



**simmons**signs

**INVINCA-VAS Speed Indicator Device**

**User Guide**

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## 1 INVINCA-VAS Speed Indicator Device

### 1.1 Introduction

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The INVINCA-VAS Speed Indicator Device is a robust pole or tripod mounted vehicle speed indicating device designed to provide road users with dynamic information about their speed so as to encourage better driving behaviours.

The Speed Indicator Device incorporates a low power Frequency Modulated Continuous Wave radar that generates accurate vehicle count and speed information. Speed information is presented to the driver via an LED array that can be factory configured to display a variety of graphical information.

For ease of use the product features a convenient user interface over a Wi-Fi link to facilitate system configuration.

A log of vehicle speed and time information can be downloaded over the Wi-Fi link from the Speed Indicator Device in the form of a standard comma separated variable (CSV) file that can be loaded directly into a spreadsheet for further analysis.

The standard product is configured to display:-

- A "YOUR SPEED" message
- The vehicle speed
- A happy or unhappy face depending if the vehicle is complying with or exceeding a pre-determined speed limit.

The display can also be blanked above and below pre-set vehicle speeds; this is to discourage the situation where the product might be used to record a high speed record and to prevent nuisance triggers at slow speeds.

The product can also operate in stealth mode; whilst in stealth mode the product operates normally collecting speed and count information but blanks the display. It is recommended to use stealth mode after the unit is first installed; in this way the speed habits of drivers can be ascertained before driver behaviour is affected by feedback of vehicle speed information.

When power is first applied the product will cycle through the installed displays until the system is triggered by an approaching vehicle. After triggering the display will revert to the standard operational mode where on detecting a vehicle it will display the "YOUR SPEED" message, the vehicle speed and a happy or unhappy face and then a blank display until the next vehicle is detected.

## INVINCA-VAS Speed Indicator Device

The product features vehicle data logging; the speed output from the radar is recorded to internal memory and may be downloaded using a Wi-Fi interface. The radar count has been shown to be >93% accurate. Note that the radar is set to only record vehicles approaching the sign.

The product is available as a 230V mains operated unit or as a battery operated unit with a built in battery charging device. The battery option is offered in two versions to allow recharging either by connection to an adjacent supply e.g. a lighting column which allows overnight charging or by taking the unit 'back to base' (portable installation) and plugging it into a mains supply to charge.

The product features a range of mounting options including post top and mid post mounting. Also available is a tripod mount for mobile applications.



## 1.2 Outline product specification

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- Utilises a K Band RADAR vehicle speed indicating device to detect the speed and range of a vehicle
- The RADAR unit has a range of up to 180m and a count accuracy of >93%
- The RADAR makes speed measurements from 7mph to 99mph
- The product has a robust chassis contained within an MDPE Rota-moulded body with a cast (LM6M) Aluminium Hinged access door
- The product has an IP55 rating and is impact resistant to IK09
- The display is contained behind a 6mm thick anti-glare polycarbonate window using secure hex screws
- The RADAR module is positioned central to the sign above the screen
- There is a power indicating green LED central to the sign below the screen
- The product can be secured using modified Simmons signs Invinca Varifix or Variband fixings or a standard Invinca Post Top
- The battery operated unit has a capacity of 26 Amp Hours supporting over 12,000 detections

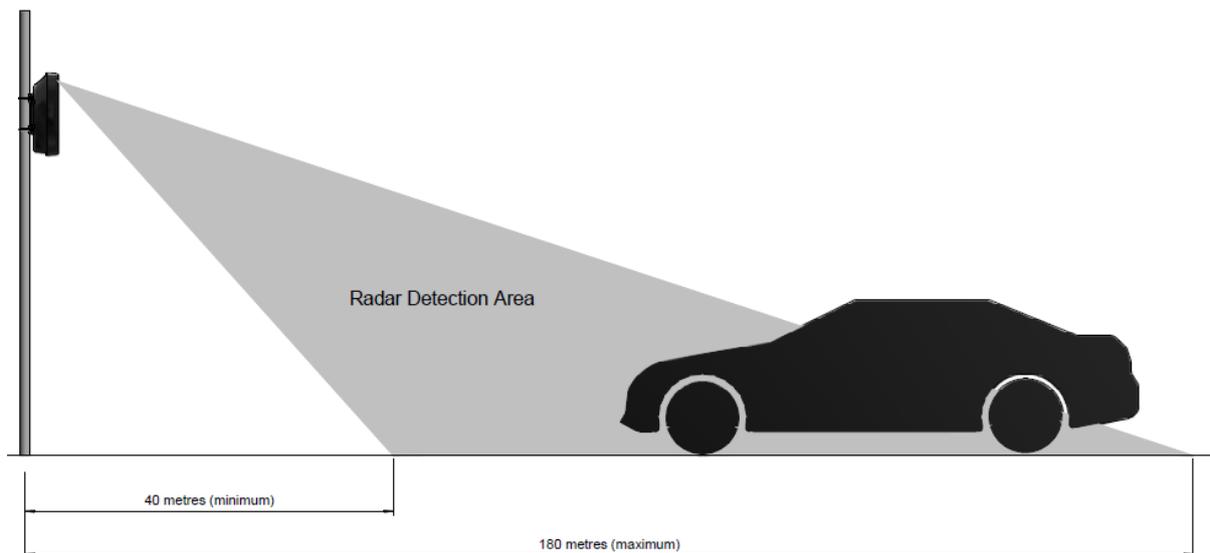
## 2 RADAR Detection

### 2.1 Mounting height

The optimum mounting height for the Speed Indicator Device RADAR sensor is 2.3 metres to the underside of the sign.

The Speed Indicator Device detection range is between 40 metres and 180 metres.

For further information see the installation guide.



### 2.2 Mounting angle

For the radar to cover the width of a 3.5 Metre carriageway at:-

- 100 metres the device needs to rotate approximately 5° toward the centre of the road
- 180 metres the device needs to rotate approximately 4° toward the centre of the road

The radar unit is positioned behind the front panel towards the top of the product.

# INVINCA-VAS Speed Indicator Device

## 2.3 Speed detection and counting

The Speed Indicator Device uses a sophisticated K-band 24GHz frequency modulated continuous wave (FMCW) radar with a range up to 180m that is capable of measuring vehicle speeds from 7mph to 99mph.

The use of a FMCW radar detector enables the Speed Indicator Device to detect both speed and range of a vehicle Traditional continuous wave (CW) Doppler radar detectors typically detect only the speed of a vehicle.

The vehicle count occurs independently of speed detection and vehicles advancing towards the sign are counted at a range of 20 metres from the unit.

## 2.4 Factory radar configuration

The Speed Indicator Device can be set for different road conditions and different speed limits. The Speed Indicator Device is factory configured for 30mph and the other speed settings are shown below: -

<b>Default speed limits</b>			
Road Speed Limit	Lower speed threshold	Upper speed threshold (i.e. speed above which the display is blanked)	Initial Vehicle Detection Range
30mph	15mph	45mph	100m

### 3 Configuration

The Speed Indicator Device features a Wi-Fi interface that gives access to user settings. The interface is a single screen as shown below:-

**Simmons signs Vehicle Activated Sign Configuration Interface**  
5.8.2

---

**Change Wi-Fi Credentials**

New SSID

New Password

[Change Credentials](#)

**Warning**

Ensure you keep a record of the new credentials. Once credentials are changed you will be

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**Download Log**

[Download Log CSV](#)

---

**Time and Date**

15-Jun-2019 10:41:04

Set Date:

Set Time (UTC/GMT):

[Change Time and Date](#)

---

**Radar Settings**

Select Speed Mode:

Select Max detection range (40 - 150 metres):

[Submit Settings](#)

---

**Speed Display Settings**

Minimum Display Speed:

At Speed:

High Speed:

Maximum Display Speed:

Stealth Mode:

[Submit Settings](#)

**Note:**

These settings affect display only. All detected vehicle speeds will still be logged.

The sections below explain how to establish a Wi-Fi connection, connect to the Wi-Fi interface and adjust the system settings.

To connect to the Wi-Fi interface the user will require a device (laptop, tablet or smartphone) that features a Wi-Fi connection and a suitable browser.

## 3.1.1 Establish a Wi-Fi connection: Windows

The Speed Indicator Device broadcasts as a Wi-Fi Access point using the identification INVINCA-VAS. To connect follow the steps below:-

<p>Select Wireless Network Connection from the taskbar on your computer</p>	
<p>This diagram shows a typical screen from a Windows computer Wi-Fi connection offering INVINCA-VAS Speed Indicator Device as a potential Wi-Fi connection.</p>	<p>The screenshot shows the 'Wireless Network Connection' window in Windows. The network 'INVINCA-VAS' is highlighted. A tooltip displays the following information: Name: INVINCA-VAS, Signal Strength: Excellent, Security Type: WPA2-PSK, Radio Type: 802.11n, and SSID: INVINCA-VAS. A button at the bottom reads 'Open Network and Sharing Center'.</p>
<p>Selecting INVINCA-VAS as the connection will bring up a network security screen.</p>	<p>The screenshot shows the 'Connect to a Network' dialog box. It prompts the user to 'Type the network security key'. There is a text input field for the 'Security key', a 'Hide characters' checkbox, and 'OK' and 'Cancel' buttons at the bottom.</p>

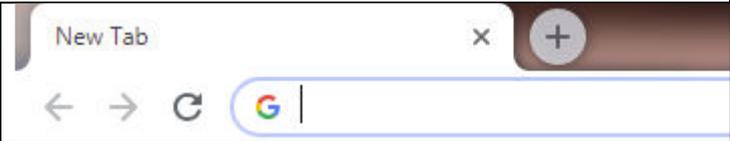
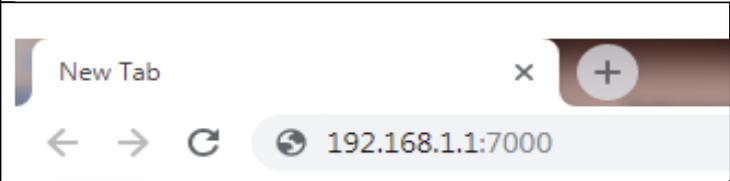
<p>Enter the default password (SimmonSigns) as shown.</p> <p>Press Ok</p>	
<p>The computer will attempt connection to the INVINCA-VAS.</p>	
<p>When the connection is made the computer Wi-Fi connection will display a screen similar to that opposite.</p> <p>NOTE The windows computer must display a message indicating "No internet connection". This in normal as there will not be an internet connection provided to the Windows computer by the INVINCA-VAS.</p>	

# INVINCA-VAS Speed Indicator Device

## 3.1.2 Connect to the Wi-Fi interface: Windows

The Wi-Fi interface within the Speed Indicator Device is available at the address:  
192.168.1.1:7000.

To access this interface follow the steps below:-

<b>Important Note for computers connected to other networks</b>	
When your computer is connected to another network (e.g. a mobile network or wired Ethernet network) the computer may preferentially attempt connection to the Speed Indicator Device Wi-Fi interface using that other network instead of the Wi-Fi connection.	
To prevent this occurring it is best to disconnect the computer from other networks whilst initiating communication with the Speed Indicator Device.	
Open a browser Window	
In the browser address bar enter the address in the browser and press return:-	

If the connection is successful the Speed Indicator Device Wi-Fi interface screen will appear in the browser as opposite:-

If the connection is not successful then follow the steps in Section 5 Troubleshooting guide later in this document

**Simmons Signs Vehicle Activated Sign Configuration Interface**  
5.8.2

---

**Change Wi-Fi Credentials**

New SSID

New Password

---

**Warning**

Ensure you keep a record of the new credentials. Once credentials are changed you will be

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**Download Log**

[Download Log CSV](#)

---

**Time and Date**

15-Jun-2019 10:41:04

Set Date:

Set Time (UTC/GMT):

---

**Radar Settings**

Select Speed Mode:

Select Max detection range (40 - 180 metres):

---

**Speed Display Settings**

Minimum Display Speed:

At Speed:

High Speed:

Maximum Display Speed:

Blatney Mode:

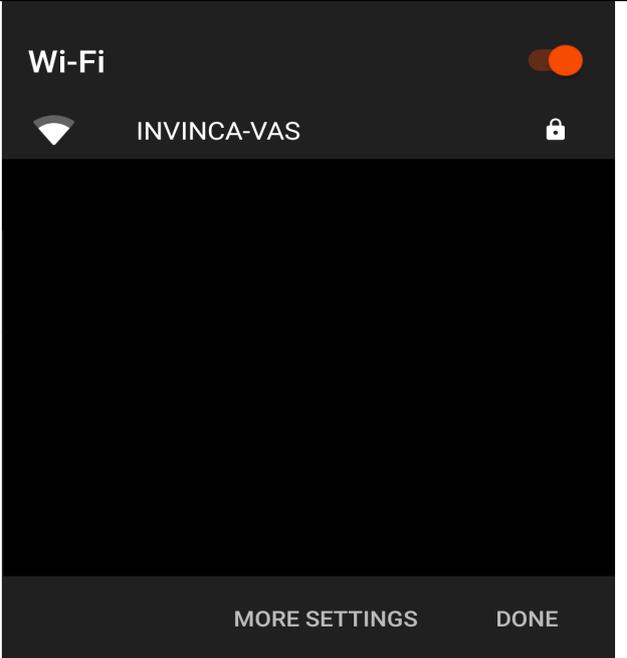
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**Note:**

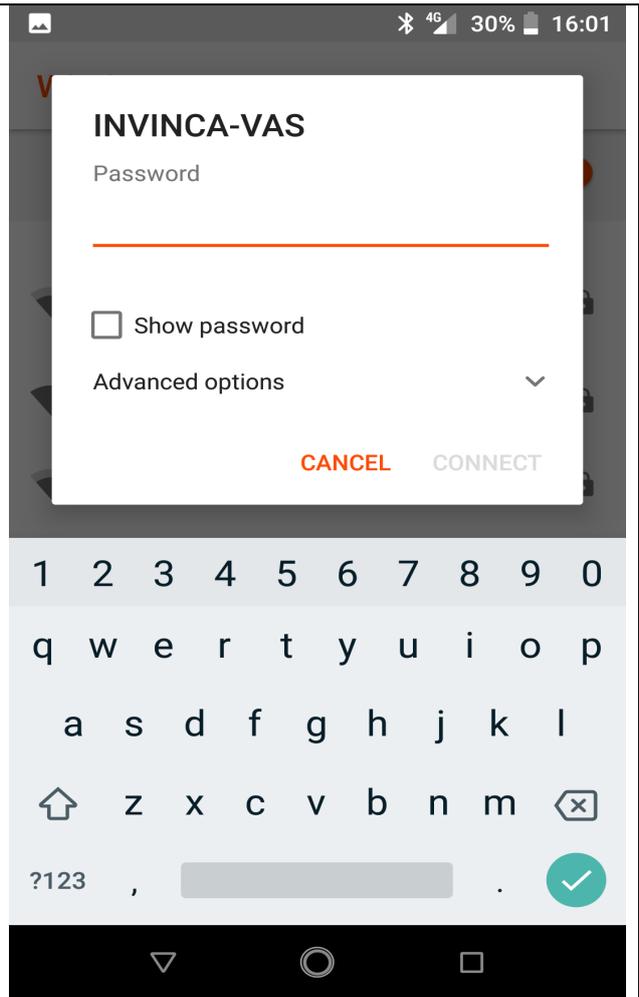
These settings affect display only. All detected vehicle speeds will still be logged.

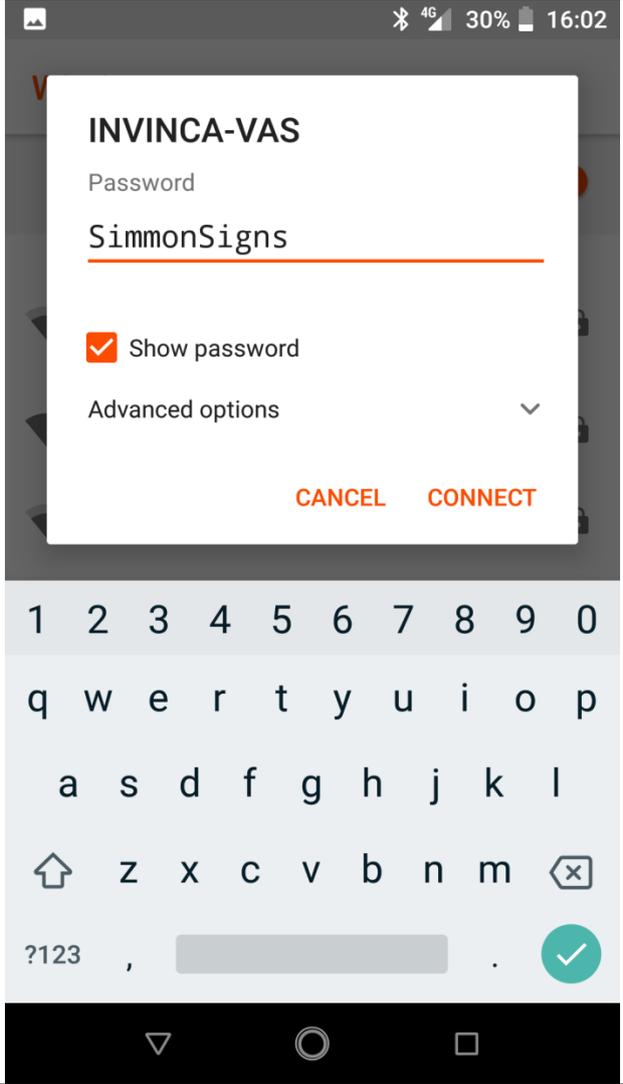
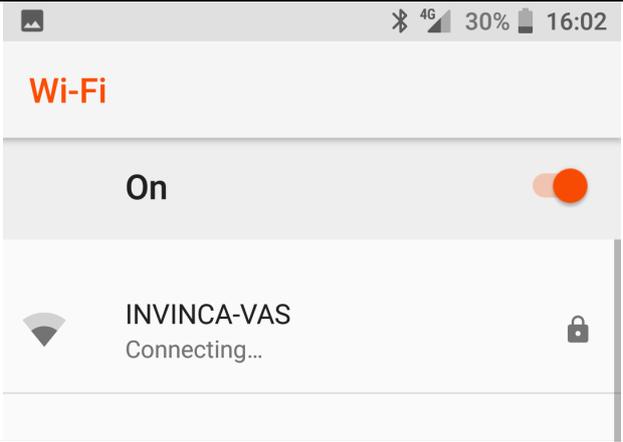
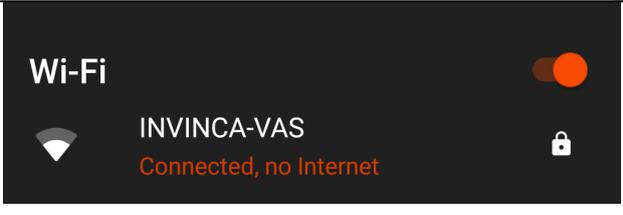
NOTE most browsers allow saving this address as a bookmark on your device so that it may be easily recalled; you can give the bookmark a more recognisable name.

3.1.3 Establish a Wi-Fi connection: Android

<p>Select Wi-Fi Connection from settings on your device</p>	
<p>This diagram shows a typical screen from an Android device Wi-Fi connection offering INVINCA-VAS as a potential Wi-Fi connection.</p>	 A screenshot of an Android Wi-Fi settings screen. At the top, the word "Wi-Fi" is displayed in white on a dark background, with a toggle switch to its right that is turned on (orange). Below this, a Wi-Fi signal icon is shown next to the text "INVINCA-VAS". To the right of the network name is a lock icon. At the bottom of the screen, there are two buttons: "MORE SETTINGS" and "DONE", both in white text on a dark background.

Selecting the INVINCA-VAS as the connection will bring up a network security screen.



<p>Enter the default password (SimmonSigns) as shown.</p> <p>Press Connect</p>	
<p>The computer will attempt connection to the INVINCA-VAS.</p>	
<p>When the connection is made the computer will display a screen similar to that opposite.</p>	

## 3.1.4 Connect to the Wi-Fi interface: Android

The Wi-Fi interface is available at the address: 192.168.1.1:7000. To access the interface follow the steps below:-

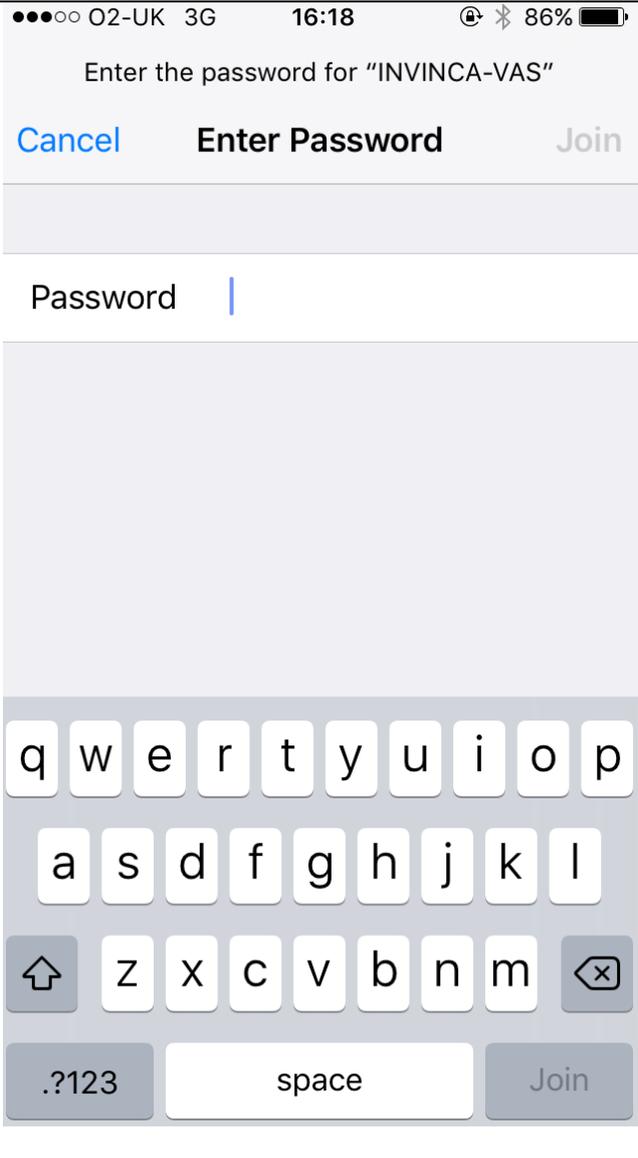
<p>Turn off mobile network connection</p> <p>Important Note for devices connected to mobile networks</p> <p>When your mobile device is connected to your mobile network the device may preferentially attempt connection to the Speed Indicator Device Wi-Fi interface using the mobile network instead of the Wi-Fi connection.</p> <p>To prevent this occurring it is best to turn off the mobile network connection whilst communicating with the INVINCA-VAS.</p> <p>To do this access you access the setting screen (opposite)</p> <p>Select mobile data</p>	
<p>Select TURN OFF mobile data</p>	
<p>You may then proceed with accessing the Wi-Fi interface</p>	
<p>Launch a browser and enter the Wi-Fi address of the INVINCA-VAS</p> <p>192.168.1.1:7000</p> <p>In the address bar</p>	
<p>In the browser address bar enter the address in the browser and press return:-</p>	

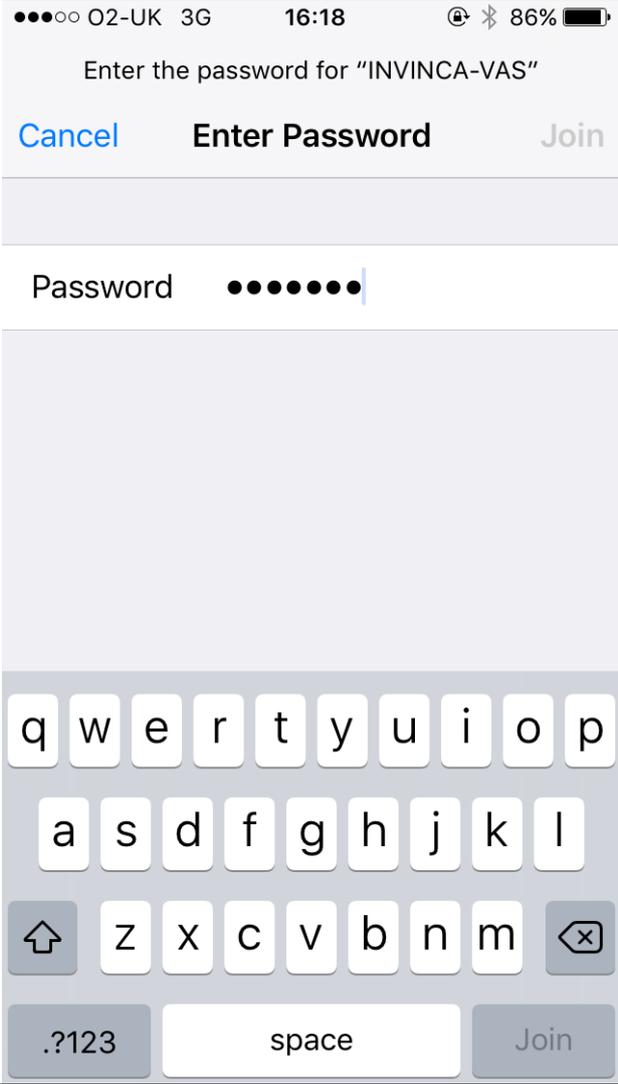
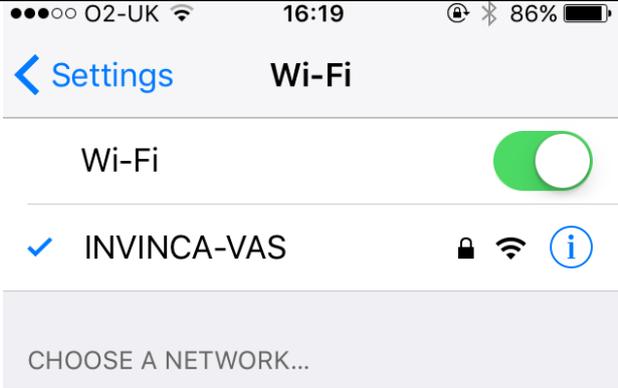


3.1.5 Establish a Wi-Fi connection: iOS

<p>Select Wireless Network Connection from the settings option on your device</p>	
<p>This diagram shows a typical screen from a computer Wi-Fi connection offering the INVINCA-VAS as a potential Wi-Fi connection.</p>	

Selecting INVINCA-VAS as the connection will bring up a network security screen.



<p>Enter the default password (SimmonSigns) as shown.</p> <p>Press Ok</p>	
<p>The computer will attempt connection to the INVINCA-VAS.</p>	
<p>When the connection is made the computer will display a screen similar to that opposite.</p>	

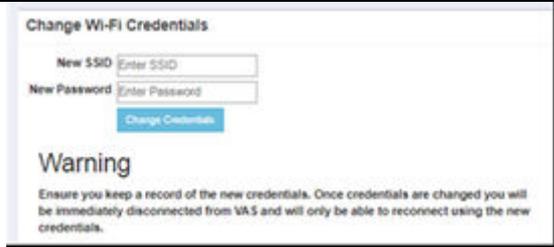
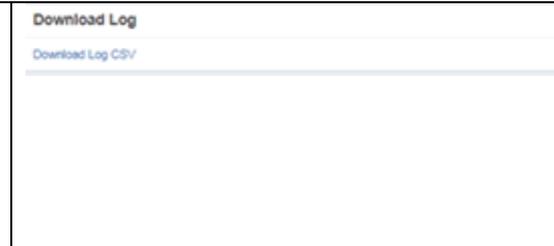
## 3.1.6 Connect to the Wi-Fi interface: iOS

The Wi-Fi interface is available at the address: 192.168.1.1:7000. To access the interface follow the steps below:-

<p>Turn off mobile network connection</p> <p>Important Note for devices connected to mobile networks</p> <p>When your mobile device is connected to your mobile network the device may preferentially attempt connection to the Speed Indicator Device Wi-Fi interface using the mobile network instead of the Wi-Fi connection.</p> <p>To prevent this occurring it is best to turn off the mobile network connection whilst communicating with the INVINCA-VAS.</p> <p>To do this access you access the settings screen (opposite)</p> <p>Select Mobile Data</p>	<p>The screenshot shows the 'Settings' app on an iPhone. At the top, the status bar shows 'O2-UK', signal strength, Wi-Fi, time '16:19', Bluetooth, and 86% battery. The 'Settings' menu is open, showing options for Airplane Mode (off), Wi-Fi (INVINCA-VAS), Bluetooth (On), Mobile Data, and Carrier (O2 - UK).</p>
<p>Turn off mobile data (as opposite)</p>	<p>The screenshot shows the 'Mobile Data' settings screen. At the top, the status bar shows 'O2-UK', signal strength, Wi-Fi, time '16:20', Bluetooth, and 86% battery. The 'Mobile Data' toggle switch is turned off.</p>
<p>You may then proceed with accessing the Wi-Fi interface</p>	
<p>Launch your browser and enter the address</p> <p>192.168.1.1:7000</p> <p>In the address bar</p>	<p>The screenshot shows a mobile browser's address bar. The status bar at the top shows 'O2-UK', signal strength, Wi-Fi, time '16:20', Bluetooth, and 85% battery. The address bar contains the text 'Search or enter website name' and a 'Cancel' button.</p>
<p>In the browser address bar enter the address in the browser and press return:-</p>	<p>The screenshot shows the same mobile browser's address bar. The status bar at the top shows 'O2-UK', signal strength, Wi-Fi, time '16:21', Bluetooth, and 85% battery. The address bar now contains the IP address '192.168.1.1:7000' and a 'Cancel' button.</p>

<p>If the connection is successful the Speed Indicator Device Wi-Fi interface screen will appear in the browser as opposite:-</p> <p>If the connection is not successful then follow the steps in Section 5 Troubleshooting guide later in this document</p>	
<p>NOTE most browsers allow saving this address as a bookmark on your device so that it may be easily recalled; you can give the bookmark a more recognisable name.</p>	

3.2 Adjust system settings

<b>Change Wi-Fi Credentials</b>	
<p>All Speed Indicator Device units are shipped with the access point SSID (set service indicator) set as INVINCA-VAS and the default password set as SimmonSigns.</p> <p>There may be circumstances when it is necessary to create an individual access point ID to individually identify each Speed Indicator Device sign. To support this circumstance the SSID and password may be changed to the users custom settings.</p> <p>The user can set both SSID and password in the appropriate boxes provided and the select the Change Credentials button to accept the new settings.</p> <p><b>IMPORTANT NOTE</b></p> <p>The user must keep a record of the new settings as once these credentials are changed the user will be disconnected from the Speed Indicator Device and may only reconnect using the new credentials.</p>	
<b>Download Log</b>	
<p>To download the vehicle count and speed log click on the Download CSV link. This will transfer a data file to the host computer, tablet or mobile device.</p> <p>For further information on the data log see the later section entitled Download Log.</p>	
<b>Setting time and date</b>	
<p>To set or adjust the time and date settings using the appropriate section to enter the correct date and time and then click the button (labelled Change Time and Date) to set the time.</p>	

**Set Radar Settings**

This section allows the user to set the detection mode and the range at which the speed is first detected.

The Select Speed Mode selection has two possible modes to determine the display of the RADAR detects more than one vehicle:-

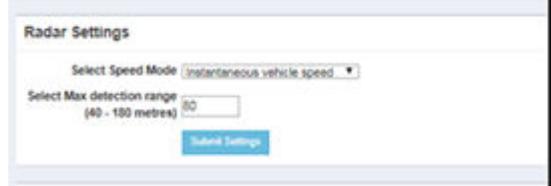
- Instantaneous vehicle speed
  - o In this mode the current speed of the vehicle that has been tracked for the longest time is displayed
  
- Average vehicle speed
  - o In this mode the average speed of the vehicle that has been tracked for the longest time is displayed

The user will most likely use the Instantaneous vehicle speed setting

NOTE the count is not affected by this setting

The Select Max Detection Range sets the detection range of the radar in metres.

After changing these parameters the user should click the button (labelled Submit Settings) to commit the settings.



<b>Speed Display Settings</b>	
<p>This screen allows setting of the display screen:-</p> <ul style="list-style-type: none"> <li>- Minimum Display Speed : below this speed the Speed Indicator Device screen will remain blank</li> <li>- At Speed: this sets the speed limit for the display. For example, if this is set to 30 then a green happy face will be displayed for vehicle speeds at and below 30 mph and a red unhappy face will be displayed at vehicle speeds above 30mph</li> <li>- High Speed: This field should be set to the same value as maximum speed. this has been included to allow for future product variants.</li> <li>- Maximum Speed : above this speed the Speed Indicator Device screen will remain blank</li> </ul> <p>Stealth Mode</p> <ul style="list-style-type: none"> <li>- Setting Stealth mode to ON means that the Speed Indicator Device will detect, count and log cars but not display any information to the driver. This mode can be used to collect data without providing a warning to the driver.</li> </ul> <p>After changing these parameters the user should click the button (labelled Submit Settings) to commit the settings</p>	<div style="border: 1px solid #ccc; padding: 10px;"> <p><b>Speed Display Settings</b></p> <p>Minimum Display Speed <input style="width: 50px;" type="text" value="15"/></p> <p>At Speed <input style="width: 50px;" type="text" value="20"/></p> <p>High Speed <input style="width: 50px;" type="text" value="30"/></p> <p>Maximum Display Speed <input style="width: 50px;" type="text" value="99"/></p> <p>Stealth Mode <input type="checkbox"/> OFF <input type="checkbox"/> ON</p> <p style="text-align: center;"><a href="#" style="background-color: #007bff; color: white; padding: 2px 5px; border-radius: 3px;">Submit Settings</a></p> <p><b>Note:</b> These settings affect display only. All detected vehicle speeds will still be logged.</p> </div>

## 4 Download Vehicle Data Log

In all operating modes (normal or stealth mode) the Speed Indicator Device collects vehicle speed and count information. This data is retained in system memory and can be downloaded using the Wi-Fi interface.

To simplify management of the stored data the Speed Indicator Device maintains two separate stores of data, each capable of storing in excess of 1 million vehicle speed information records. In operation the system stores data in the first memory block; when the first block becomes full the system stores data in the second block. When the second block becomes full the first block is erased and the system writes to the first block, in turn when the first block becomes full the second block is erased and then re-used.

The information is presented to the user in a zipped CSV format (Comma Separated Format) and contains date, time and speed information. CSV is a portable file format and can be opened directly in spreadsheet programs such as Microsoft Excel.

To access the data follow the instructions below:-

<p>To download the vehicle count and speed log click on the Download CSV link. This will transfer a data file to the host computer, tablet or mobile device.</p>	
<p>For further information on the data log see the later section entitled Download Log.</p>	

This will transfer a file in zipped format to the host computer, tablet or mobile device. The file will appear in the Download section on the user’s device.

The data has the format “Date time speed A”.

These fields indicate the following:-

- Date – the date of detection of the vehicle count
- Time – the time of detection of the vehicle count
- Speed – the speed as detected at the time of the count (note this is the last speed of the detected vehicle not the maximum speed)
- A – Indicates Advance, meaning a vehicle travelling towards the INVINCA-VAS. This field cannot be changed and has been included to allow for future product variants.

Typical data will be similar to that shown below:-

13/08/2018	15:24	29 mph	A
13/08/2018	15:24	27 mph	A

13/08/2018	15:24	32 mph	A
13/08/2018	15:25	29 mph	A
13/08/2018	15:25	24 mph	A
13/08/2018	15:26	28 mph	A
13/08/2018	15:27	29 mph	A
13/08/2018	15:27	38 mph	A

## 5 Product Maintenance

### 5.1 Cleaning

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The product has been designed to minimise build of dirt on the front face. You are however advised to clean the product from time to time in order to maintain maximum clarity of the display and if used the photocell window. This can be achieved with soapy water and a soft cloth.

The front surface has been hard-coated with an anti-glare finish but under no circumstances should abrasive cleaners, strong chemicals or scourers be used.

### 5.2 Ingress Protection Seals

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The product is protected from the ingress of water and dust to IP55. In order to maintain the integrity of the product the seals should be inspected for any sign of damage and replaced if necessary. Note: the angled cut overlap (scarf joint) is a normal feature.

Contact the manufacturer if seals need replacement.

# INVINCA-VAS Speed Indicator Device

## 6 Troubleshooting Guide

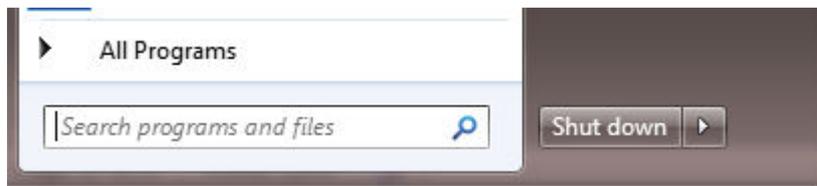
### 6.1 Windows Wi-Fi Connection Issues

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If your computer is having difficulty connecting to the Speed Indicator Device Wi-Fi then it is possible that the computer is experiencing issues with the DHCP protocol (dynamic host control protocol).

This can occur if your computer is normally attached to another wired or Wireless network interface and you are attempting to connect to the INVINCA-VAS. To resolve this renew the IP address of the computer by following the steps below:-

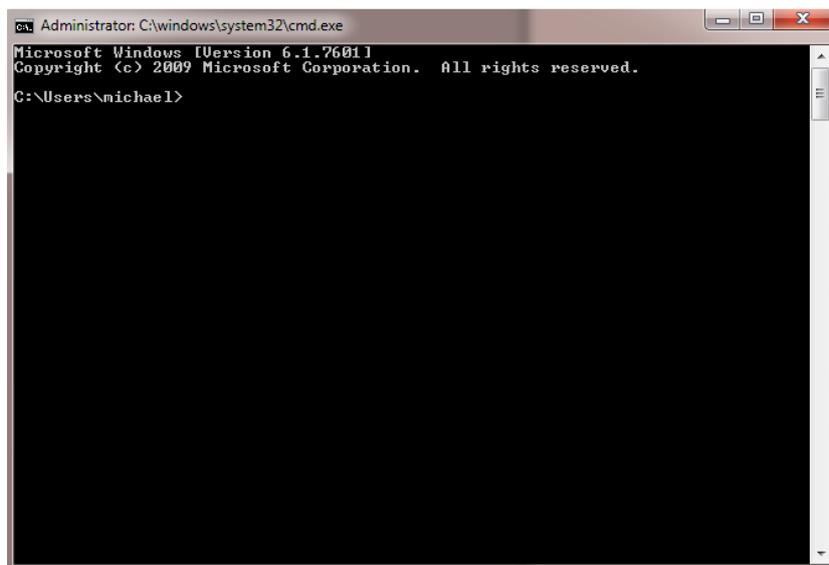
Access the command prompt



Type in cmd and press enter

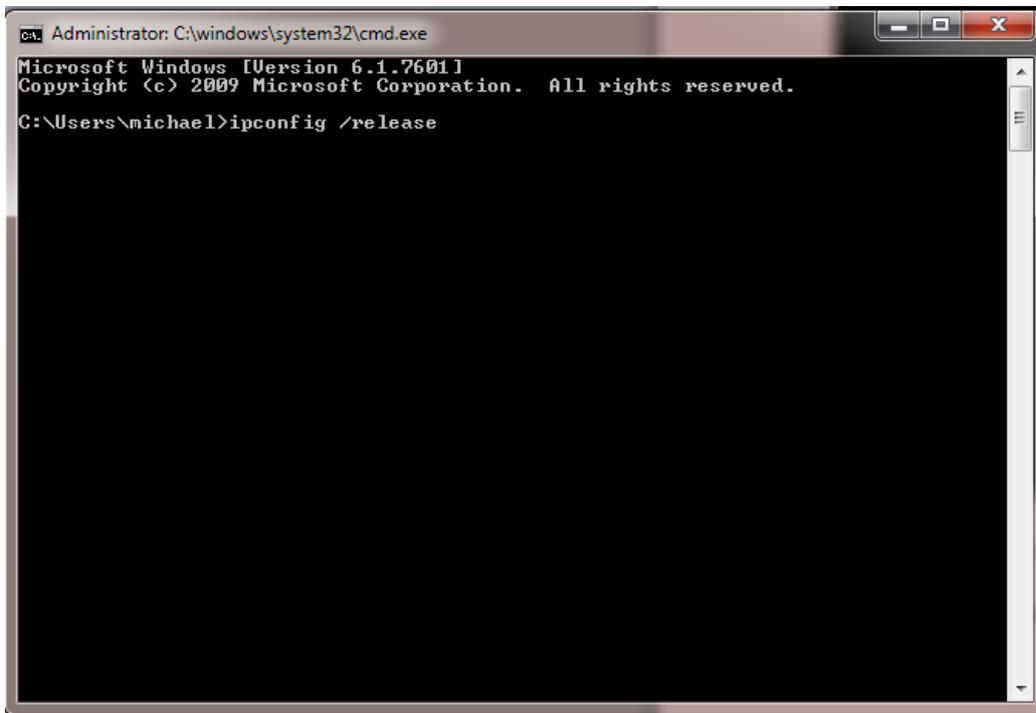


A screen similar to the following window will appear



Release the DHCP configuration

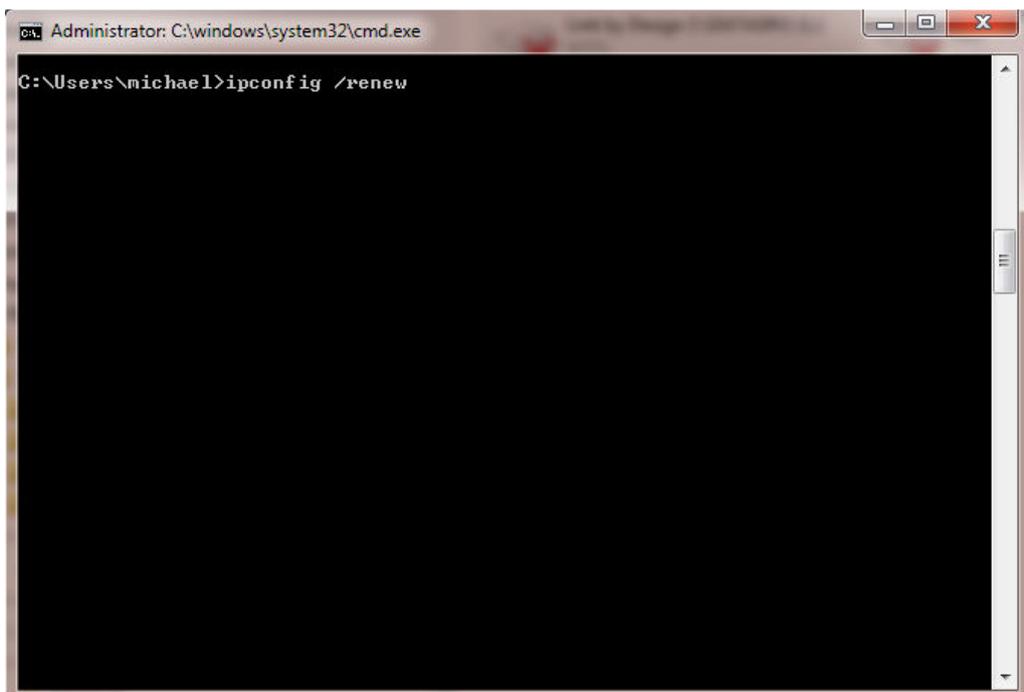
Type in ipconfig /release and press enter



The screen will fill with information regarding IP addresses (not reproduced here)

Renew the DHCP Configuration

Type in ipconfig /renew and press enter

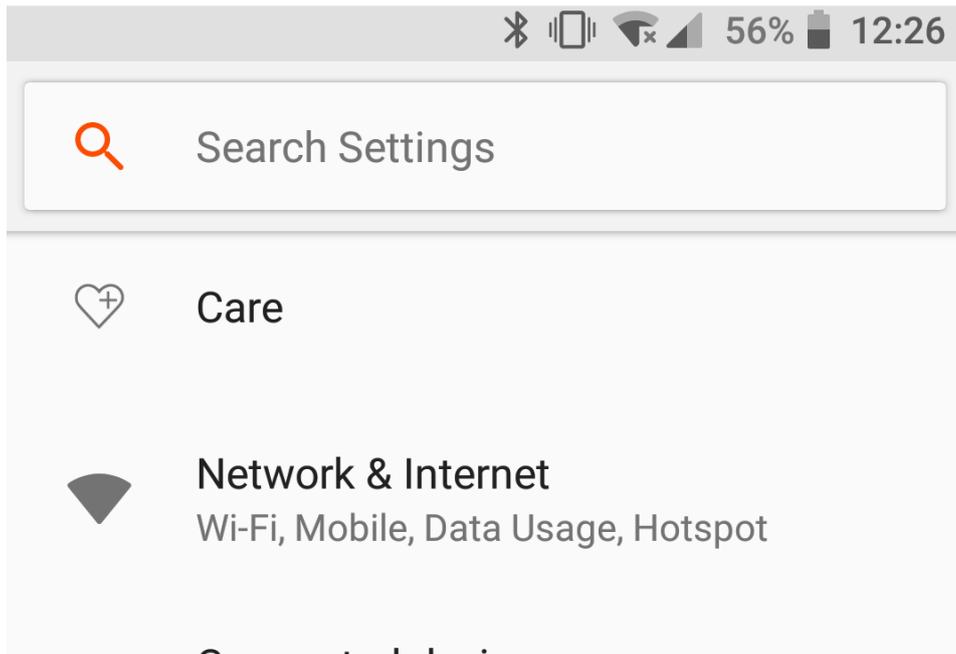


Again the screen will fill with information regarding IP addresses (not reproduced here)

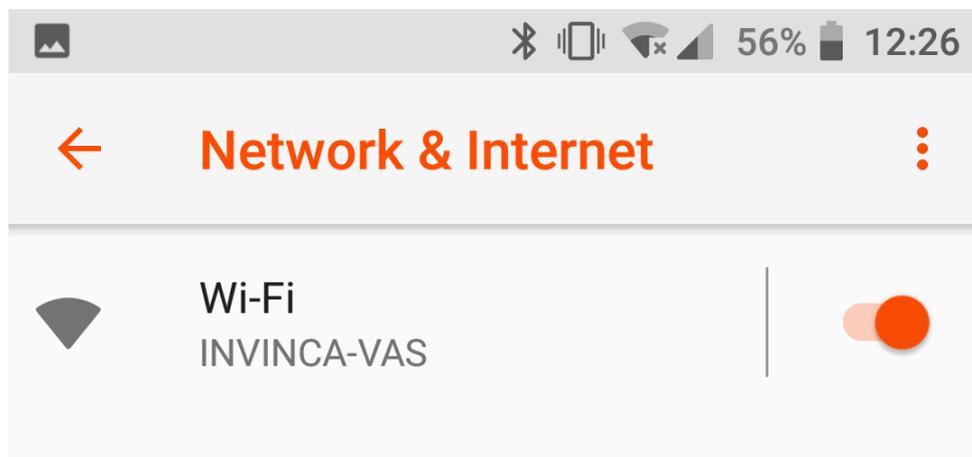
## 5.2 Android Wi-Fi Connection Issues

If your device is having difficulty connecting to the Speed Indicator Device Wi-Fi then it is useful to be able to reset the connection by forgetting the Wi-Fi connection. To do this follow the steps below:-

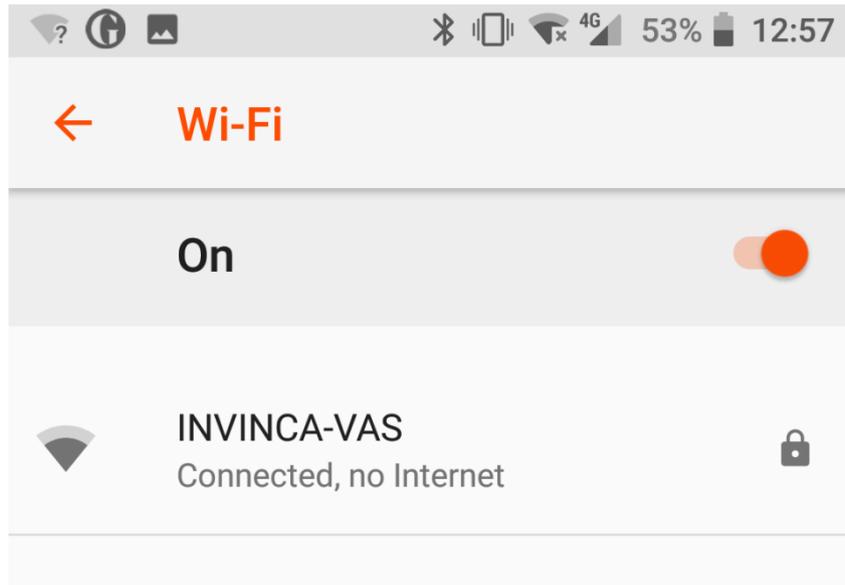
From the settings screen (example below) select Network & Internet



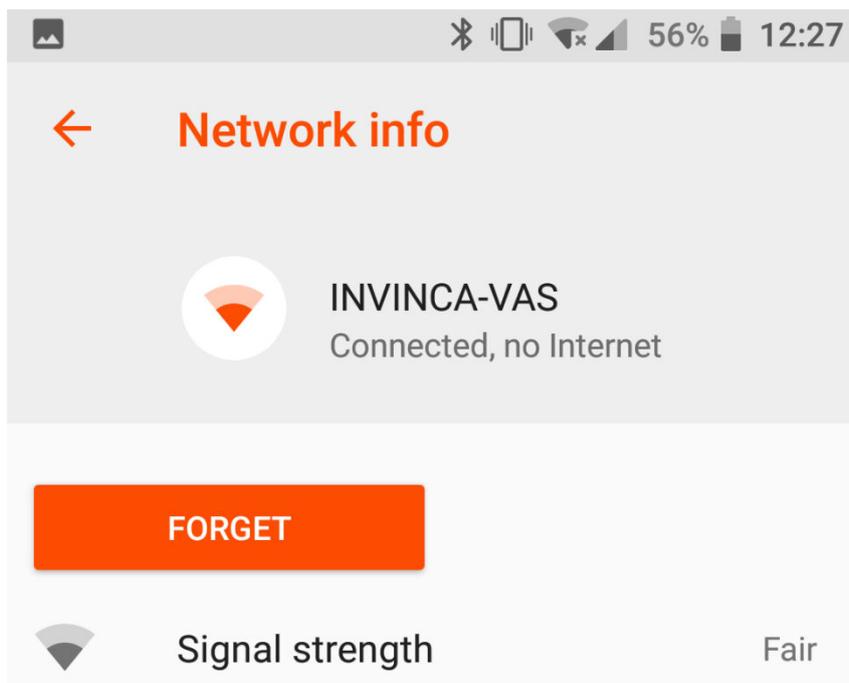
From network and internet screen select Wi- (example below)



From the Wi-Fi screen select INVINCA-VAS (example below)



From the INVINCA-VAS screen select FORGET



Then follow the steps in section 3.1.3 to establish a Wi-Fi connection: Android to reconnect.

## 6.2 iOS Wi-Fi Connection Issues

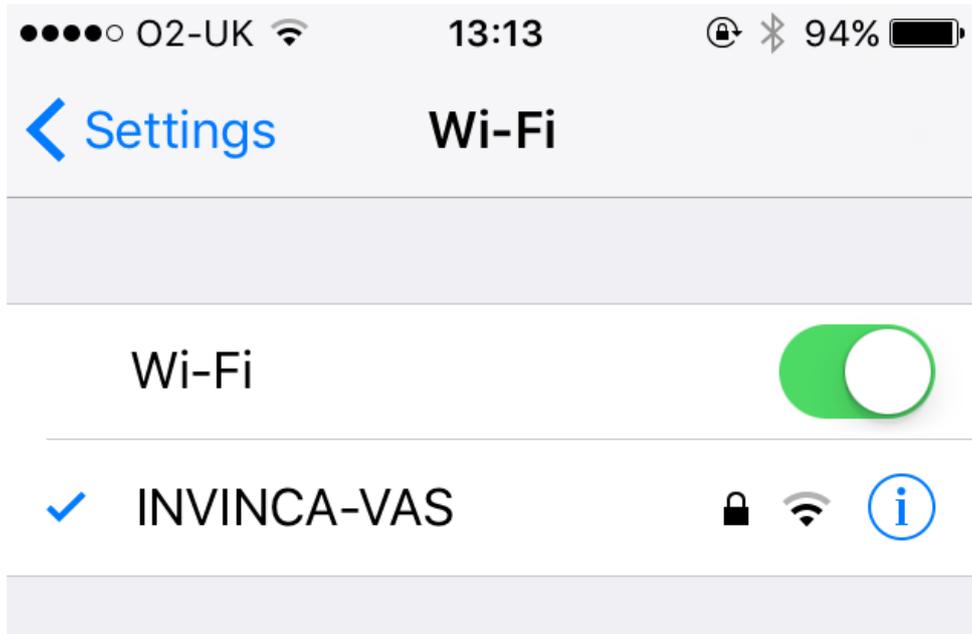
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If your device is having difficulty connecting to the Speed Indicator Device Wi-Fi then it is useful to be able to reset the connection by forgetting the WiFi connection. To do this follow the steps below:-

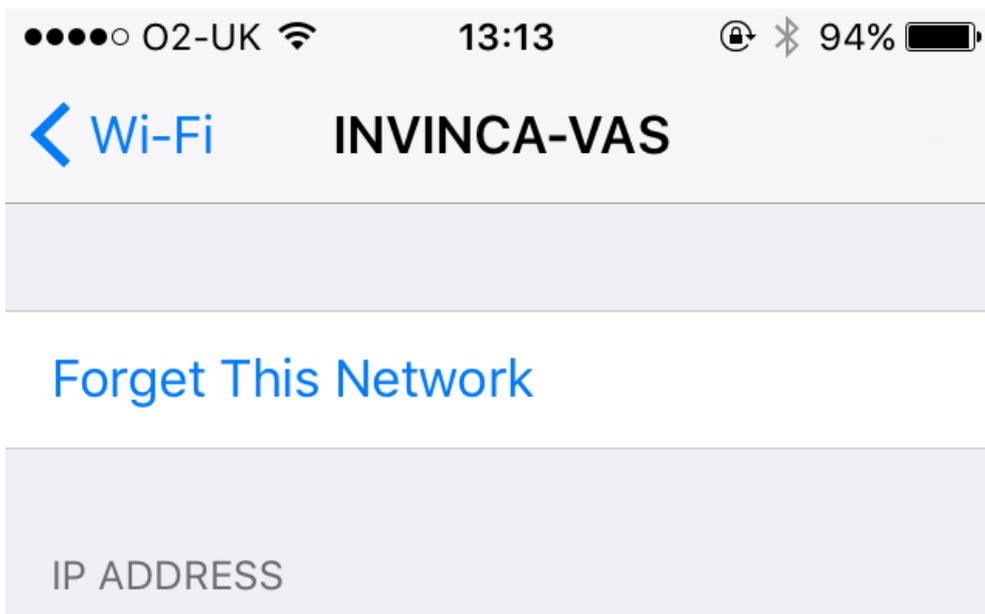
From the settings screen (example below) select Wi-Fi



From the Wi-Fi screen select INVINCA-VAS (example below)



From the INVINCA-VAS screen select Forget This Network



Then follow the steps in section 3.1.5 to establish a Wi-Fi connection: iOS to reconnect.