Heimdall Radar Pedestrian Detector

Kerbside Detector Installation Guide

Document Authorisation			
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This document is electronically held.

Contents

1 General

This document refers to the Kerbside Pedestrian version of the Heimdall series of Detectors which incorporate 'state of the art' radar antenna designs tailored to the specific requirements for each detector type.
All detectors are housed within the same style of enclosure and are of minimal size to reduce the 'eye clutter' associated with older types of equipment.
All detectors can be readily installed onto both new and existing traffic signal control poles.
Detectors come supplied with a standard interface cable together with the HA specified Bulgin Buccaneer connector. Existing sites can easily be upgraded with the Heimdall detector as the detector is compatible with existing above ground units.
Please check that the layout of the site is compatible by referring to the General Handbook (667/HB/31900/000)

1.1 Part number

Part Number	Description
667/1/31900/06x	Kerbside Detector

Note: In the above table '**x**' relates to the particular option installed, thus:

0 – Basic Detector
1 – Basic Detector with RS485 Interface (SiTOS)
2 – Basic Detector with Wireless Interface
3 – Basic Detector with 2nd Output
4 – Basic Detector with 2nd Output + Wireless Interface
Note: Options 1 – 4 are non standard, please refer to Siemens Poole for further ordering information.

1.2 Tooling requirements

As well as a standard Installers tool kit, the following are required when installing or maintaining a Heimdall Detector:

1. 2mm Allen key – for side access door and lid.
2. T-8 Torx driver – alternative tool for side access door and lid.
3. 13mm Socket spanner - for angular adjustment and installation of detector.
4. 19mm Ring spanner - for cable gland (DE only).
5. Small flat bladed screwdriver – for DIP switch adjustment.
6. Inline Installation Assistance Cable (667/1/31912/000) (Optional)

1.3 Performance Details

Operating Range:	Detection system can be adjusted to accommodate crossing widths (zone length) up to 4m .
Zone Width:	Basic detection zone width is 1.6m, with a width of 2.4m close to the mounting pole.
Zone Length:	~2.5m (extended to 4.5m by setting).
Detector Locations:	A typical system will comprise of a single Heimdall detector located on a pole just to one side of the push button.
Presence Time:	Not applicable.
Mounting Height:	3.3m to 4.0m.
Accuracy:	Not applicable.
LED Orientation:	Facing forwards

1.4 Electrical Details

The Heimdall detector is capable of being powered from either:

(a) 24V AC ± 20% (48 to 63 Hz), or
(b) 10.8V to 24.8V DC
(c) 24V Full wave rectified ± 20%. From Siemens ELV controller

For information relating to the following:

1. Power consumption requirements of this model.
2. 24V AC & DC power supply options.
3. Permissible detector supply cable lengths.
4. Calculating 24V AC & DC supply cable feeds.
5. Cable length 'look up tables'.

Please refer to the '***Heimdall General Handbook***' (667/HB/31900/000).

2 Detector Installation

2.1 Electrical Connections

Important Notes:

a) When connecting this detector to a 24V AC source, please ensure that the 24V AC source is derived from an earthed secondary transformer (as used in standard traffic installations).

b) Particular attention should be paid to the correct termination of the power supply wires. The RED wire should be used for the 24V AC/DC supply feed and the Black wire for the EARTHED supply return.

c) When using a 24V AC supply, only use battery powered interface equipment (e.g. laptop, PDA). Do not connect mains powered/connected equipment to the Heimdall series of detectors, as this will cause the detectors to fail.

d) When installing this detector with a Siemens ELV controller or a Siemens ELV controller additional supply, please ensure the RED wire of the interface cable is connected to the POSITIVE (common) connector, the BLACK wire is connected to the NEGATIVE (-24VDC) source and the GREEN (screen) is connected to the POSITIVE (common) connector.

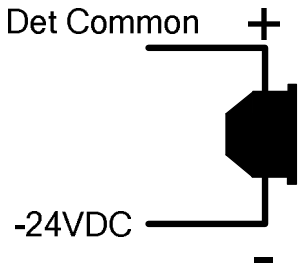


Figure 2-1 Connection of Heimdall detector to Siemens ELV controller

2.1.1 9-Pin 'Buccaneer' connector

All Heimdall detectors are equipped with a captive lead and a standard 9 pin 'Buccaneer' connector (see ***Figure 2-2***, below).
The pin out for this connector is as specified in the Highways Agency Specifications: TR2505, TR2506 & TR2507. The Heimdall series of detectors provide additional facilities, to that specified in the HA documents, using the spare connections within the 9 way connector. These are outlined in the sections below.

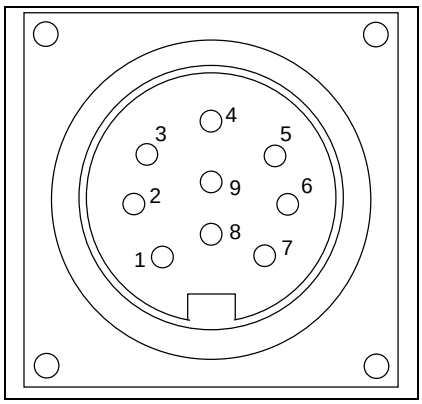


Figure 2-2 *Buccaneer Bulkhead Connector (front view)*

For the Helios Signal Head the Heimdall bulkhead connector cable is generally fitted to the topmost indent on the red Aspect (either side). The hole should be drilled using the rear drill start point. For other signal head suppliers, please refer to the relevant documentation supplied with their products. The wires from this connector should be terminated in accordance with the details shown in the sections below.

2.1.2 Output Cable (Standard)

Table 1: Output Cable (Standard) configuration – for variants: 667/1/31900**/xx0 & /xx2**.

Connector Pin No.	Comment	Colour Code
1	Detector Supply (24V AC/DC)	Red
2	Detector Supply Common (0v)	Black
3	Screen	Green
4	Detector O/P #1&2 (Common)	White
5	Detector O/P #1 (Normally Open)*****	Yellow
6	Detector O/P #1 (Normally Closed)*****	Blue
7	Not Used	Violet
8	Not Used	Orange
9	Not Used	Brown

Note: * This signal condition refers to the state when the detector is un-powered (detect state).

2.1.3 Output Cable (with SiTOS)

Table 2: Output Cable (with SiTOS) configuration – for variant: 667/1/31900**/xx1**.

Connector Pin No.	Comment	Colour Code
1	Detector Supply (24V AC/DC)	Red
2	Detector Supply Common (0v)	Black
3	Screen/ RS485 Ground	Green
4	Detector O/P #1&2 (Common)	White
5	Detector O/P #1 (Normally Open)*****	Yellow
6	Detector O/P #1 (Normally Closed)*****	Blue
7	Detector O/P #2 (Normally Open)*****	Violet
8	SiTOS RS485 (Terminal A)	Orange
9	SiTOS RS485 (Terminal B)	Brown

Note: * This signal condition refers to the state when the detector is un-powered (detect state).

2.1.4 Output Cable (with isolated 2nd detector O/P)

Table 3: Output Cable (with isolated 2nd detector O/P) configuration – for variants: 667/1/31900**/xx3 & /xx4**)

Connector Pin No.	Comment	Colour Code
1	Detector Supply (24V AC/DC)	Red
2	Detector Supply Common (0v)	Black
3	Screen	Green
4	Detector O/P #1 (Common)	White
5	Detector O/P #1(Normally Open *)	Yellow
6	Detector O/P #1(Normally Closed *)	Blue
7	Detector O/P #2 (Common)	Violet
8	Detector O/P #2 (Normally Open *)	Orange
9	Detector O/P #2 (Normally Closed *)	Brown

Note: * This signal condition refers to the state when the detector is un-powered (detect state).

2.2 DIP Switch Settings

All Heimdall detectors are equipped with switches that enable the unit to be installed, for the majority of applications, without the need for any special terminal (handset) equipment.
Access to these switches is gained by removal of the side cover. Before removal, note the cover's orientation and ensure it is replaced the same way round.
The switches on the first PCB (Digital Processor) control the basic functions of this detector and are as listed in the following table:

Note: Default settings are with all DIP switches set to '0'/ OFF.

DIP Switch Number							
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Vehicle Filter 0 = Enabled 1 = Disabled	Not Used	Detector LED 0,0 = Normal Detector O/P 0,1 = Permanently Off 1,0 = Detector O/P for 20 minutes after power applied 1,1 = Normal Detector O/P		Recalibrate Toggle switch (0-1-0).	Detection Length 0 = Normal 1 = Reduced Controls the effective range of the detector.	DFM 0 = Default monitor time (20 hours inactivity) 1 = 'fault monitor time' is set by the Engineer's Terminal	Remote Config. 0 = Disabled 1 = Enabled

Key:

0	OFF
1	ON

Note: The switches provided on the second PCB (Special I/O) control the operation of the Siemens Serial Interface (SiTOS) and detail of these settings can be found in the '***Heimdall General Handbook***' (667/HB/31900/000).

2.3 Detector mounting methods

In all Installation scenarios, there must be no obstruction between the front face of the detector and the detection zone, i.e. no obstruction by backing boards, signal aspects or foliage. Foliage such as trees and bushes that are within the detection zone, will mean there is a risk of false detects and possibly Permanent or no detect situations

Failure to adhere to these recommendations will reduce detector performance.

2.3.1 Standard Detector Installation - Recommended

The standard traffic pole with the head mounted to one side is a suitable installation scenario. In this situation the aspect (traffic light) is mounted to one side of the detector location and therefore provides for a clear view of the expected detection area. In this instance the Kerbside should be mounted with the Heimdall Kerbside Detector bracket (667/1/31910/000), this gives the correct distance from the front of the nearside.

Use of this bracket assumes that the pole has been installed with its mounting holes in parallel to the kerb; if this is not the case then please see Section **2.4** for non-standard mounting instructions.

This is recommended for all new site installations that require a Heimdall detector Kerbside.

Figure 2-3 Standard Pole configuration with Kerbside on Heimdall Kerbside Detector Bracket

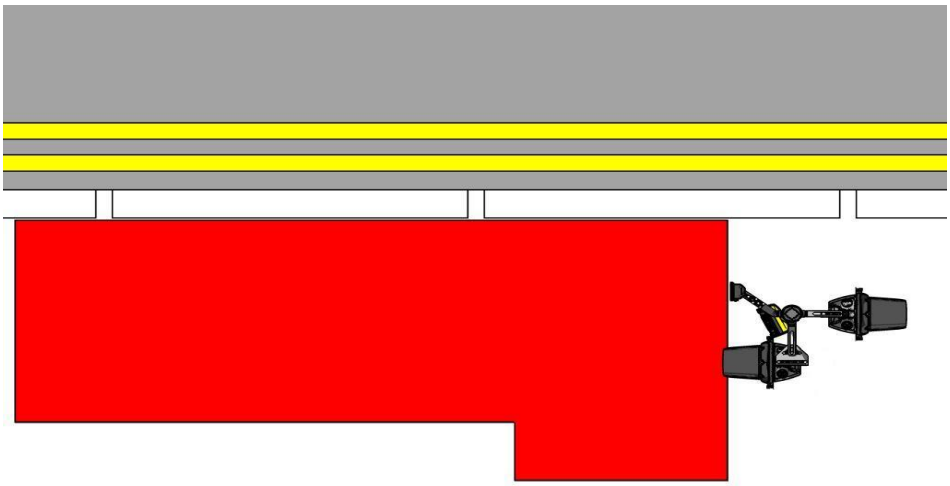


Figure 2-4 Required Detection Zone Shown in Red

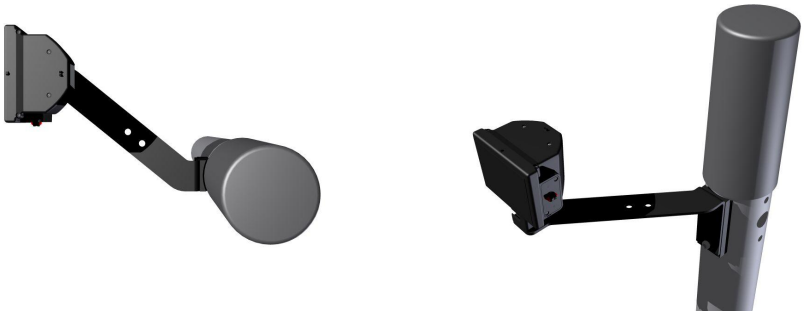


Figure 2-5 Heimdall Kerbside Detector bracket Detail

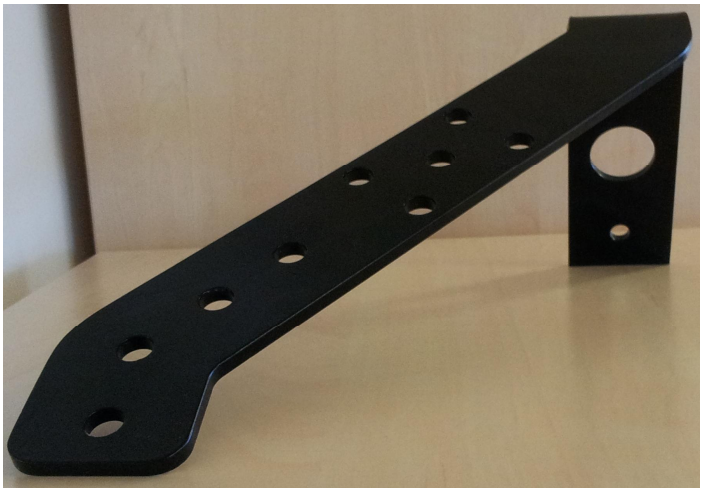


Figure 2-6 Heimdall Kerbside Detector Bracket (667/1/31910/000)

2.3.2 Cranked Pole Installation- Recommended

The Heimdall Kerbside detector can also be installed on a cranked pole. This installation is also suitable as it ensures the detector has a clear view of the detection area. A standard 'L' Bracket (Heimdall Kerbside Detector Straight Bracket 667/1/31914/000) can be used in this scenario (See **Figure 2-7**, **Figure 2-8**).

Figure 2-7 Crank pole site Installation

Figure 2-8 Heimdall Kerbside Detector Straight Bracket (667/1/31914/000)

2.4 General Detector Installation – Non Ideal

It is recommended that the standard installation and cranked pole installation is used. However, if the user requires the general installation details are provided.

The Kerbside detector should be aligned downwards, to cover the area of the kerb adjacent to the crossing. The normal detector angle (pre-set at factory) is 60 degrees. The detector must be mounted so that there is no obstruction between the detector and the detection zone. Failure to adhere to this recommendation can reduce detector performance.

If the mounting pole has a near-side attached, the Kerbside detector should be mounted such that it is at least 7cm away from the side of the nearside and at least 8cm in front.

This is normally achieved by using the Heimdall Kerbside Detector Bracket (**Figure 2-6**), but the Heimdall Detector Extension Bracket (**Figure 2-10)** may also assist in meeting the mounting requirements. There are several mounting positions available on the Heimdall Kerbside Detector Bracket for the Heimdall Kerbside Extension Bracket, two bolts must be used to secure the two together in all instances.

An example is shown in **Figure 2-11** showing a Kerbside Detector Extension Bracket being used to ensure the Kerbside Detector is in the correct position for optimal detection on a non-ideal installation.

The Heimdall Kerbside Detector Bracket Straight kit (**Figure 2-8**) is also designed for use with the Heimdall Detector Extension Bracket (**Figure 2-10**), there are various mounting positions available.

Failure to meet these mounting requirements may mean the detector will operate non-optimally and therefore performance specifications are not valid.

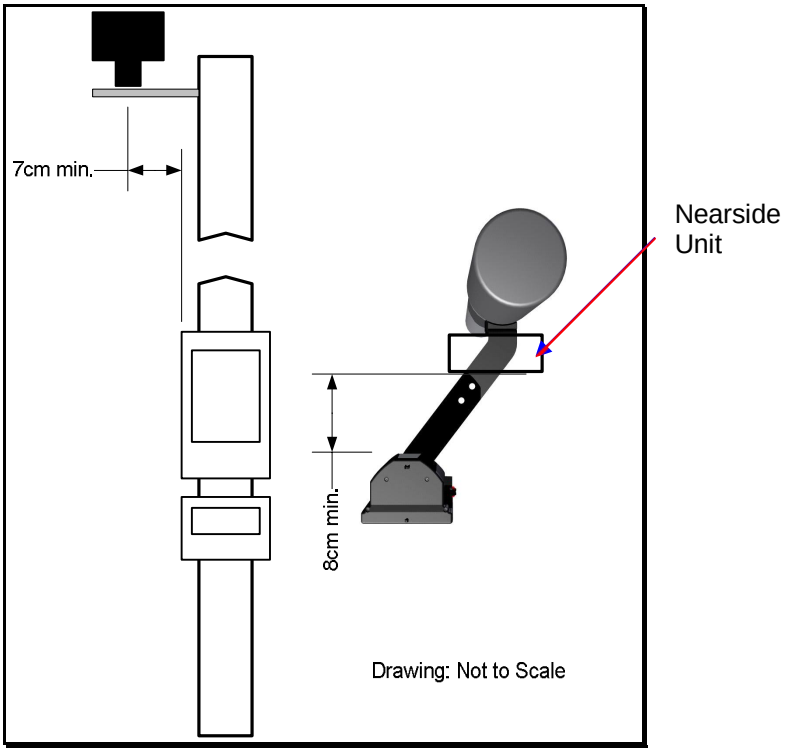


Figure 2-9 Kerbside Detector Mounting Details

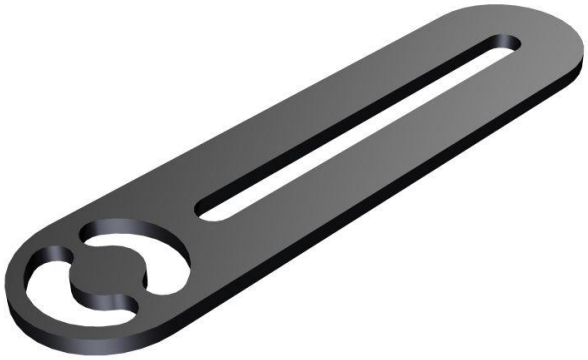


Figure 2-10 Heimdall Kerbside Extension Bracket (667/1/31911/000)

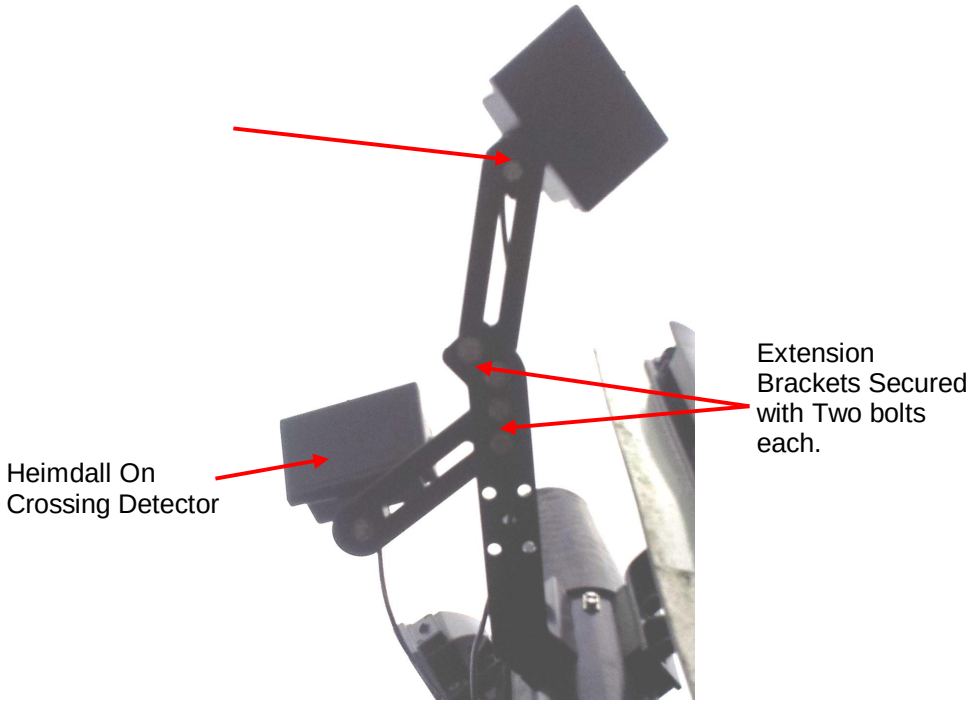


Figure 2-11 Heimdall Kerbside with Extension Bracket (Example of Non-Ideal Situation)

2.5 Detector alignment

When aligning the detector always ensure the following:

1. The detector is not installed directly above any nearside signal or demand unit (see Detector Mounting Methods).
2. All parts of the required zone are in direct line of site of the detector and are not masked by cables, brackets or any other street furniture.
3. The detector is pointing down at 60 degrees, four large notches from the zero degree mark (large notches are 15 degrees each with small notches at 5 degrees each).

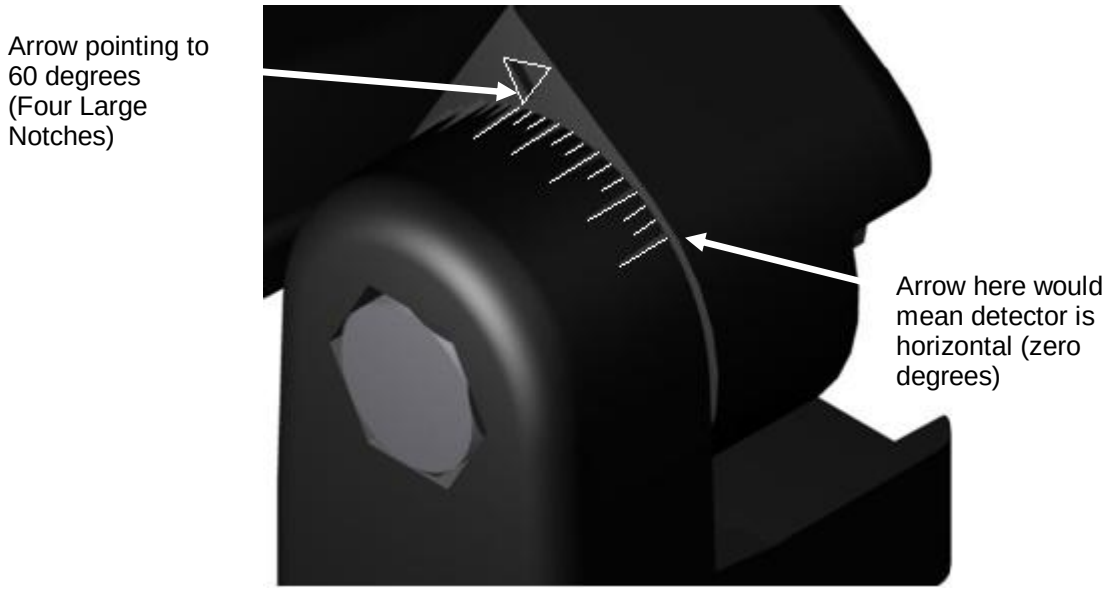


Figure 2-12 Angle Notches on Heimdall Detector

The detector should point along the line of the kerb from its installed position; this should allow detection up to and over the kerb.

At the closest point to the detector the zone is wider to take in the tactile paving, while the thinner end of the detection zone stretches out to the end of the zone (Maximum 4m). This can be altered using the DIP switch 6 under the side access panel, OFF is Long zone (default) while ON shortens the end part of the zone for thinner crossings.

Note: There must be no obstruction between the front face of the detector and the detection zone, i.e. no obstruction by backing boards, signal aspects or foliage. Foliage such as trees and bushes that are within the detection zone, will mean there is a risk of false detects and possibly Permanent or no detect situations

Failure to adhere to these recommendations will reduce detector performance

In **Figure 2-13** the zone is shown with the wider part nearest the detector extending into the road. This would pick up moving vehicles however the Heimdall software filters these out. This filter has the side effect of making the near zone smaller, DIP switch 1 can be switched to 1 to disable this filter in situations where the vehicle filter is not required and a wider near zone is desirable.

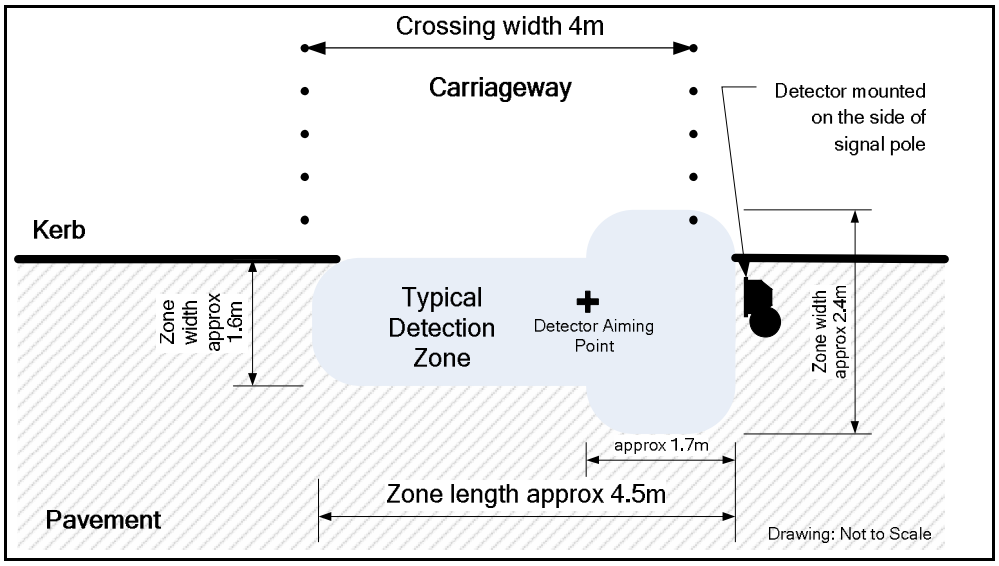


Figure 2-13 Detection zone on on standard installation

2.6 Site Calibration

The Kerbside Detector needs to be calibrated to the background noise for each site before it can work to its optimum performance. This calibration needs to be carried out for any changes of the detectors orientation or other changes to street furniture on the pole or in the zone.

The Kerbside will store the calibration information in flash memory so in the event of the detector losing power it will have the same background information on power up. This background information will be updated during long periods of inactivity in the zone (at least 10 minutes) and would normally occur over night.

Once installed and aligned the following steps need to be carried out for the initial site calibration:

1. In order to allow for single person installation, or where there is no switch to turn off the detector supply from the controller; connect the 'Inline Installation Assistance Cable' (see section 9.1 of the manual).
2. Remove the side door and toggle switch 5 (off – on – off), replace side door (detect LED will be flashing)
3. Move all equipment (Ladders etc.) away from zone and pole.
4. Ensure that the zone is clear of pedestrians and that no vehicles are passing (Use of push buttons to stop traffic is recommended).
5. Cycle the power to the detector using the 'Inline Installation Assistance Cable' or by other means if not used.
6. Calibration will take approximately 10 seconds, during which time both the detect LED and the output LED on the 'Inline Installation Assistance Cable' will flash several times.
7. If the zone has been empty during this time the detectors calibration will be complete and the Zone needs to be tested.

When the site calibration is complete the zone needs to be tested to ensure coverage and detection is acceptable. If the zone testing is not acceptable the detector will need to be re-aligned and recalibrated before testing again.

Note: When using the Inline Installation Assistance Cable the LED will not work properly if the unused core for the detector relay is attached to ground in the pole top termination. This must be "Floating", wired in to a terminal on its own to allow the LED to operate.

2.7 Zone Testing

Once the initial calibration has been carried out the zone needs to be tested.

1. If you are using the 'Inline Installation Assistance Cable', position it so you can view the LED from anywhere in the zone. If you have a second person to assist, ensure that they are positioned outside the detection zone.
2. Standing sideways to the detector (facing the road), move along the kerb stopping on every other tactile paving slab for approximately 10 seconds ensuring that the detector holds. Repeat this test throughout the required zone.

   Brief moments of non- detect are quite normal but the detector should predominantly hold on while you are in the zone.
3. When you're happy with the performance of the detector, remove the 'Inline Installation Assistance Cable' if fitted and plug the detector back in. The detector will use the previously calibrated values when it restarts.
4. In cases where the detector is not performing as required, check alignment and make adjustments before performing the Site calibration and zone testing again.

In cases where the detector does not hold people in the zone, or where there are places in the zone which do not appear to detect; re-alignment of the detector will be required. On a "Standard Installation" where the Heimdall Kerbside Detector Bracket has been used, it may require repositioning using a Heimdall Detector Extension Bracket. See section 2.4 for details of non- standard installations and check the distances from the nearside unit.

Where the zone edge along the kerb has poor performance then the detector can be angled slightly toward the road to fill this area in.

Heimdall installation 'Quick Reference' Guide for a Kerbside Detector

Electrical Connections

Important Notes:

a) **When connecting this detector to a 24V AC source, please ensure that the 24V AC source is derived from an earthed secondary transformer (as used in standard traffic and pedestrian installations).**
b) **Particular attention should be paid to the correct termination of the power supply wires. The RED wire should be used for the 24V AC/DC supply feed and the Black wire for the EARTHED supply return.**
c) **When using a 24V AC supply, only use battery powered interface equipment (e.g. laptop, PDA). DO NOT connect mains powered/connected equipment to the Heimdall series of detectors, as this will cause the detectors to fail.**
d) **When installing this detector with a Siemens ELV controller or a Siemens ELV controller additional supply, please ensure the RED wire of the interface cable is connected to the POSITIVE (common) connector, the BLACK wire is connected to the NEGATIVE (-24VDC) source and the GREEN (screen) is connected to the POSITIVE (common) connector.**

All Heimdall detectors are equipped with a captive lead and a standard 9 pin 'Buccaneer' connector. The pin out for this connector is as specified in the Highways Agency Specifications: TR2505, TR2506 & TR2507. The Heimdall series of detectors provide additional facilities, to that specified in the HA documents, using the spare connections within the 9 way connector.
The wires from this connector should be terminated in accordance with the details shown in the table below.

Output Cable (Standard)

Output Cable (Standard) configuration – for variants: 667/1/31900**/xx0 & /xx2**.

Connector Pin No.	Comment	Colour Code
1	Detector Supply (24V AC/DC)	Red
2	Detector Supply Common (0v)	Black
3	Screen	Green
4	Detector O/P #1&2 (Common)	White
5	Detector O/P #1 (Normally Open)*****	Yellow
6	Detector O/P #1 (Normally Closed)*****	Blue
7	Not Used	Violet
8	Not Used	Orange
9	Not Used	Brown

Note: * This signal condition refers to the state when the detector is un-powered (detect state).

For pinout and wiring details of the output cable for either the SiTOS or 2nd output detector options, please refer to the installation guide.

DIP Switch Settings

All Heimdall detectors are equipped with switches that enable the unit to be installed, for the majority of applications, without the need for any special terminal (handset) equipment. The initial calibration of the kerbside detector is carried out using the Dip Switches. Access to these switches is gained by removal of the side cover. Before removal, note the cover's orientation and ensure it is replaced the same way round (Led window should face forward)
The switches on the first PCB (Digital Processor) control the basic functions of this detector and are as listed in the following table:

Note: Default settings are with all DIP switches set to '0'/ OFF.

DIP Switch Number							
1	2	3	4	5	6	7	8
Vehicle Filter 0 = Enabled 1 = Disabled	Not Used	Detector LED 0,0 = Normal Detector O/P 0,1 = Permanently Off 1,0 = Detector O/P for 20 minutes after power applied 1,1 = Normal Detector O/P		Recalibrate Toggle switch (0-1-0).	Detection Length 0 = Normal 1 = Reduced Controls the effective range of the detector.	DFM 0 = Default monitor time (20 hours inactivity) 1 = 'fault monitor time' is set by the Engineer's Terminal	Remote Config. 0 = Disabled 1 = Enabled

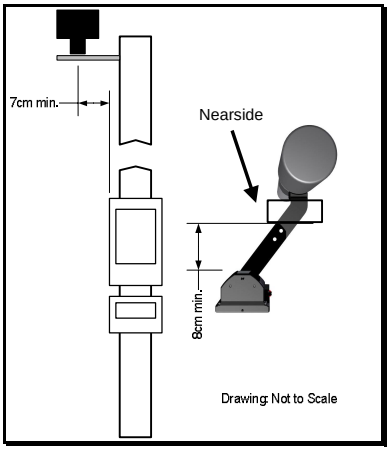
Key:

0	OFF
1	ON

Note: The switches provided on PCB 2 (Special Serial Interface card) control the operation of the Siemens Serial Interface (SiTOS), details of the switch settings for this PCB are shown in the installation guide.

Detector Mounting Methods

This detector is normally mounted on a traffic signal pole above a pedestrian demand unit with the detection zone covering the tactile paving on the pavement. The detectors position is very important as high levels of reflection can cause dead spots in the detection zone, so the alignment instructions should be followed and the zone tested.
When using the Kerbside Detector Extension Bracket two bolts must be used to secure this bracket.



Detector Alignment

When aligning the detector always ensure the following:

1. The detector is mounted at an angle of 60° from horizontal (4 Large notches from back)
2. The centre of the detector should be a minimum of 7cm to the side of the Nearside/ Demand unit, and at least 8cm in front.
3. The detector should point in parallel to the kerb.
4. All parts of the required zone are in direct line of site of the detector and are not masked by cables, brackets or any other street furniture.

Several types of brackets are available to aid the installation of detectors (please see manual for more information)

Site Calibration

Once installed and aligned the following steps need to be carried out for the initial site calibration:

1. In order to allow for single person installation, or where there is no switch to turn off the detector supply from the controller; connect the 'inline installation cable' (see section 9.1 of the manual).
2. Remove the side door and toggle switch 5 (off – on – off), replace side door (detect LED will be flashing)
3. Move all equipment (Ladders etc.) away from zone and pole.
4. Ensure that the zone is clear of pedestrians and that no vehicles are passing (Use of push buttons to stop traffic is recommended).
5. Cycle the power to the detector using the inline installation Assistance cable, or by other means if not used.
6. Calibration will take approximately 10 seconds, during which time both the detect LED and the output LED on the 'inline installation cable' will flash several times.
7. If the zone has been empty during this time the detectors calibration will be complete and the Zone needs to be tested.

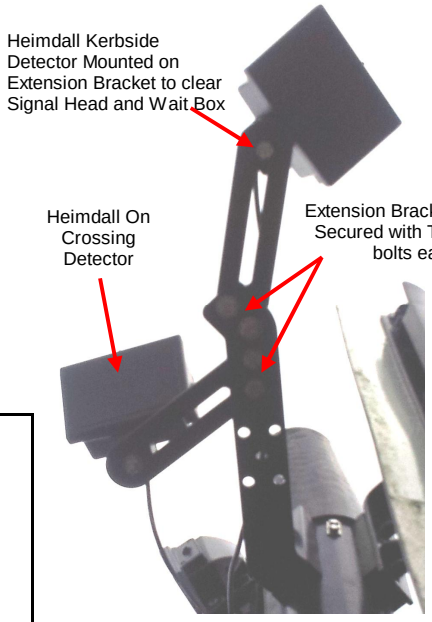
Zone Testing

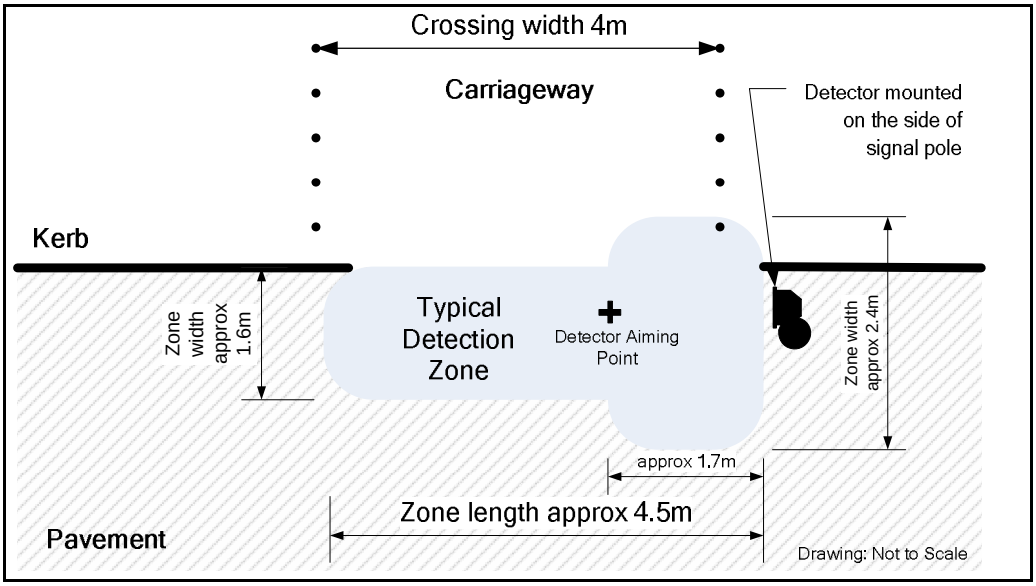
Once the initial calibration has been carried out the zone needs to be tested.

1. If you are using the 'Inline Installation Assistance Cable', position it so you can view the LED from anywhere in the zone. If you have a second person to assist, ensure that they are positioned outside the detection zone.
2. Standing sideways to the detector (facing the road), move along the kerb stopping on every other tactile paving slab for approximately 10 seconds ensuring that the detector holds Repeat this test throughout the required zone.
   Brief moments of non- detect are quite normal but the detector should predominantly hold on while you are in the zone.
3. When you're happy with the performance of the detector, remove the 'Inline Installation Assistance Cable' if fitted and plug the detector back in. The detector will use the previously calibrated values when it starts back up.
4. In cases where the detector is not performing as required, check alignment and make adjustments before performing the Site calibration and zone testing again.

Note: In cases where the alignment and calibration is not returning expected results please refer to the Heimdall Detector General Handbook (667/HB/31900/000) or the Kerbside Installation Guide (667/HB/31900/360)

Heimdall Kerbside with Extension Bracket (Example of Non-Ideal Situation)





Arrow pointing to 60 degrees (Four Large Notches)