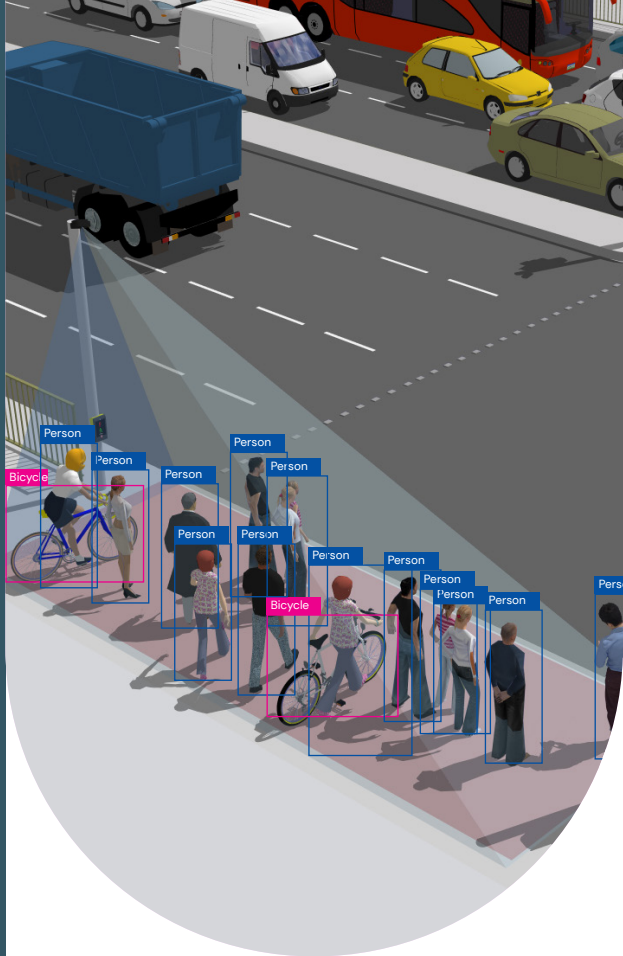




PRODUCT MANUAL

# AGD646

AI Pedestrian and VRU Detector



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AGD646

AI Pedestrian and VRU Detector

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AGDTOUCH

WiFi 3-Click Setup

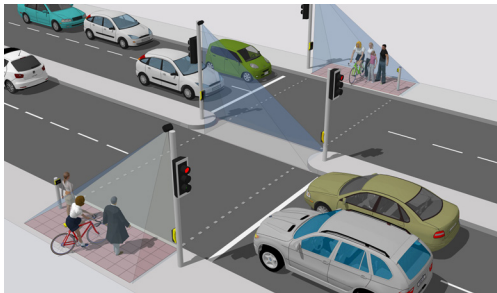
# INTRODUCTION

## PRODUCT AND TECHNOLOGY

The AI Pedestrian and VRU Detector is a next-generation solution for intelligent pedestrian crossing detection. The AGD646 uses artificial intelligence and long-range infrared to deliver accurate, reliable performance in all lighting and weather conditions.

Designed for kerbside use, it detects pedestrians and cyclists in waiting areas, enabling adaptive signal control and improved safety. By identifying user types, it supports dynamic strategies that prioritise vulnerable road users, reduce delays, and enhance crossings. The AGD646 combines AI with real-world functionality, advancing connected detection technology for smarter cities, safer roads, and more efficient pedestrian management systems.

## TYPICAL APPLICATIONS



5m x 3m Toucan Crossing



10m x 3m Super Crossing using single units

# AGD646

AI Pedestrian and VRU Detector



## KEY FEATURES

- Next-generation AI engine specially trained for kerbside applications
- Long-range infrared illumination for large detection zones up to 3m x 10m
- High-quality image sensor and optics for enhanced detection accuracy
- Occupancy mode to enable pedestrian signal prioritisation
- Lower power consumption with improved efficiency
- Enhanced user interface for easy setup and monitoring
- Ethernet connectivity with JSON data output
- Designed to meet TOPAS 2507B standards

# INTRODUCTION

## PRODUCT OVERVIEW

AGD646

AI Pedestrian and VRU Detector



## PRODUCT VARIANTS

|             |                                                                                                                |
|-------------|----------------------------------------------------------------------------------------------------------------|
| 646-400-722 | AI Pedestrian and VRU Detector / 24V / Wi-Fi / Ethernet / Dual Opto output / 1m lead / 2m bulkhead mating lead |
| 646-401-722 | AI Pedestrian and VRU Detector / 24V / Wi-Fi / Ethernet / Dual Opto output / 5m flying lead                    |
| 646-403-722 | AI Pedestrian and VRU Detector / 24V / Wi-Fi / Ethernet / Dual Opto output / 1m lead / 6m bulkhead mating lead |

## PRODUCT OVERVIEW

The AGD646 Pedestrian Detector is an AI optical product that makes crossings safer by delivering robust detection within a larger zone. Multiple units easily integrate to comfortably cover ‘super-crossings’.

It is a high-performance product that processes information onboard using sophisticated AI algorithms, automating decision-making to provide ultra-reliable detection.

The AGD646 Pedestrian Detector employs an HD optical system that detects moving and stationary targets over a large 10m x 3m zone. It has an outstanding AI capability to detect different types of vulnerable road users while rejecting shadows, litter, leaves and small objects such as birds walking through the zone.

Designed into the platform to cover the needs of ‘Smart City’ systems are IP, Power Over Ethernet, and real-time video capabilities which allow the AGD646 to feed data and pictures ‘down the wire’ straight into ITS control rooms – empowering truly informed decision making.



AGD Connect is a cloud-based user authentication platform for supported AGD products. It ensures that only authorised individuals can access and configure supported products. Access permissions are managed by each user's organisation through the AGD Connect website at [agd-connect.com](https://agd-connect.com). A full guide to AGD Connect, including user administration, access permissions and use of the AGD Secure Browser, is provided separately in the AGD Connect User Guide.

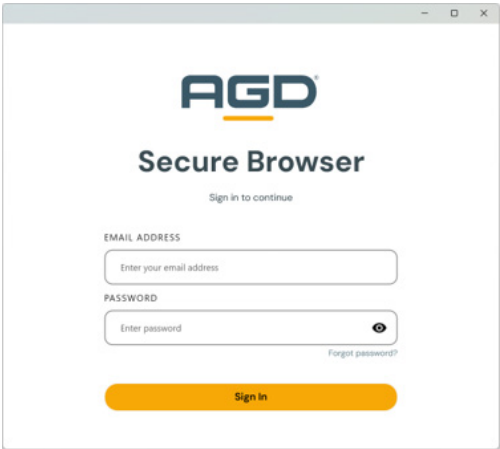
Access to the AGD646 configuration web pages is provided through the AGD Secure Browser, which forms part of the AGD Connect system. The Secure Browser verifies the user's credentials with AGD Connect and then allows access to the AGD646 configuration interface via a Wi-Fi Touch Setup or Ethernet connection.

The AGD Secure Browser requires an Internet connection when the user logs in, so that their credentials can be checked with AGD Connect. Once login has been completed successfully, the Secure Browser remains authorised for 24 hours. During this period, it can be used to access supported AGD devices even where Internet connectivity is not available at the installation location. The AGD Secure Browser may be closed and re-opened during this 24 hour period and will retain the authorisation.

In cases where Internet connectivity will be unavailable at the installation location, log in to the AGD Secure Browser earlier the same day from a location where connectivity is available. The Secure Browser displays the date and time by which a further login is required; this reminder is shown in amber when there are less than 8 hours remaining and red when the time remaining falls below 3 hours. This ensures engineers can ensure they are located somewhere with Internet access at that time to perform a login. Note that if the time is left to expire, any existing activity being performed using the AGD Secure Browser will be immediately terminated.

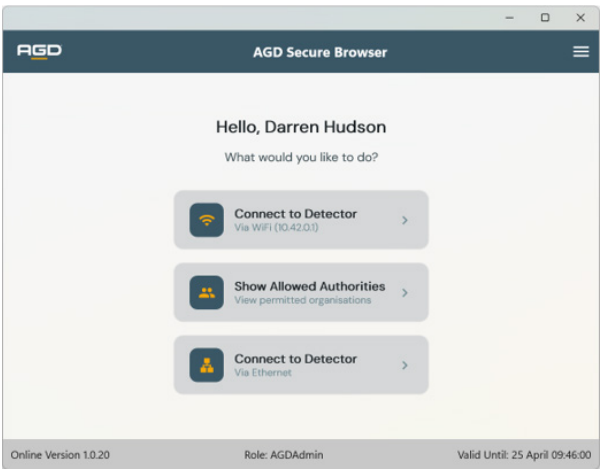
## AGD SECURE BROWSER LOGIN

Access to the AGD Secure Browser requires AGD Connect login credentials provided by your organisation. The AGD Secure Browser can be downloaded from the AGD Systems Website.



The image shows a web browser window displaying the AGD Secure Browser login interface. At the top is the AGD logo. Below it, the text "Secure Browser" is centered, followed by "Sign in to continue". There are two input fields: "EMAIL ADDRESS" with a placeholder "Enter your email address" and "PASSWORD" with a placeholder "Enter password" and a toggle icon. A "Forgot password?" link is located below the password field. At the bottom is a large orange "Sign in" button.

Start the AGD Secure Browser application and enter your AGD Connect username and password. If the device running the Secure Browser does not have Internet access, a warning is displayed so that connectivity can be enabled before login is attempted.



The image shows the AGD Secure Browser application interface. The top header bar contains the AGD logo, the text "AGD Secure Browser", and a menu icon. The main content area displays "Hello, Darren Hudson" and "What would you like to do?". There are three large buttons with icons and text: "Connect to Detector Via WiFi (10.42.0.1)", "Show Allowed Authorities View permitted organisations", and "Connect to Detector Via Ethernet". The bottom status bar shows "Online Version 1.0.20", "Role: AGDAdmin", and "Valid Until: 25 April 09:46:00".

After login, the Secure Browser presents the available connection options for supported AGD devices.

## CONNECTING TO THE AGD646

The AGD Secure Browser provides two connection methods for the AGD646:

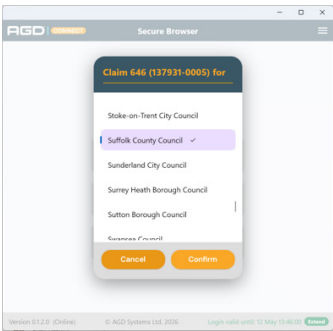
- **Connect to detector via Wi-Fi**  
Use this option when connected directly to the AGD646 using its Wi-Fi Touch Setup access point. The Secure Browser opens the detector configuration page directly, without the need to enter an IP address or a separate device password.
- **Connect to detector via Ethernet**  
Use this option when connecting to an AGD646 through an Ethernet connection. Enter the detector's IP address when prompted and the Secure Browser will open the configuration interface.

## CLAIMING A NEW AGD646

AGD devices in AGD Connect are each configured to know which Highway Authority they are owned by. The process of assigning ownership of an AGD device to a Highway Authority is referred to as 'claiming' the device.

New AGD646 units are supplied in an unclaimed state. When first connecting to a new device, the AGD Secure Browser prompts the user to claim it for the correct Highway Authority. The device can only be claimed for a Highway Authority that has granted the user with access. The Secure Browser allows users to view the Highway Authorities that have granted them permission to access AGD devices.

Check the selected Highway Authority carefully before confirming. Claiming a device to the wrong authority may make it available to the wrong user groups and may require a site visit to correct.



## CHANGING DEVICE OWNERSHIP

If a device needs to be moved from one Highway Authority to another, it must first be released by a user who has permission to access devices belonging to the current Highway Authority. Once released, the device returns to an unclaimed state and can then be claimed for the new Highway Authority in the same way as a new device.

# INSTALLATION AND COMMISSIONING

## AGD646

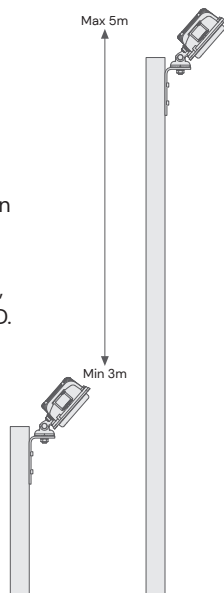
AI Pedestrian and VRU Detector

### PHYSICAL INSTALLATION

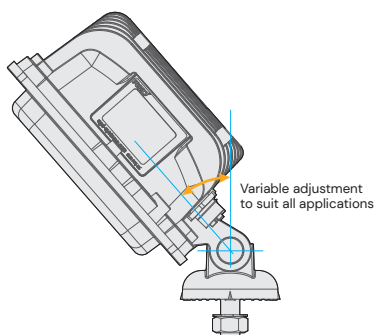
#### STEP 1 – MOUNTING HEIGHT

**HEIGHT** – The AGD646 Pedestrian Detector has excellent performance when mounted between heights of **3–5 metres**.

If you have an application for which you wish to mount the detector outside of these heights, then please contact AGD.

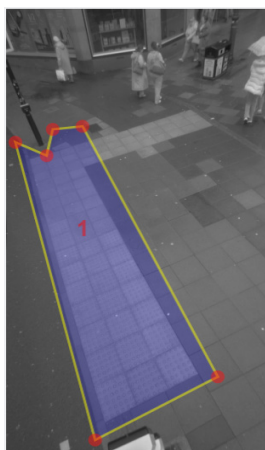


**STEP 2 – DETECTOR ALIGNMENT** – The AGD646 Detector should be mounted using the supplied hardware. The optimal mounting angle will change depending on the installation location; angling the camera at approximately 45 degrees is a good start position. The mounting angle may need to be corrected during the commissioning stage of the installation. Ensure the detector is securely fixed and the mounting nut is tight.



**STEP 3 – DETECTOR VIEW** – View the zone area from the detector, including the area directly in front of the nearside pole. Obstruction of the zone area by signal head backing boards, moving foliage or anything else **must** be avoided so that the detector has a clear field of view.

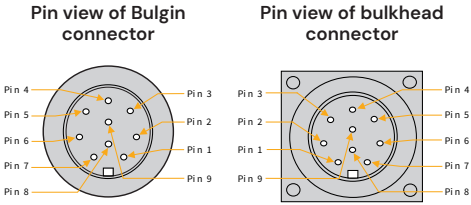
**Detector Alignment** – Further adjustment may occasionally be required to accommodate particular site conditions.



ELECTRICAL INSTALLATION

The detector is powered using a 24V ac/dc ( $\pm 20\%$ ) supply. The power is applied to the detector using the multi-pin mating connector.

The AGD646 Pedestrian Detector is provided with a Buccaneer Series PX0728/S 9-pole connector to enable direct connection to the traffic control system. The pinouts of the connector and detector function are highlighted in the table below:



CONNECTIONS

| Single Cable 24V ac/dc, ac Supply Wiring (1m bulkhead lead with Bulgin connector) |            |                 |           |                      |                   |                                    |
|-----------------------------------------------------------------------------------|------------|-----------------|-----------|----------------------|-------------------|------------------------------------|
| Pin No.                                                                           | Pin Colour | Function        | Power Off | Power On - No Detect | Power On - Detect | Notes                              |
| 1                                                                                 | RED        | +24V ac/dc      | -         | -                    | -                 | -                                  |
| 2                                                                                 | BLACK      | 0V ac/dc        | -         | -                    | -                 | -                                  |
| 3                                                                                 | GREEN      | Earth/Ground    | -         | -                    | -                 | Must be connected                  |
| 4                                                                                 | WHITE      | Opto 1/2 Common | -         | -                    | -                 | -                                  |
| 5                                                                                 | YELLOW     | Opto 1 N/O      | N/O       | N/C                  | N/O               | -                                  |
| 6                                                                                 | BLUE       | Opto 1 N/C      | N/C       | N/O                  | N/C               | Not for use on Puffins/Toucans     |
| 7                                                                                 | -          | Not Connected   | -         | -                    | -                 | -                                  |
| 8                                                                                 | BROWN      | Opto 2 N/O      | N/O       | N/C                  | N/O               | *Only for use with occupancy mode* |
| 9                                                                                 | VIOLET     | Opto 2 N/C      | N/C       | N/O                  | N/C               | *Only for use with occupancy mode* |

| Single Cable 24V ac/dc, Supply Wiring (5m flying lead) |                    |           |                     |                  |                                    |  |
|--------------------------------------------------------|--------------------|-----------|---------------------|------------------|------------------------------------|--|
| Wire Colour                                            | Function           | Power Off | Power On- No Detect | Power On- Detect | Notes                              |  |
| Red                                                    | +24V ac/dc, 42V ac | -         | -                   | -                | -                                  |  |
| Grey                                                   | 0V ac/dc           | -         | -                   | -                | -                                  |  |
| Green                                                  | Earth/Ground       | -         | -                   | -                | Must be connected                  |  |
| White                                                  | Opto 1/2 Common    | -         | -                   | -                | -                                  |  |
| Yellow                                                 | Opto 1 N/O         | N/O       | N/C                 | N/O              | -                                  |  |
| Blue                                                   | Opto 1 N/C         | N/C       | N/O                 | N/C              | Not for use on Puffins/Toucans     |  |
| -                                                      | Not Connected      | -         | -                   | -                | -                                  |  |
| Brown                                                  | Opto 2 N/O         | N/O       | N/C                 | N/O              | *Only for use with occupancy mode* |  |
| Pink                                                   | Opto 2 N/C         | N/C       | N/O                 | N/C              | *Only for use with occupancy mode* |  |

ETHERNET CONNECTOR TYPE

Please see Technical Resource section.

OPTO-COUPLER RATINGS

- Max. current 50mA
- Max. voltage 50VAC or 75VDC
- Max closed resistance: 50 Ohms
- Min open resistance: 10 Mega-Ohms

POWER-UP SEQUENCE

After applying power to the unit, the red LED will illuminate for approx 30s while the operating system loads. The red LED will then flash 5 times. If a detection zone has not been set or the setup process has not been completed, the LED will remain on. When a detection zone has been set, the red LED will come on when the zone is in the detect state and will turn off when the zone is in the non-detect state.

Upon power up, owing to the nature of the equipment power supply, an initial current of 15A < 5ms can be drawn. The supply should be fused as follows: 24V ac/dc – 3A circuit breaker or in-line fuse.

The table shows typical currents (amps) at various voltages and operating temperatures.

| Temperature (°C) | -34   | +20   | +60   | +74   |
|------------------|-------|-------|-------|-------|
| 24 Vdc           | 0.290 | 0.280 | 0.349 | 0.378 |
| 24 Vac           | 0.420 | 0.412 | 0.467 | 0.525 |

CONNECTING

The AGD646 AI Pedestrian and VRU Detector has been designed with efficiency and ease of use in mind. It can be set up simply by connecting to it by Wi-Fi and using AGD Secure Browser. This step-by-step process describes the actions required to set up the detector upon initial deployment when first removed from the box.

CONNECTING Wi-Fi

Check the red LED on the underside of the unit has illuminated and flashed 5 times. Search for the unit and identify it by its **serial number (S/N)**:

**646:XXXXXX-XXXX-TBD** (the X characters denote the S/N, TBD is a user-configurable field used to name the pole location the AGD646 is installed on)

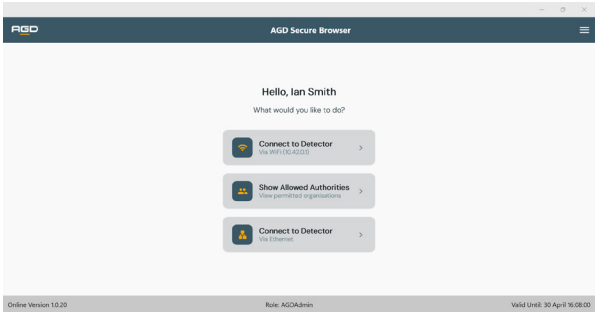
Click 'connect' and input the **default password**:

**Agd646:XXXXXX-XXXX** (the X characters denote S/N)

The LED on the underside of the unit should now be illuminated blue to show Wi-Fi is successfully connected.

Ensure the steps on page 6 have been followed before continuing.

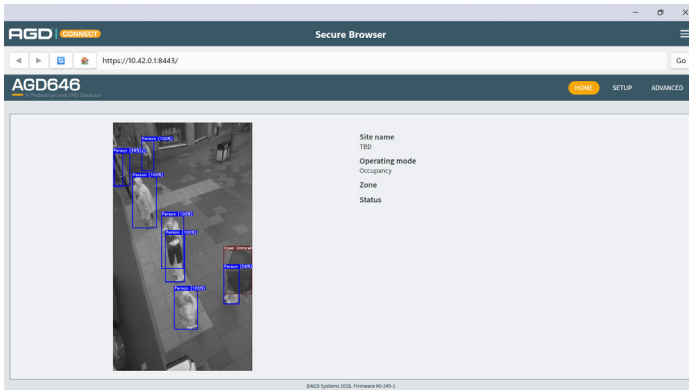
Select Connect to Detector in AGD Secure Browser to configure the detector.



## SET UP THE AGD646 USING AGD TOUCH SETUP

### HOME PAGE

There are no settings on this page. Just the 'camera view'. This page is used to adjust the camera to the correct position.

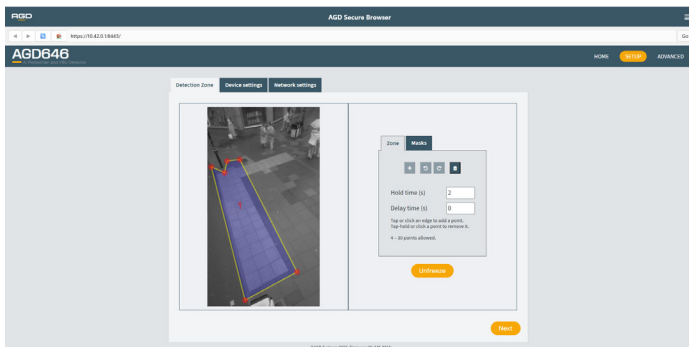


### STEP 1 – DEFINE ZONE

Select the 'SETUP' page

Select the + icon to create the zone

Adjust the zone to cover the area where pedestrians should be detected. The zone can be moved by dragging it and reshaped by dragging the red points. Additional points can be added by left-clicking (or tapping on a touch screen) anywhere on the yellow line. Points can be deleted by left-clicking them (or tapping and holding on a touch screen).



**Hold time (s)** – The amount of time the detection output is held on after a valid target leaves the zone.

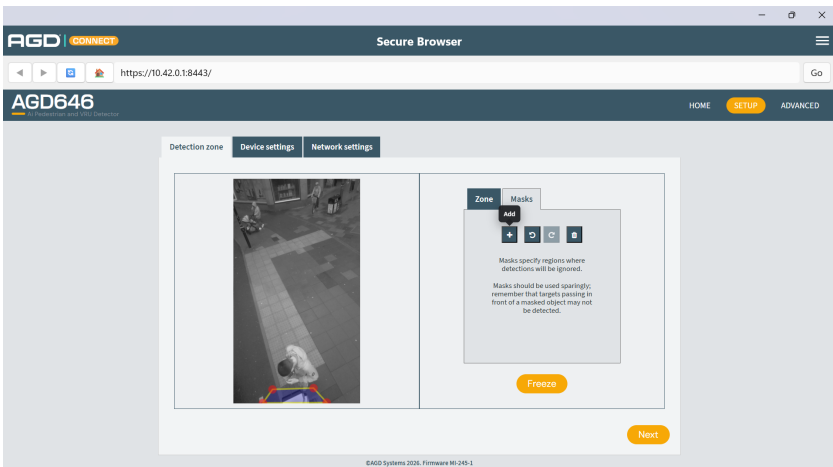
Input range = 0 – 60s Default = 1s

**Delay time (s)** – The amount of time the detection output is not reported after a valid target enters the zone.

Input range = 0 – 20s Default = 0s

### Masks

Occasionally, street furniture within the image can give rise to false detections. This can be resolved through the application of a mask. A mask is a region of the image within which the detector will not report targets. **Masks should be used sparingly.** It can be prudent to mask any foreground street furniture such as a close-up view of the back of a signal head. Use of masks in other areas can sometimes be beneficial for resolving specific issues but should not be routinely employed. It is important to note that pedestrians moving through a masked region might not be detected.

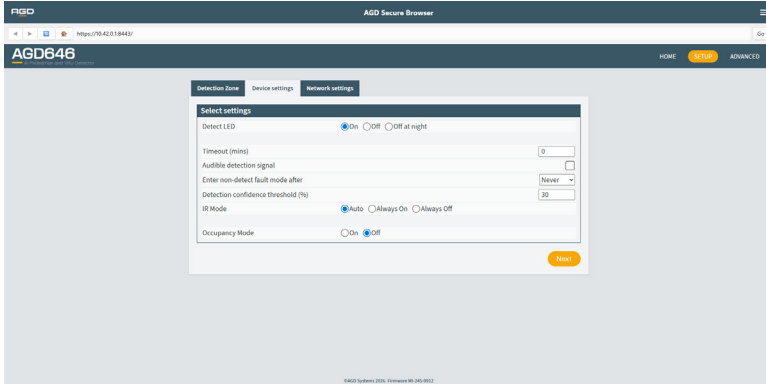


### Freeze/Unfreeze

The Freeze button can be used to freeze the camera feed at a time when the field of view is quiet, making it easier to draw the zone. In environments with a lot of Wi-Fi interference, freezing the image can also improve user-interface responsiveness.

Click 'Next' to move on to the next step

## STEP 2 – DEVICE SETTINGS



### Detect LED

When this option is set to On, the red LED will illuminate when the zone is in the detect state. This behaviour can be disabled completely by selecting Off or only during the night by selecting Off at night. The red LED will always come on during startup and in fault states. The detector will be in a fault state if no zone is set, if setup has not been completed (i.e. the Finish button has not been clicked) if there is a non-detect fault (see below).

### Timeout (mins)

The amount of time the detection output is permitted to stay ON. If the zone is in the detect state for longer than this time, it will switch to the non-detect state. Normal operation will be resumed once the zone is no longer triggered. Default: 0 (off).

### Audible detection signal

If this option is enabled, a speaker symbol will appear in the title bar. This symbol can be toggled between the muted and unmuted states by clicking it. When it is unmuted, the connected device will make a sound when the zone is in the detect state to assist with set-up and testing.

### Enter non-detect fault mode after

If no valid targets are detected in the detection zone for this amount of time, the detector will revert to a permanent detect state. This state will persist until a target is detected.

### Detection threshold (%)

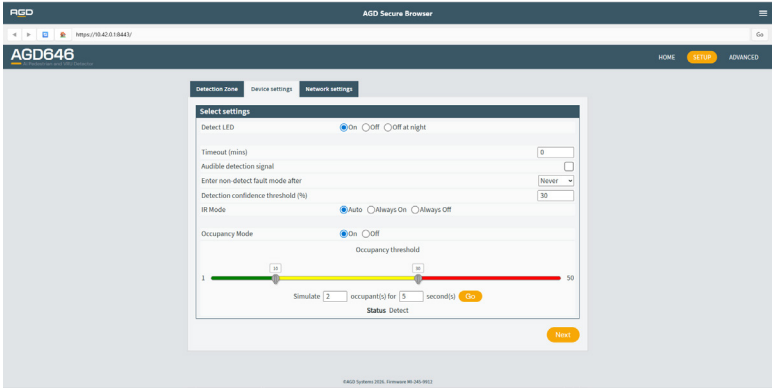
The threshold value at which the detector will report a valid target. Percentage figures can be seen on the home screen when looking at the live view.

Input range = 0 - 100% Default = 30% (recommended)

### IR Mode

Recommendation is to leave the setting on auto.

OCCUPANCY SETTINGS



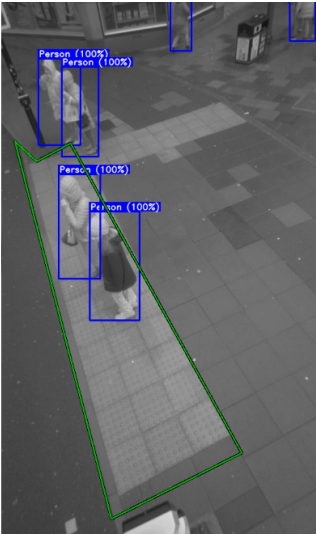
The AGD646 occupancy mode allows the invitation time for crossing the road to be adjusted dynamically, depending on the number of people waiting to cross. This is ideal for sites with irregular pedestrian flows, such as schools, event venues and areas where large numbers of pedestrians may become trapped on a central reservation.

The ‘Occupancy’ setting can be accessed and turned on under the ‘device settings’ menu in stage two of the setup process.

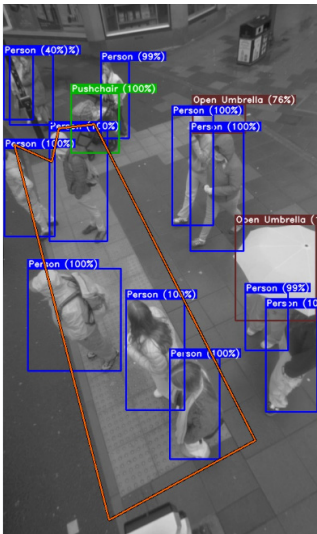
Once turned on, the occupancy setting reveals a slider bar which defines the number of people corresponding to each occupancy state. Here, the values represented are:

- Low = 1 – 10
- Medium = 11 – 30
- High = 31 – 50

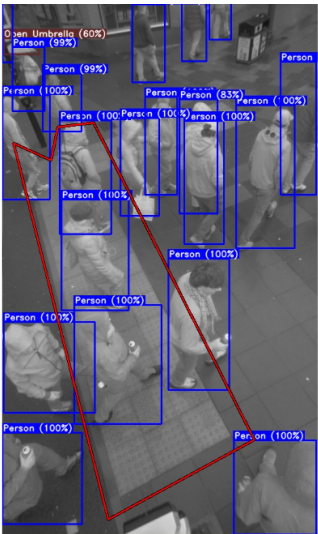
The AGD646 occupancy settings are based on the actual number of people present within the zone. LOW, MEDIUM and HIGH states of occupancy will be produced based on your slider settings.



This image shows the detector having a 'LOW' occupancy.



This image shows the detector having a 'MEDIUM' occupancy.



This image shows the detector having a 'HIGH' occupancy.

The state of the OPTO outputs in relation to the occupancy is shown in the table below:

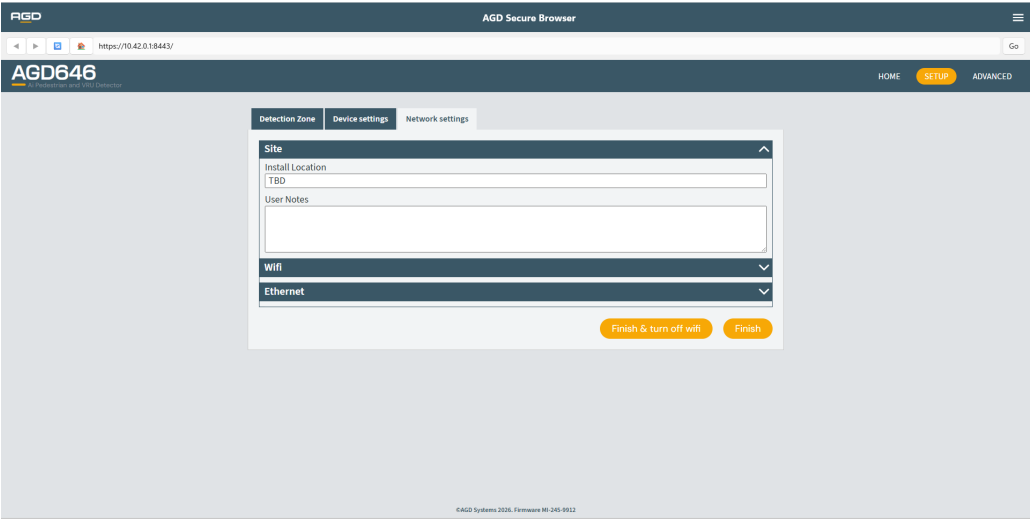
| Occupancy  | Opto 1 | Opto 2 |
|------------|--------|--------|
| Non-Detect | OFF    | OFF    |
| Low        | OFF    | ON     |
| Medium     | ON     | OFF    |
| High       | ON     | ON     |

Simulate occupancy

This option simulates a defined number of targets to assist with system verification and ensure that the controller is configured correctly. When the Go button is clicked, the specified number of occupants will be simulated for the requested time period and the zone and opto states will be set accordingly.

Click Next to move on to the next step

STEP 3 – NETWORK SETTINGS



**Install Location**

A name can be allocated for ease of identification. This will be appended to the SSID.

**User Notes**

Notes can be added here to assist other users of the device. The contents of this field are also displayed on the ADVANCED tab.

WI-FI SETTINGS

AGD

AGD Secure Browser

https://10.42.0.1:8443/

AGD646

HOME SETUP ADVANCED

Detection Zone Device settings Network settings

Site

Wifi

SSID Prefix 646:137151-0001 ☐ Allow changes

Effective SSID 646:137151-0001-TBD

Wi-Fi off after Never

New password

Confirm password

Please Note: If you choose to change the password and the password is lost, the product will need to be returned to AGD to be reset.

Ethernet

Finish & turn off wifi Finish

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SSID prefix

The first part of the SSID can be changed. To change, you must first tick allow changes. If using the default password, it is recommended to also use the default SSID prefix.

Effective SSID

Displays the SSID, which is a combination of the SSID prefix and install location.

Wi-Fi off after

Wi-Fi can be deactivated after a selected period of time. Wi-Fi can be re-enabled by power cycling the unit.

New password/Confirm password

To keep the default password, leave these fields blank.  
To change you must enter an identical password in both fields. Characters = 8 minimum, 63 maximum.

ETHERNET SETTINGS

The AGD646 can be connected to a network and obtain an IP address through a DHCP server. Alternatively, the IP address, gateway and netmask may be set to customer-specified values.

IP Address Source

Select your preferred IP source option. When using static IP settings, please consult your networking professional for assistance. The Ethernet IP address is displayed on the ADVANCED page of the user-interface.

### DNS AND NTP CONFIGURATION

#### DNS Servers:

- When a static IP address is used, the AGD646 supports configuration of up to two DNS servers.
- To unset a DNS server, clear the field so that it is replaced with all zeros.
- If no DNS servers are set, DNS resolution will not be available.

#### NTP Servers:

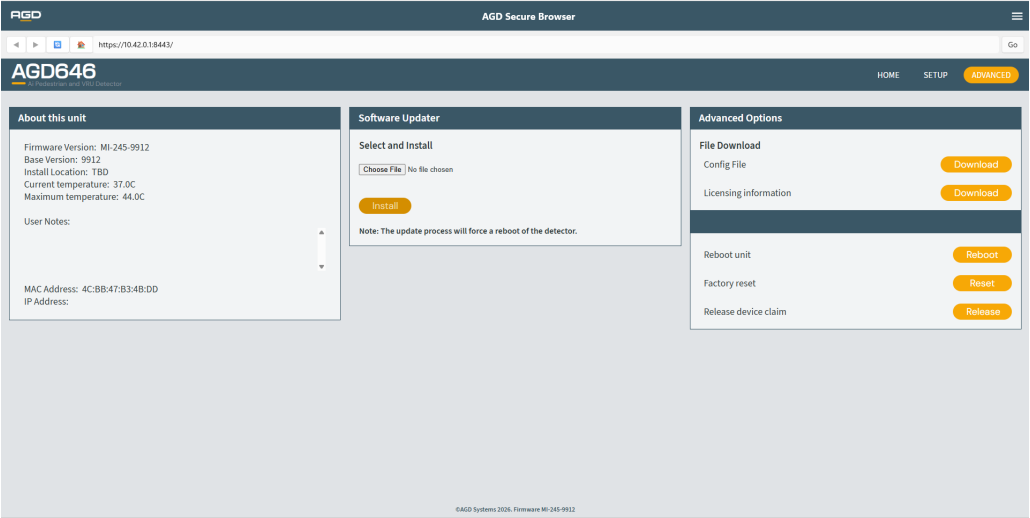
- The AGD646 allows configuration of up to two NTP servers.
- To unset an NTP server, clear the field so that it is replaced with all zeros.
- If no NTP servers are set, the AGD646 will attempt to locate an NTP server via a network connected device, but this requires a configured and accessible DNS server.

#### Time Synchronisation Behaviour

- If a NTP server is unavailable, the AGD646 will synchronise its date and time from the connected device during initial setup.
- If the unit is power-cycled without an available NTP server, it will not retain the current date and time. While this does not affect core functionality, the timestamp in the JSON output message (see Page 25) will be incorrect.

To complete the setup, either select Finish, or turn off Wi-Fi and then select Finish. If you have made changes to Wi-Fi or Ethernet settings, you may need to reconnect using the new settings.

ADVANCED PAGE



About this Unit

View unit information including firmware version

Software Updater

This is used to install the latest software version.

Advanced Options

Config file and licensing information can be downloaded. The unit can also be rebooted and factory reset from this panel. Releasing the device claim allows the unit to be released from ownership of the authority for which it has currently been claimed (see p. 7).

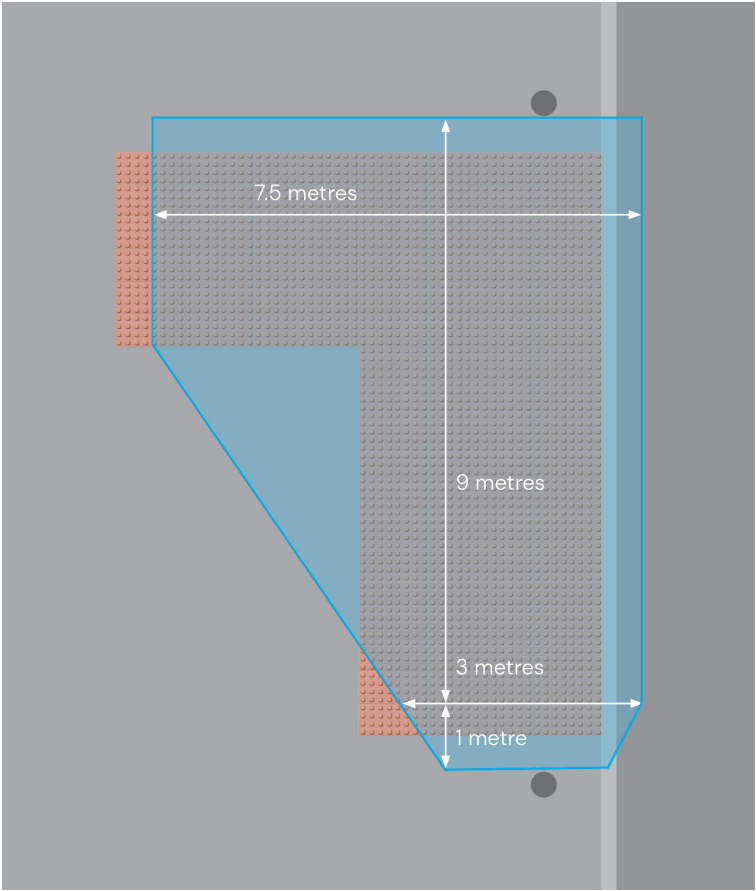
| Conversion Table         |                            |
|--------------------------|----------------------------|
| 1m = 3.3ft               | 1ft = 0.3m                 |
| Popular Mounting Heights | Popular Range Measurements |
| m = ft                   | m = ft                     |
| 2.0 = 6.6                | 5 = 16.5                   |
| 2.5 = 8.3                | 10 = 33.0                  |
| 3.0 = 9.9                | 15 = 49.5                  |
| 3.5 = 11.6               | 20 = 66.0                  |
| 4.0 = 13.2               | 25 = 82.5                  |
| 4.5 = 14.9               | 50 = 165.0                 |
| 5.0 = 16.5               | 100 = 330.0                |
| 5.5 = 18.2               | 150 = 495.0                |
| 6.0 = 19.8               | 180 = 594.0                |

**Please Note:** The table above is a generic metres to feet conversion table to aid international customers. For product-specific mounting heights and detection ranges, please refer to the relevant sections of this product manual.

PHYSICAL INSTALLATION

TYPICAL INSTALLATION PARAMETERS

The AGD646 operates with a high degree of accuracy when mounted within normal parameters. The diagram below shows a plan view of the expected coverage of the camera when the device is mounted at 3.5–4.0 metres.



10m x 3m zone - Illustrated using nominal mounting height of 3.5–4.0m

ETHERNET INTERFACE

The AGD646 has a Cat 6 Ethernet Interface provided on the product connector on the rear of the unit. It can be connected to a network and obtain an IP address through a DHCP server. Alternatively, the IP address, gateway and netmask may be set to customer-specified values.

MATING CONNECTOR DETAILS

Product mating connector: **Stewart Connector SS-12400-003**



FIELD INSTALLABLE CONNECTOR

Cable mount connector: **Stewart Connector SS-12400-001**

\*Connector is wired as per the manufacturer's instructions\*



PoE – POWER OVER ETHERNET REQUIREMENTS

AGD646 P.O.E REQUIREMENTS

Type 1 Class 4 Device

802.3at Compliant and Isolated

12.95 – 25.5W (7W nominal)

37.0V to 57.0V

Supports Mode A and Mode B Wiring

### CONNECTING ETHERNET

There are multiple ways to wire and connect the Ethernet of the AGD646 to a roadside network. AGD suggests using one of the two methods pictured below:



#### OPTION 1

An SWA (steel wire armoured) Cat 5e/Cat 6 cable is installed between the traffic cabinet and the signal pole where the AGD646 is to be mounted.

The field-installable connector is then fitted directly to the cable and plugs into the rear of the detector.

The part number for the cable mount connector is:

**Stewart Connector SS-12400-001**

#### OPTION 2

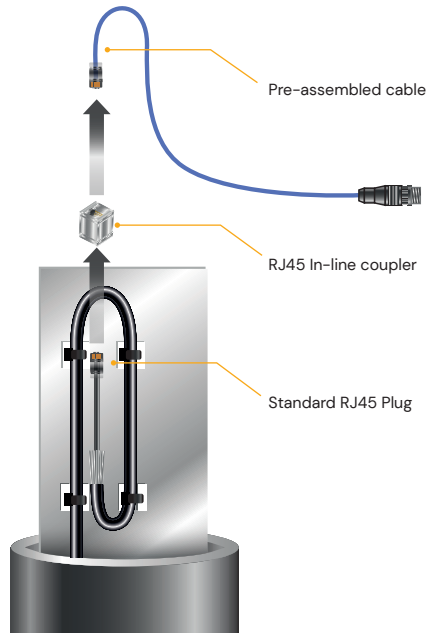
An SWA (steel wire armoured) CAT 5E/6 cable is installed between the traffic cabinet and the signal pole where the AGD646 is to be mounted.

This cable end is then terminated with a regular RJ45 crimp end. As per the diagram, this is simply clicked into an inline coupler and then into a 1m pre-assembled cable.

This is the preferred method as it allows the use of standard tooling and allows testing and fault finding to be carried out easily using regular RJ45 network test equipment.

The part number for the pre-assembled cable is:

**Stewart Connector BM-MARM003F** (supplied in lengths ranging from 0.9m – 10m)



### DATA OUTPUT VIA ETHERNET

The AGD646 outputs data in JSON format for each image frame that is analysed. Therefore the data output rate is the same as the detection frame rate.

#### Data output format

An example of the JSON output is shown below:

```
{
  "SN": "123456-0005",
  "msUTC": 1771403336311,
  "type": "646",
  "version": 1,
  "zones": [
    {
      "index": 1,
      "occupancy": 2,
      "roadusers": [
        {
          "H": 0.3859105408191681,
          "W": 0.4949941039085388,
          "X": 0.7412024140357971,
          "Y": 0.5171651244163513,
          "className": "Person",
          "trackID": 5
        },
        {
          "H": 0.5588020086288452,
          "W": 0.5136396884918213,
          "X": 0.4055975377559662,
          "Y": 0.7125082015991211,
          "className": "Person",
          "trackID": 4
        }
      ],
      "state": 5
    }
  ]
}
```

The fields in this data have the following meanings:

- SN: The serial number of the AGD646 that is outputting the data.
- msUTC: A timestamp expressed as milliseconds since 1st January 1970 UTC.
- type: This will always be "646"
- version: A version number for the JSON message format.
- zones: An array containing one entry for each zone.
- index: The index of the zone (starting from one).
- occupancy: The number of people currently in the detection zone. This field is only present when occupancy mode is enabled.
- roadusers: An array of road-users currently in the zone.
- className: The type of road-user. This could be: "Bicycle", "Open Umbrella", "Person", "Pushchair" or "Wheelchair / Mob Scooter".
- trackID: A 32 bit unsigned integer that is assigned to each road-user by a tracking algorithm. This can be used to identify the same road-user across multiple frames so that count data can be obtained. Track IDs begin at 0 when the unit is powered on and are incremented by 1 for each road-user identified.
- H: The height of the road-user's bounding box, relative to image height.
- W: The width of the road-user's bounding box, relative to image width.
- X: The horizontal position of the centre of the road-user's bounding box, where 0 corresponds to the left side of the image and 1 corresponds to the right side of the image.
- Y: The vertical position of the centre of the road-user's bounding box, where 0 corresponds to the top of the image and 1 corresponds to the bottom of the image.
- state: The current state of the zone where: 0 = not set, 1 = in detect (standard mode), 2 = in non-detect, 3 = timed out (see above for an explanation of the timeout feature), 4 = low occupancy, 5 = medium occupancy, 6 = high occupancy.

### Receiving the data

The JSON data can only be received via an Ethernet connection (not over Wi-Fi). In order to receive the data, the connected computer/controller needs to have the ZeroMQ library (<https://zeromq.org/>) installed and to be running software that uses the ZeroMQ library to receive the data. This software can be written in a range of different languages including C, C++, C#, Java and Python. The following Python code shows an example of how to receive data from the AGD646 (where <ipaddress> is the current Ethernet IP address of the AGD646):

```
import zmq

context = zmq.Context()
sock = context.socket(zmq.SUB)
sock.setsockopt(zmq.SUBSCRIBE, b'') # note: this line contains two single quote marks
sock.connect("tcp://<ipaddress>:9003") # note: this line contains two double quote marks
while True:
    message = sock.recv()
    print(message)
```

### CONFIGURING DETECTION ZONES TO OBTAIN ACCURATE COUNT DATA

Obtaining count data with the AGD646 relies on an algorithm which tracks objects from frame to frame. If an object is not detected for several frames (e.g. due to being occluded) and then reappears, this may lead to the tracking algorithm deciding that a new object has entered the field of view, resulting in over-counting. Over-counting is therefore most likely to occur in detection zones that get very busy.

In very busy areas, when a zone is to be used primarily for obtaining count data, it may be better to locate the zone at a point where pedestrians and cyclists will travel through the zone, rather than stop within it. Attention also needs to be paid to siting the AGD646 in a way that minimises occlusion.

## PHYSICAL INSTALLATION

If the unit is not operating correctly, please check whether the unit has been:

- 1) Mounted within the recommended height of 3–5 metres?
- 2) Angled according to the installation guide to provide good coverage of the detection area?
- 3) Installed with no obstructions in the viewable area, such as a traffic signal head?

## ELECTRICAL INSTALLATION

If the unit is not operating correctly, please check the following:

- 1) Is power present at the unit?
- 2) Is the red LED illuminated when power is applied to the unit?
- 3) Is there sufficient current to run the unit – identified by the red LED failing to flash or flashing only once during power-up and the web page not starting correctly? Refer to technical specification table.

## CONNECTING / COMMISSIONING

If the unit is not operating in the prescribed manner, please check the following:

- 1) Is the LED on the front of the unit you wish to connect to illuminated blue to show that the Wi-Fi network is successfully connected?
- 2) Has the correct IP Address been entered into the browser address bar?
- 3) Have you followed the AGD Touch–setup stages correctly and verified correct operation?
- 4) Have you refreshed the user–interface? This can be done by pressing F5 on your keyboard. Alternatively, Ctrl+F5 can be used to perform a “hard refresh” which clears the browser cache.

If trouble with any operations persist, please contact AGD Technical Support.

## AGD TECHNICAL SUPPORT

Email: [technical@agd-systems.com](mailto:technical@agd-systems.com)

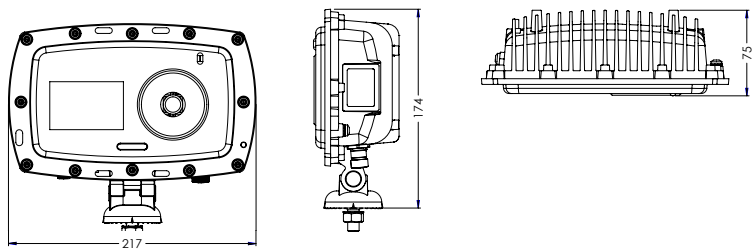
Tel: +44-1452-557404

TECHNICAL  
SPECIFICATIONS

AGD646

AI Pedestrian and VRU Detector

PRODUCT DIMENSIONS



SPECIFICATIONS

|                       |                                                                                                                                                                                                          |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description           | AI Pedestrian and VRU Detector                                                                                                                                                                           |
| Technology            | AGD Optical Vision with AI                                                                                                                                                                               |
| Detection Zone        | 10m x 3m (polygon with up to 30 points)                                                                                                                                                                  |
| Mounting Height       | 3-5m (3.5m nominal)                                                                                                                                                                                      |
| Power Supply          | 24V ac/dc or PoE                                                                                                                                                                                         |
| Power                 | 7W                                                                                                                                                                                                       |
| Wi-Fi Frequency/Power | 2412-2472 MHz<br>Highest EIRP power in the range (dBm): 19.7"                                                                                                                                            |
| Detect Output         | Dual opto / Ethernet                                                                                                                                                                                     |
| LED Indication        | LEDs for detect and Wi-Fi connection                                                                                                                                                                     |
| Frame Rate            | 4Hz                                                                                                                                                                                                      |
| Housing Material      | Black polycarbonate / aluminium                                                                                                                                                                          |
| Sealing               | IP66                                                                                                                                                                                                     |
| Operating Temp        | -34°C to +74°C                                                                                                                                                                                           |
| Configuration         | Secured AGD Touch-Setup                                                                                                                                                                                  |
| Light Level           | Built-in IR for low light                                                                                                                                                                                |
| Dimensions            | W 217mm x D 75mm x H 174mm                                                                                                                                                                               |
| Weight                | 1200g                                                                                                                                                                                                    |
| Complies with         | EMC: BS EN 50293:2012, EN 301 489-17, EN 301 489-1<br>Health & Safety: BS EN 62368-1, EN 50556, EN 62479<br>Spectrum: EN 300 328, FCC CFR47 Part 15.247, RSS-247<br>RoHS: EN 63000<br>Other: TOPAS 2507B |

Owing to the Company's policy of continuous improvement, AGD Systems Limited reserves the right to change their specification or design without notice.

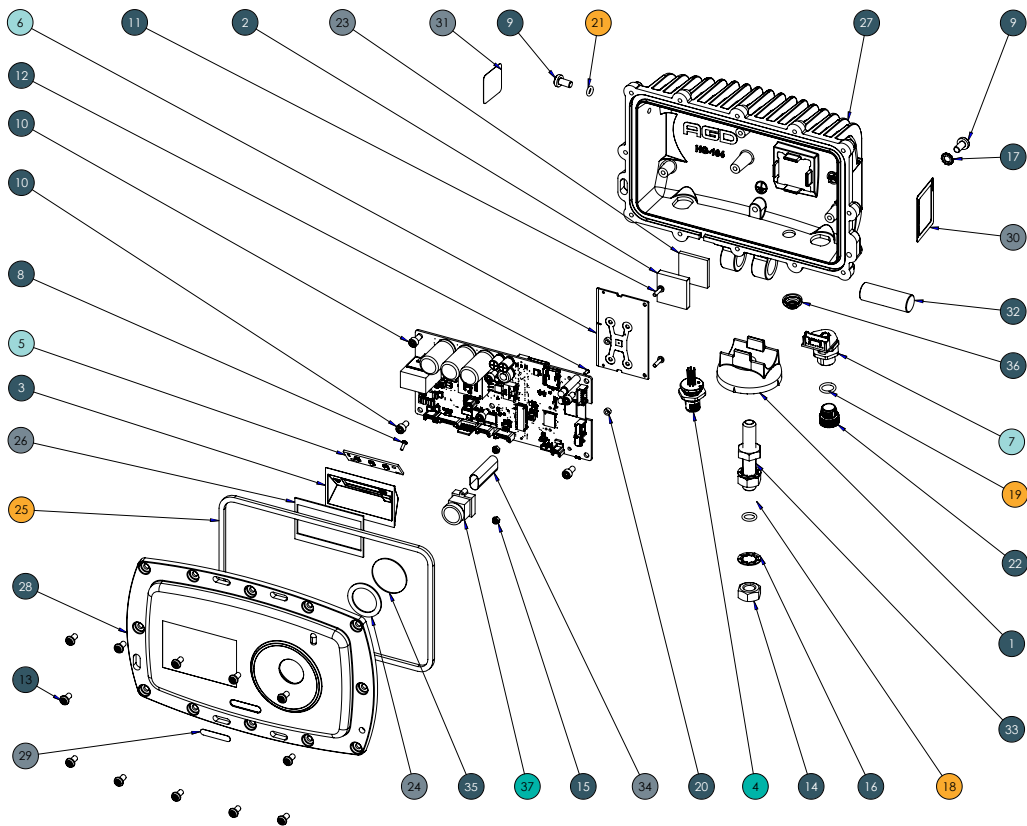


END OF LIFE

AGD646

AI Pedestrian and VRU Detector

DISPOSAL INSTRUCTIONS (EOL)



● Reuse / Recycle    ● Separate & Recycle    ● Downcycle    ● Hazardous Recovery    ● Non-Recyclable

| Item | Qty | Material          |
|------|-----|-------------------|
| 1    | 1   | Polycarbonate     |
| 2    | 1   | Copper            |
| 3    | 1   | Polycarbonate     |
| 4    | 1   | Mixed Metals, PVC |
| 5    | 1   | PCB ASSY          |
| 6    | 1   | PCB ASSY          |
| 7    | 1   | Mixed             |
| 8    | 1   | Stainless steel   |
| 9    | 2   | Stainless steel   |
| 10   | 6   | Stainless steel   |

| Item | Qty | Material               |
|------|-----|------------------------|
| 11   | 2   | Stainless steel        |
| 12   | 2   | Stainless steel        |
| 13   | 12  | Stainless steel        |
| 14   | 2   | Stainless steel        |
| 15   | 2   | Stainless steel, Nylon |
| 16   | 2   | Stainless steel        |
| 17   | 1   | Stainless steel        |
| 18   | 1   | Nitrile                |
| 19   | 1   | EDPM                   |

| Item | Qty | Material        |
|------|-----|-----------------|
| 20   | 2   | Nylon           |
| 21   | 1   | Nitrile         |
| 22   | 1   | Nylon           |
| 23   | 1   | Aluminium oxide |
| 24   | 1   | HSAP            |
| 25   | 1   | Nitrile         |
| 26   | 1   | HSAP            |
| 27   | 1   | Aluminium       |
| 28   | 1   | Polycarbonate   |
| 29   | 1   | Polyester       |

| Item | Qty | Material        |
|------|-----|-----------------|
| 30   | 1   | Polyester       |
| 31   | 1   | Polyester       |
| 32   | 1   | Aluminium       |
| 33   | 1   | Stainless steel |
| 34   | 1   | Polyolefin      |
| 35   | 1   | Glass           |
| 36   | 1   | Polycarbonate   |
| 37   | 1   | Glass, Plastic  |

## IMPORTANT

### SAFETY PRECAUTIONS

**AGD646**

AI Pedestrian and VRU Detector

All work must be performed in accordance with company working practices, in-line with adequate risk assessments. Only skilled and instructed persons should carry out work with the product. Experience and safety procedures in the following areas may be relevant:

- **Working with mains power**
- **Working with modern electronic/electrical equipment**
- **Working at height**
- **Working at the roadside or highways**

1. This product is compliant to the Restriction of Hazardous Substances (RoHS – European Union directive 2011/65/EU).
2. The product must be correctly connected to the specified power supply. All connections must be made whilst the power supply is off or suitably isolated. Safety must always take precedence and power must only be applied when deemed safe to do so.
3. No user-maintainable parts are contained within the product. Removing or opening the outer casing is deemed dangerous and will void all warranties.
4. Under no circumstances should a product suspected of damage be powered on. Internal damage may be suggested by unusual behaviour, an unusual odour or damage to the outer casing. Please contact AGD for further advice.
5. This product is Compliant with the European Radio Equipment Directive 2014/53/EU. There is no restriction of use within any EU Member state for this product. This product is Receiver Category 2.

/contd

### SAFETY PRECAUTIONS

6. This device complies with part 15 of the FCC Rules and contains licence-exempt transmitter(s)/ receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s).

- 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

Le présent appareil est conforme aux CNR d'ISDE Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance such that the module should not be installed in equipment intended to be used within 20cm of the body.
- The transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- Changes or modifications not expressly approved by AGD Systems Ltd could void the user's authority to operate the equipment.



# DISCLAIMER

While we (AGD Systems) endeavour to keep the information in this manual correct at the time of download or print, we make no representations or warranties of any kind, express or implied, about the completeness, accuracy, reliability, suitability or availability with respect to the information, products, services, or related graphics contained herein for any purpose.

Any reliance you place on such information is therefore strictly at your own risk. In no event will we be liable for any loss or damage including without limitation, indirect or consequential loss or damage, or any loss or damage whatsoever arising from loss of data or profits arising out of, or in connection with, the use of this manual.

## Warranty

All AGD products are covered by a 12 month return to factory warranty. Products falling outside this period may be returned to AGD Systems for: evaluation, repair, update or re-calibration, any of which may be chargeable.

|                   |
|-------------------|
| Revision          |
| Issue 1 July 2026 |



**AGD**® | SAFER  
GREENER  
MORE EFFICIENT

**AGD Systems Limited**  
White Lion House, Gloucester Road,  
Cheltenham, GL51 0TF, UK  
**Tel:** +44 (0) 1452 854212  
**Email:** [info@agd-systems.com](mailto:info@agd-systems.com)  
**Web:** [agd-systems.com](http://agd-systems.com)

