of EN54-23 making them suitable for a wide variety of environmental conditions

**Pulse Alert**<sup>®</sup>  
TECHNOLOGY 



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