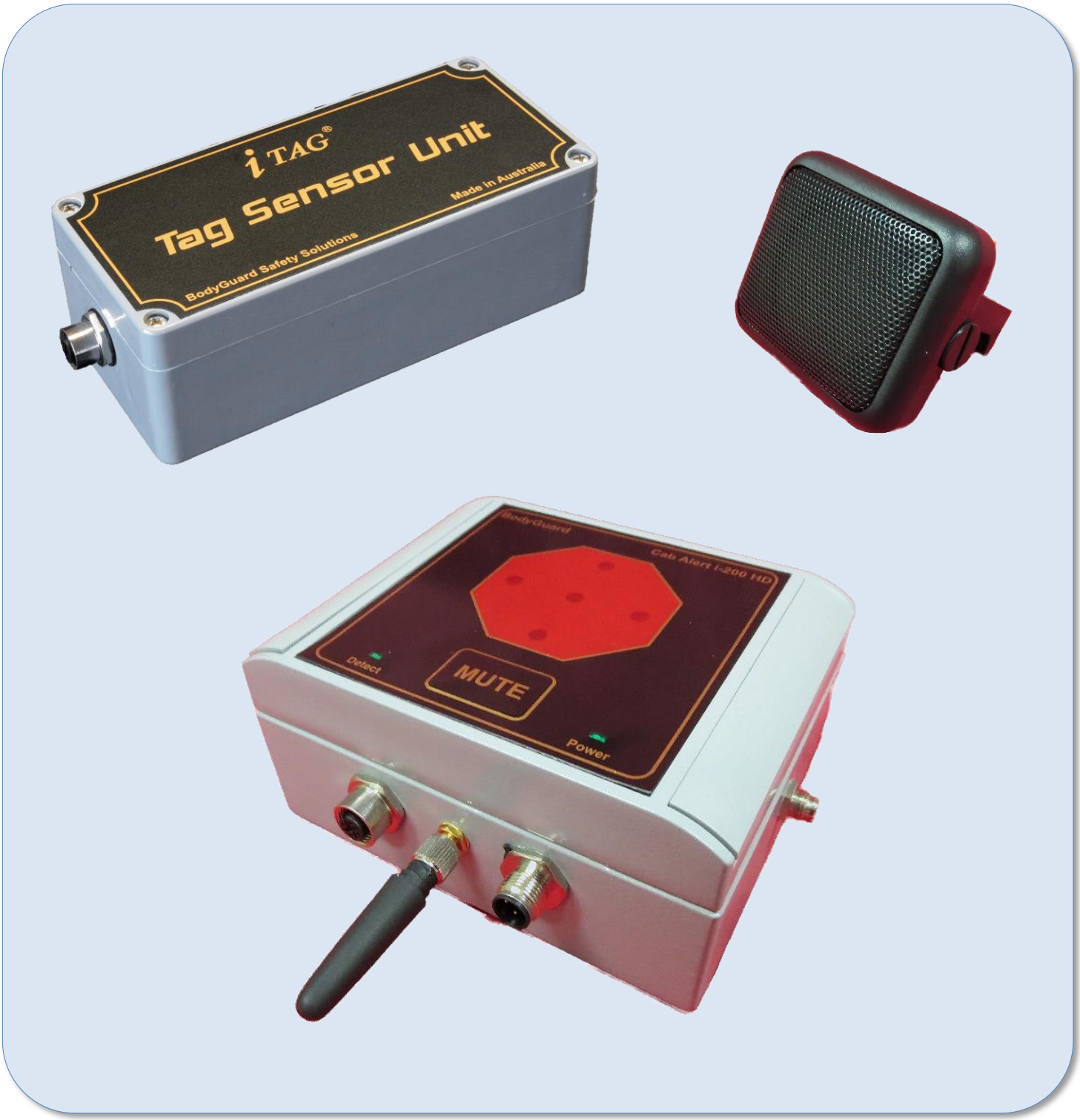


Installation Guide

Introduction

This Guide provides information to assist with installation and use of the BodyGuard® i-Tag® proximity detection and warning system.

The document begins with an overview of the system and then describes the wiring connections for both single sensor and dual sensor systems.

An explanation is given for installation and running the simple configuration utility that enables changes to the detection zone distances and speaker volume using a Bluetooth connection between computer BodyGuard® systems.

Overview

The BodyGuard® system improves safety by increasing driver awareness when pedestrians are too close to the vehicle. The system comprises a Cab Alert unit, Speaker and one or more sensor units.

The Sensor Unit receives information from pedestrian "Tag" devices, process and transfer information to the Cab Alert unit.

The Cab Alert Unit processes information from all sensors and determines whether a Tag detection has occurred within the detection zone of any Sensor unit fitted. The Cab Alert unit provides an Audible alarm (alert followed by human voice notification) as well as visual warning. In addition to the Alarm functions, the Cab Alert manages installation and removal of sensor units, storage of all detection and system events and facilitates Bluetooth communication between the Cab Alert unit and computer.

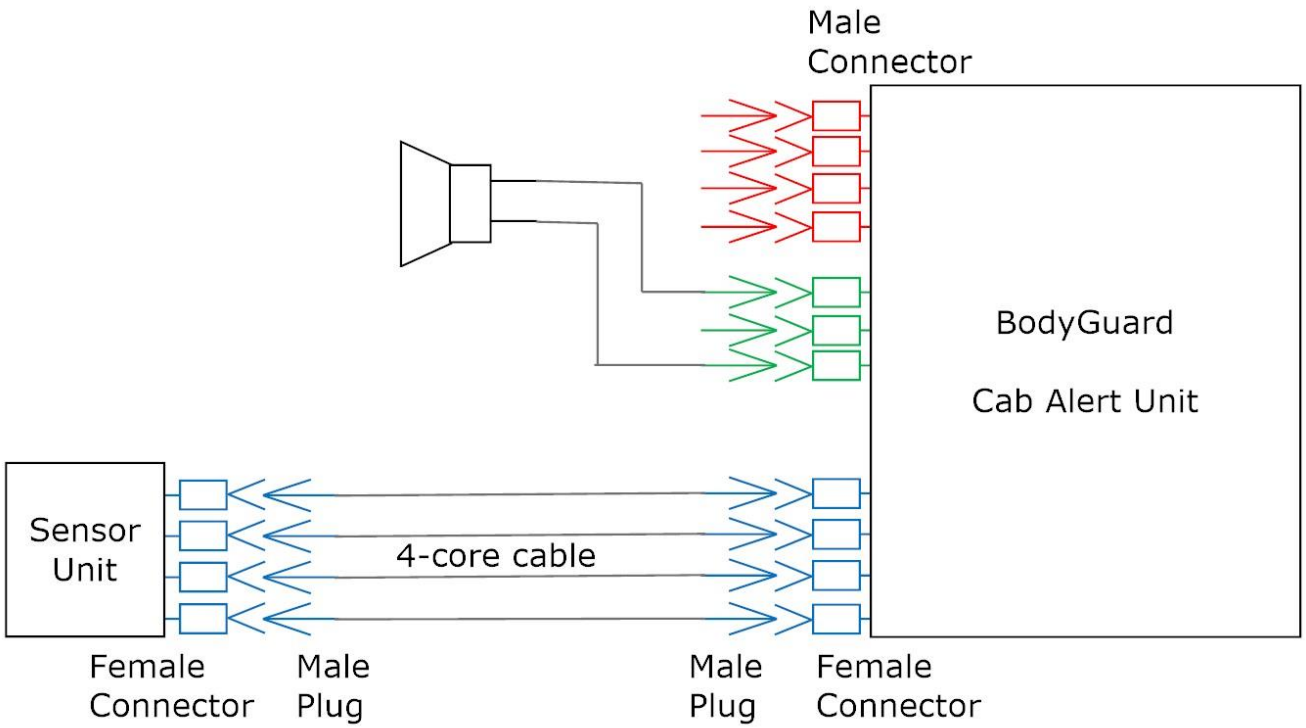
Wiring

The sensor units connect to the Cab Alert unit by 4-core cable. The standard length cable supplied is 5m per sensor. (Longer length cable available upon request in 5m increments). The 4-core cable has two shielded-twisted pairs in addition to overall shielding. The recommended maximum cable length between the Cab Alert unit and a sensor unit is 200m.The 4-core cable is terminated at each end using M12, Male circular plugs. The cable wiring connection is “straight-through” (Pin 1 at one end connects to pin one at other end and so forth).

The Power (pins “1” and “2”) should connected to one of the twisted pairs and data signals (pins “2” and “3”) to the other twisted pair.

Dual sensor systems are supplied with a “Y” splitter cable that enables the 2 sensors to plug into the one Cab Alert unit connector.

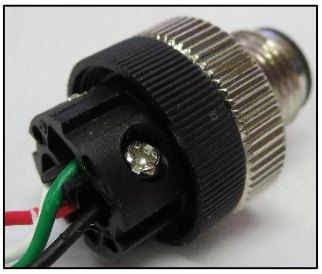
The supplied cable is Alpha Wire 2466C or 1243/2C.



Fitting M12 circular male plugs to 4-core cable

1) Loosen Hexagonal plastic nut at bottom of plug by rotating ant-clockwise.

2) With rear nut unfastened, hold knurled plastic ring near metal ring with one hand and turn plastic body of plug anti-clockwise with other hand.



3) Use a screwdriver to fasten ends of cable to the terminals inside the plug head

IMPORTANT: Be careful to ensure correct wiring of plug. The signals are connected to pins as shown below at BOTH ends of the cable (i.e. Straight-Through connection).

Wire colouring

Pin 1: **Red**

Pin 2: **White**

Pin 3: **Green**

Pin 4: **Black**

RED/Black = shielded twisted pair
White/Green = shielded twisted pair

Power Supply

The system comes with 2m length power cable, fitted with moulded M12 female 4-core cable to plug into Cab Alert Unit and flying leads at other. The system connects to +12V or +24V DC supply via 2A fuse. Voltage above 24V requires a Voltage Reducer to lower voltage into range 12-24V DC.

The Cab Alert unit receives power from the vehicle electrical system, Sensor units receive power from the Cab Alert connector.

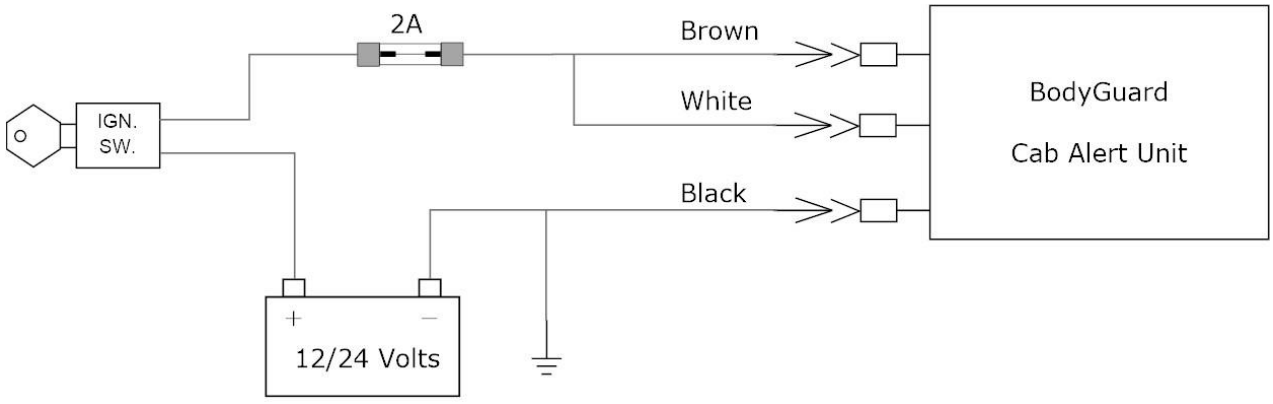
Power Cable connections

Pin 1: +12V DC Power Supply Input (**Brown**)
Pin 2: Ignition Sense (**White**)
Pin 3: Switched output (**Blue**)
Pin 4: Ground/Earth (**Black**)

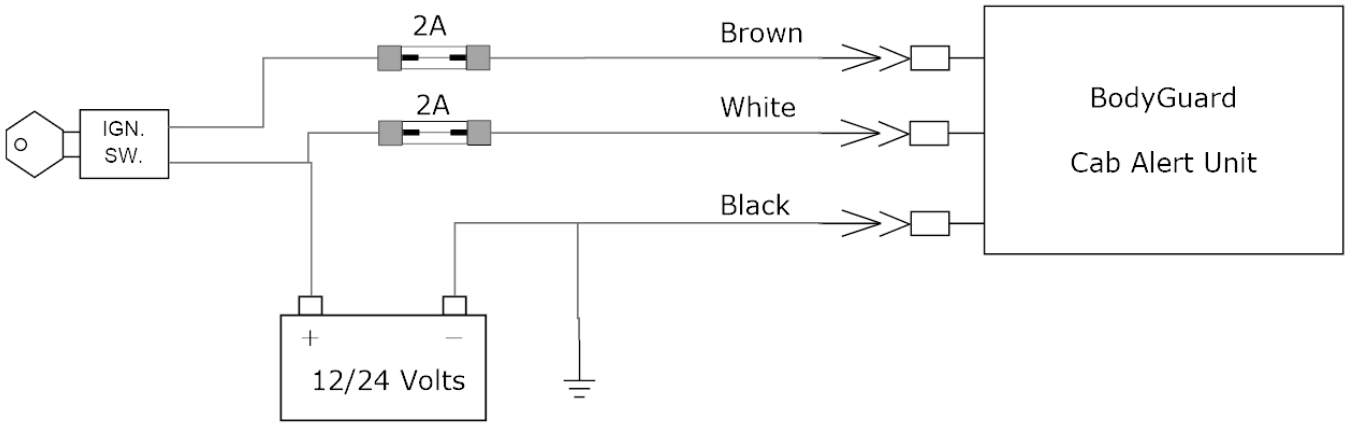
Power Supply wiring Examples

The system operates from the vehicle's 12V or 24V DC power supply. If the vehicle's supply voltage is higher than 24V DC, then a voltage reduce is required. When logging is required, "Ignition Sense" connects to the ignition switch. When logging is not required, "Ignition Sense" connects to 12V DC input signal. *IMPORTANT: Tag Detection will only occur when the WHITE "Ignition Sense" wire connects to the supply voltage*.

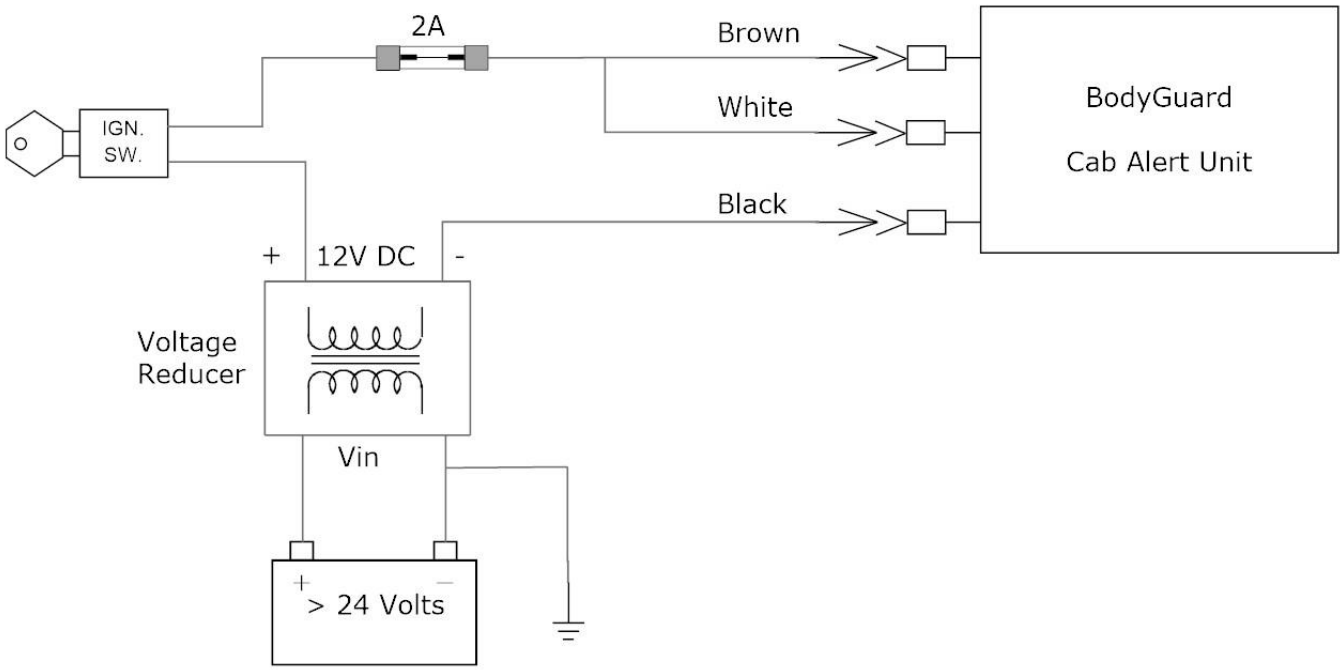
12/24V DC supply, NO logging



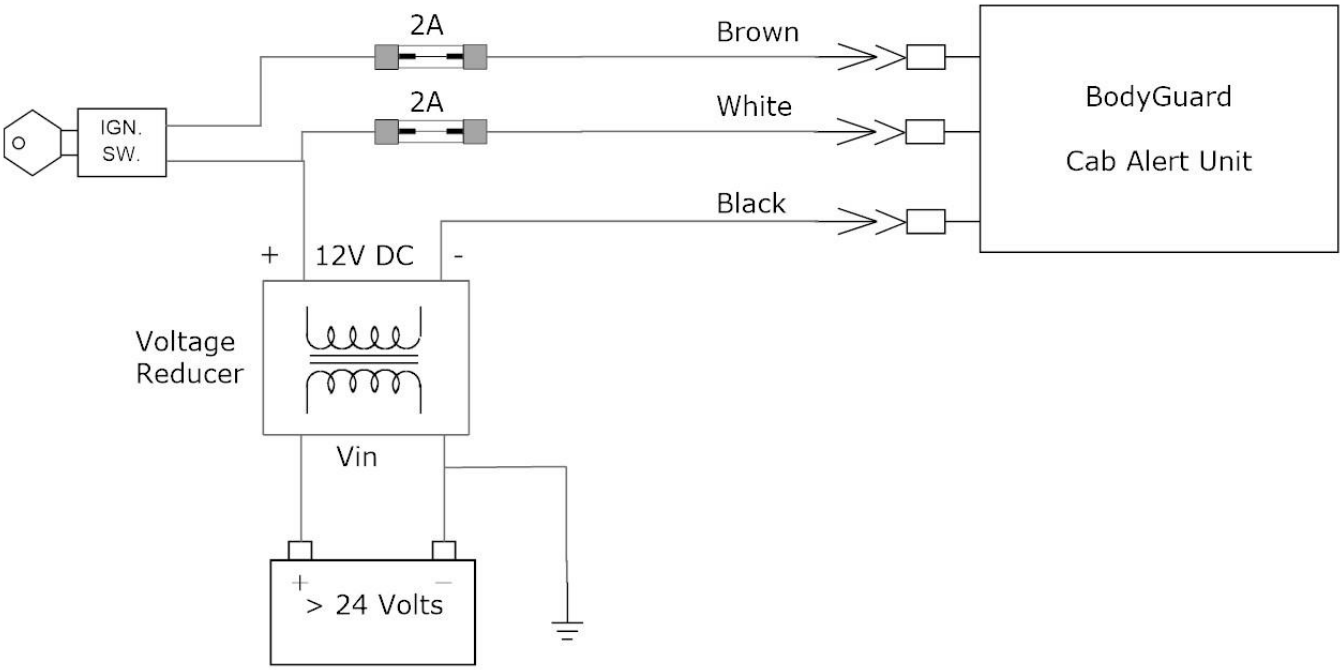
12/24V DC supply, with Data Logging



Higher than 24V DC supply, NO logging

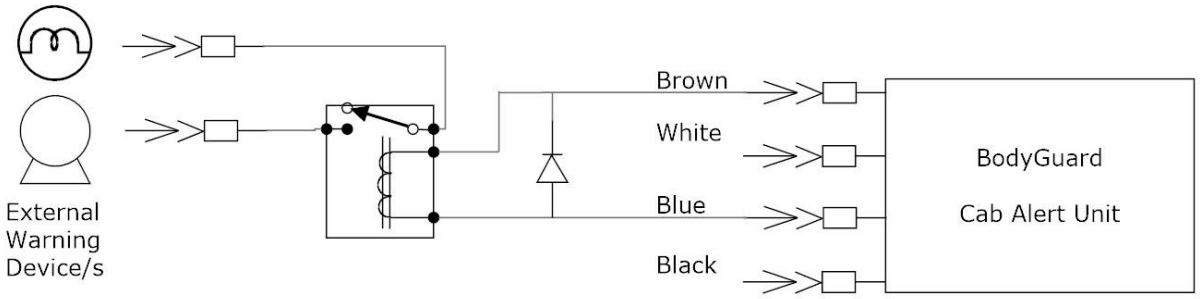


Higher than 24V DC supply, with logging



Switched Output

The Cab Alert unit provides an Open Drain (floating) output. This output pulls to ground whenever the alarm is active. This low current output (less than 100mA capacity) controls an external relay that can switch other equipment or devices during Tag detection. An external relay can be connected to control warning devices or "lockout" controls. A **protection diode** (such as 1N4001 or 1N4007) should be placed across the relay control coil as shown.



Cab Alert Location

The Cab Alert unit mounts inside the driver cab within view of the driver. The speaker mounts in any convenient location (keep speaker location at least 300mm away from location of driver's ear).

All cables exit from the bottom of the enclosure. There is no requirement to leave space around top or sides of the enclosure. Leave at least 150mm left below the enclosure to enable cables to exit the enclosure without excessive bending. The supplied pivot mounting bracket enables the cab alert unit to be mounted in any orientation and then rotated to best viewing angle (for instance, it can be mounted on the roof of the vehicle). The Pivot mount bolts to the back of the Cab Alert enclosure using four M5 x 16mm bolts. Be careful to ensure the unit does not interfere with driver movement or obstruct the view.

Important: Use only M5 x 16mm bolts for pivot mount. Ensure no more than 10mm thread extends into the Enclosure when bolts fastened. If the pivot is not used then ensure that the thread of bolts used does not extend more than 10mm into the enclosure.

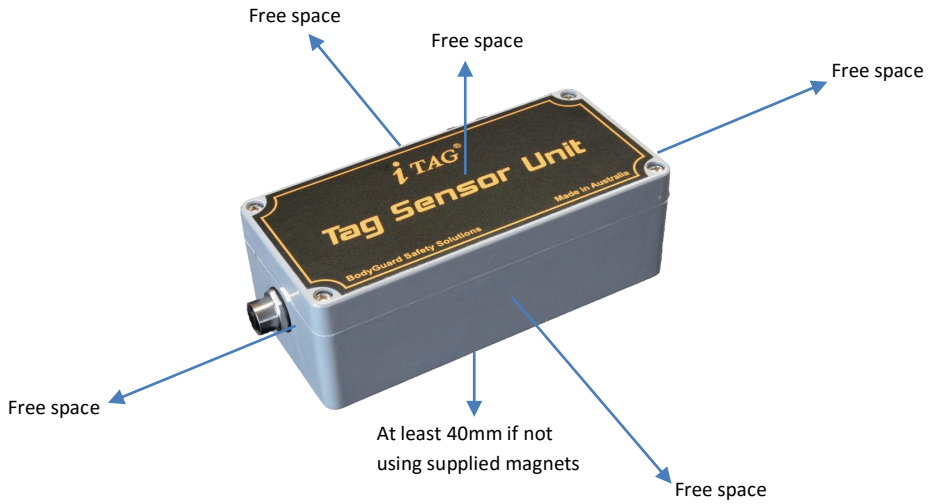
Sensor Location

The detection zone range is the distance from the actual **Sensor unit to the Tag** device. The Range is adjustable from minimum setting of around 2.5m to maximum setting around 9m. The 4-way switch inside sensor unit is used to adjust range.

The Sensor unit mounts either horizontally or vertically. The shape of the detection zone is slightly oval around the vehicle when sensor is located horizontally and is almost circular when mounted vertically. The choice of mounting orientation is dependent on the application. The horizontal orientation is good for applications where more detection may be required at front and rear with less range at sides. The vertical orientation is best when a uniform zone is required.

These characteristics of the Sensor detection zone shape can be used to advantage in various applications. For instance, a large vehicle may require long distance at front and rear. In this case, a front and rear sensor placed horizontally with edges of sensor pointing to sides, would give best front and rear range turning the horizontal sensor 90 degrees would give better range at sides and less at front and rear. Vertical mounted sensor on a smaller vehicle (such as a forklift) may give better all-round cover.

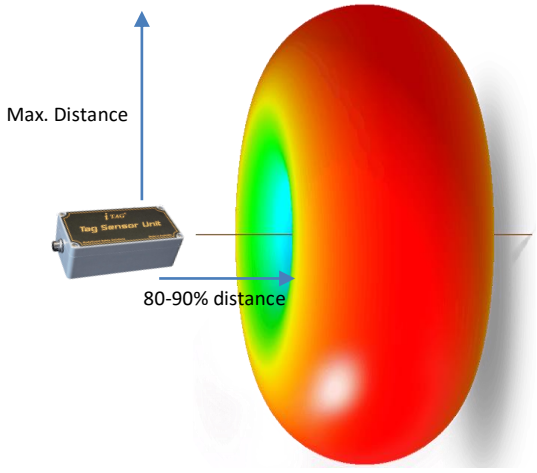
The optional Install Kit comes with magnetic mounting brackets for ease of installation. M5 x 8mm bolts secure the magnets to the mounting brackets. Leave as much “free space” gap between sensor and surrounding metal as possible. This will optimise sensor performance. If the magnetic mounting is not used, avoid mounting base of sensor directly to metal surface. In this case, try to mount sensor at least 30mm above the surface.



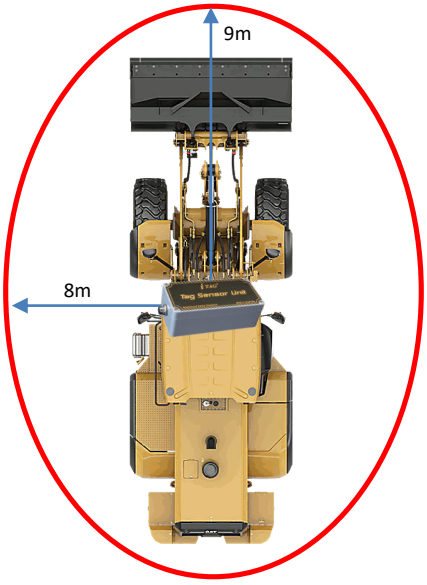
Horizontal Sensor Location

The large Red donut image below approximates the expected detection zone shape relative to the location of the sensor unit with sensor unit mounted horizontally.

The maximum zone distance is perpendicular to the long side of the sensor unit while the shorter side is at the sides looking into the end of the sensor unit. The shorter side may be around 80-85% of the long side distance. The image at the right shows top view of vehicle with sensor horizontal and the approximate zone around the outside of the vehicle. (*Assuming Tag worn in vertical orientation*).



Approximate 3D Detection zone pattern

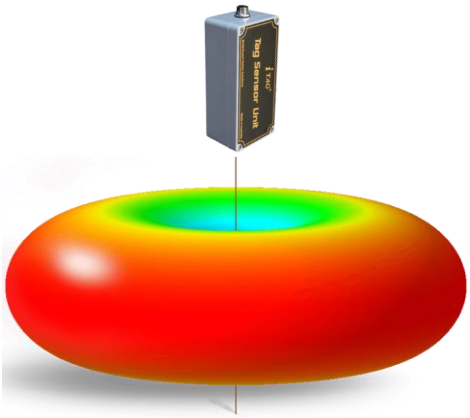


Aerial View

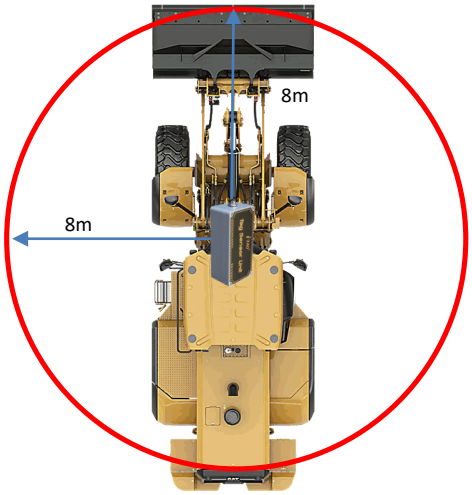
This image demonstrates the effect of placing sensor horizontally for detection zone pattern. *Actual distance may be vary.*

Vertical Sensor Location

A vertically mounted Sensor unit produces vertical donut shaped detection zone. The long axis is up and down while the short axis is around the vehicle. This orientation produces the most uniform (almost circular) pattern, however, the maximum range in this orientation may be slightly less due to approach around vehicle being made on short axis.



Approximate 3D Detection zone pattern

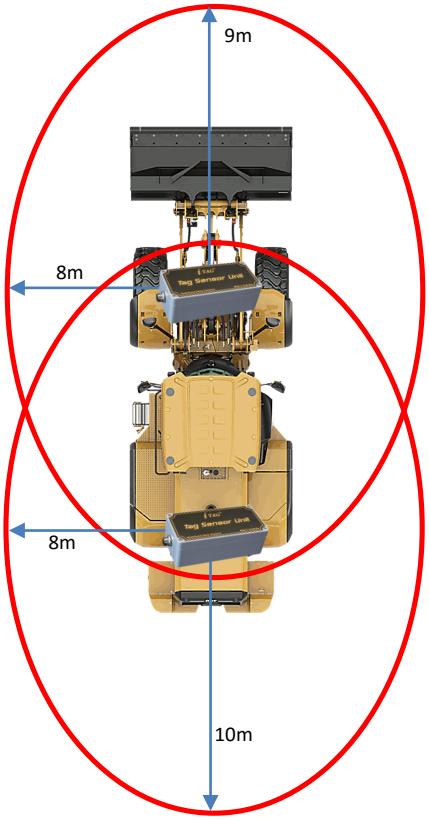


Aerial View

This image demonstrates the effect of placing sensor vertically for detection zone pattern. *Actual distance may be vary*

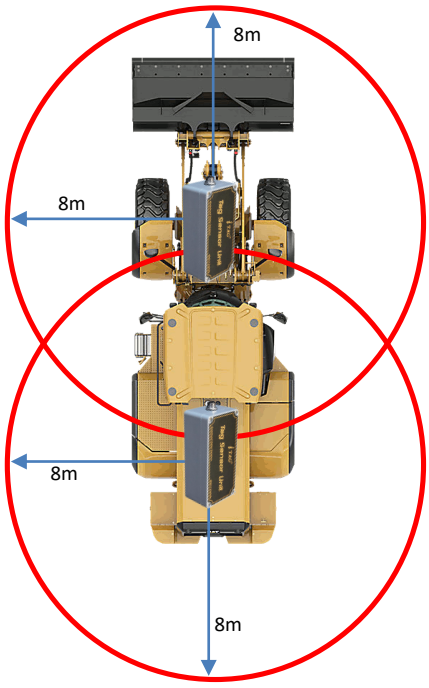
Front and Rear Horizontal Sensor Orientation

The example below illustrates how multiple sensors provide extended range at front and rear of larger vehicle with Sensors mounted horizontally. Distances shown are indicative to highlight shape of zone only.



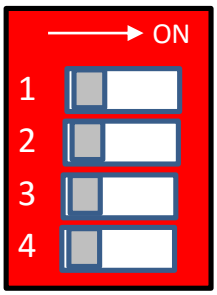
Front and Rear Vertical Sensor Orientation

The example below illustrates how multiple sensors provide extended range at front and rear of larger vehicle when sensors mounted vertically. Distances shown are indicative to highlight shape of zone only.



Detection Zone distance setting

The range of the detection is set using the 4-way switch inside the sensor unit. (Note: The Lid is connected to the base by cable, be careful not to stretch cable).The values shown below are approximate distance settings. The table below provides a guideline for initial zone range setting. Test the system by walking in and out of zone with Tag and then adjust range up or down as required until desired range achieved. (Do NOT open lid when water can enter and ensure lid fastened securely after distance adjusted).



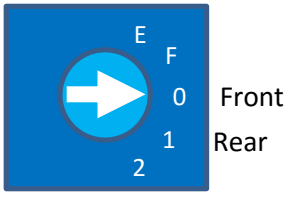
Range Setting Switch (LEFT = OFF, RIGHT = ON)

Distance	Switch 1	Switch 2	Switch 3	Switch 4
3	OFF	OFF	OFF	OFF
4.5	ON	OFF	OFF	OFF
5.5	OFF	ON	OFF	OFF
6.5	ON	ON	OFF	OFF
7	OFF	OFF	ON	OFF
7.5	ON	OFF	ON	OFF
8	OFF	ON	ON	OFF
8.5	ON	ON	ON	OFF
Maximum	ON	ON	ON	ON

Sensor ID

The sensor can be assigned an ID from “0” to “15” (Characters “A” through “F” represent values “10” through “15”) using the rotating selection switch inside the Sensor unit. This switch sets the **location** of the sensor on the vehicle.

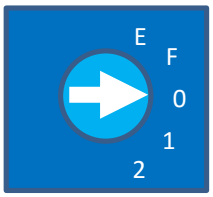
Single system Sensors and dual “Front” Sensors; set ID = “0”.
Dual system “Rear” Sensors; set ID = “1”.
NOTE: Single system MUST have Sensor ID set to “0”.



Alert Speaker Volume

The volume of the speaker has 16 levels of adjustment from softest to loudest setting. The adjustment is made by changing setting on the rotary switch inside the Cab Unit. Access to the Cab unit is achieved by pulling up the plastic side covers from the lid by hand to reveal the 4 fastening bolts. Undo the 4 bolts to remove the lid. **The lid is connected to the base of the Cab Alert unit by thin cable, be careful not to stretch the cable when removing the lid.**

The minimum setting is "0". Increase volume by moving switch CLOCKWISE (maximum setting is "F") and software by turning anti-clockwise. The alert will sound each time the switch is changed, this provides an indication of the new volume setting.



Configuration software

Refer to configuration and log management device "User guide".

System Operation

Power Up

At power up the system will flash warning LEDs, turn on "POWER LED" and provide system start up voice notifications.

Communication with each fitted sensor is checked and voice notification given.

Example;

- "Front Tag Sensor OK", "Rear Tag Sensor OK" (for dual system)
- "Tag Sensor OK" for single sensor system (single system)
- "No Front Sensor Found" or "No Rear Sensor Found" (dual system)
- "No Sensors Found" (single system)

Once the system has started without error, the Cab alert unit will begin communication with the sensor units. Valid responses from the sensor units cause the "Detect" LED on the front panel to blink. During normal operation, "Detect" LED should be blinking non-stop.

Power Down

If the Ignition Sense is used, the Power Led will remain ON after vehicle ignition switches off. The system can connect to handheld configuration and log device management in this mode. When ignition is switch back on, the system will power up and start detection.

Alarm Activation

A Tag detected within the detection zone of a sensor unit causes an audible alarm to sound, followed by a human voice indication of the risk.

For a single sensor system “Look Out! Person near you”. For dual sensor system “Look out! Person in front of you” or “Look Out! Person behind you”. The high brightness LEDs on the front panel (in the shape of a STOP sign) will begin to flash. The siren will repeat approximately every 5 seconds while the Tag remains in the detection zone, and the LEDs will continue to flash.

When the Tag leaves the detection zone, the LEDs will stop flashing and siren will cease. The alarm takes around 1 second to stop after Tag leaves the zone.

Mute

If the driver presses the mute switch while an alarm is active, a voice will advise “Speaker Muted” and the repeating siren will cease. The LEDs will remain flashing as long as the Tag is still in the detection zone. If the Tag leaves the zone OR another Tag enters, then the alarm resets and starts again automatically. The driver cannot permanently mute the speaker.

Driver Tag Lockout

The Driver Tag Lockout is a feature that enables the driver to wear a Tag without activating his or her own vehicle alarm.

Two methods are available:

1. Press and hold MUTE button longer than 3 seconds, while alarm is active. The driver Tag must be only tag in detection zone. This method works ok for intermittent use but not recommended for long-term use due to higher battery consumption. Use Rechargeable Tags for long-term use. The Driver Tag will UNLOCK automatically when the vehicle is switched off, ensuring the Tag cannot permanently lock out.
2. Tag “Disable Pouch”. This pouch mounts to the vehicle. Tags disable while in the pouch and automatically enable when removed. The driver places the Tag into pouch when operating the vehicle and then removes the Tag when leaving the vehicle.

Driver Tag “Disable Pouch”

Safety Precautions

Observe the following safety precautions whenever the BodyGuard system is in operation or in service. Failure to comply with these precautions violates the safety standards of the design, manufacture and intended use of the product.

Important

BodyGuard proximity detection and warning system is intended to be an aid to the driver and is not intended in any way to replace existing safety processes or remove or minimise the driver's diligence and/or duty of care.

The Bodyguard system receives and transmits radio frequency energy while switched on, therefore interference may occur if the system is located near TVs, radios, PCs or any inadequately shielded equipment.

Due to the nature of wireless systems, transmission and reception of data will not guaranteed. Data may be corrupted (i.e. Have errors) or be totally lost at certain times due to the environment, other machinery or malfunction of electronic components. Significant loss of data is rare when wireless devices, such as the BodyGuard system, used normally. The BodyGuard system should not be used in situations, or in any manner, where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death or loss of property. Orbit Communications Pty Ltd accepts no responsibility for damages of any kind resulting from errors in data transmitted or received using the BodyGuard systems, or for the failure of the BodyGuard system to transmit or receive such data.

- Do not operate the BodyGuard system in areas where blasting is in progress, where explosive atmospheres may be present, near medical equipment, near life support equipment, or any equipment which may be susceptible to any form of radio interference, in such areas, BodyGuard system must be powered OFF.

- Do not operate BodyGuard system in any aircraft, whether the aircraft is on the ground or in flight. In an aircraft, the BodyGuard system must be OFF.

The information in Orbit Communications Pty Ltd documents are subject to change without notice and do not represent a commitment on the part of Orbit Communications Pty Ltd.

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WEEE directive 2002/96/EC, disposal of old electronic equipment

This product shall not be treated as household waste. It must be placed at an appropriate collection point for the recycling of electrical and electronic equipment. By ensuring the correct disposal of this equipment, it will help the environment and human's health. The recycling will help to conserve the natural resources.

Do **NOT** Dispose of Personnel TAG units (i-TAGs) in a fire, furnace or other extreme heat source. These units contain lithium batteries that may explode when exposed to extreme temperature.

CAUTION

- Always remove battery connection before starting work on equipment to eliminate the risk of short circuit.
- Fuse type is 3AG, 2A, Slow-Blow.
- Make sure correct fuse installed before applying power to system.
- Ensure fuse is replaced with specified type and rating only.
- Ensure power removed from fuse before attempting to replace (Ignition switched OFF).
- Ensure cause of fuse "blowout" fixed before replacing fuse.
- Ensure Power supply input voltage to BodyGuard unit is within the range specified for the model (12V DC to 28V DC for standard model), (12V DC to 90 VDC when used with voltage reducer).
- Ensure that BodyGuard Cab Alert and Speaker unit are connected to chassis ground.
- Be careful to mount the Components of the system in such a manner as to ensure the unit does not obstruct the driver's field of vision or interfere with driver movement required for safe operation the vehicle.
- The speaker should not be mounted close in a position where the sound can be clearly heard in event of a proximity detection but no so close as may prevent the driver from hearing other sounds or may potentially cause damage to hearing. The speaker should mount a minimal distance of 300mm (12") away from either of the operator's ears.

Cleaning

Clean using a soft cloth dampened in mild detergent and water. Do NOT use chemicals or cleaners containing harsh materials such as benzene, xylene and acetone.

Certificate Information

C-Tick

FCC

Cab Alert Unit contains FCCID S7AIW02

Sensor Unit: FCC Rule: Part 15 Subpart C

Tag Device: FCC Rule: Part 15 Subpart C

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.