AGD510 INDUCTIVE LOOP DETECTOR
Access Control

■ General

The AGD510 is a single channel CW boxed inductive loop detector operating in the 18 to 130KHz band and has been specifically designed for access control applications.

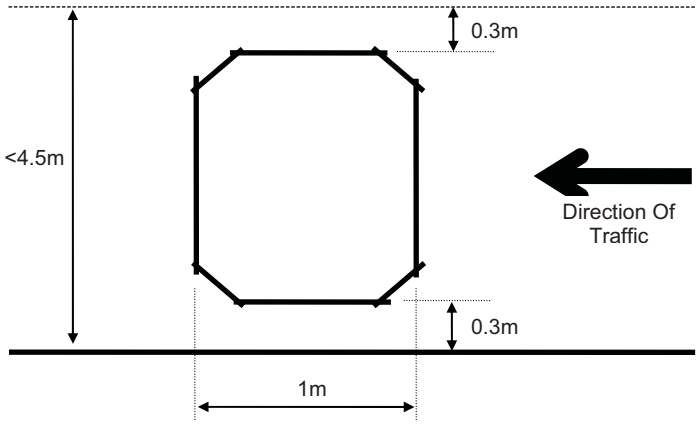
■ Electrical Connections

The detector is marked on the rear label with the voltage supply to be used and it is essential that the detector is connected to the correct power supply. Consideration must be given to the multiple grounding of supplies and to its effect on the whole system. The installation of this equipment must conform to the latest edition of the IEE Wiring Regulations (BS7671) as applicable.

Pin Number	Connection 230V Version	Connection 12-24V Version
1	230V ac Live	12-24V ac/dc
2	230V ac Neutral	12-24V ac/dc
3	Pulse Relay O/P Low Impedance For Detect	Pulse Relay O/P Low Impedance For Detect
4	Pulse Relay Common	Pulse Relay Common
5	Presence Relay O/P Low Impedance For Detect	Presence Relay O/P Low Impedance For Detect
6	Presence Relay Common	Presence Relay Common
7	Sensing Loop Connection	Sensing Loop Connection
8	Sensing Loop Connection	Sensing Loop Connection
9	Earth	Earth
10	Presence Relay O/P High Impedance For Detect	Presence Relay O/P High Impedance For Detect
11	Pulse Relay O/P High Impedance For Detect	Pulse Relay O/P High Impedance For Detect

■ Installation

Correct installation of the sensing loop will give optimum detection performance. The sensing loop is to be installed in the surface of the carriageway at the point of desired detection. This is performed by slot cutting the carriageway surface of width 0.5mm greater than the diameter of sensing loop cable to be used and to a depth of n x cable diameter(in mm) +25mm minimum (where n is the number of turns 2, 3 or 4 which is dependent on the circumference of the sensing loop). The slots should be cut to the guidelines indicated below. Cutting the corners of the rectangle at 45° helps to meet the minimum bend radius limits for the cable used. The cable from the detector to the sensing loop (feeder) should be twisted at a rate exceeding 25 turns per metre. The feeder length should not exceed 75m.



The sensing loop consists of n turns of cable indicated as follows:

Number Of Turns (n)	Sensing Loop Circumference (m)
2	>10
3	6-10
4	<6

The cut slot should be back filled with quick-set epoxy or hot bitumen mastic. If a second sensing loop is to be installed in the same carriageway then the separation of adjacent edges is to be a minimum of 2m for adjacent edges of lengths up to 2.5m and an extra 0.5m separation for each additional 1m length thereafter. Care should be taken not to trap water in the slot during back filling as this may lead to unstable detection performance.

AGD510 CUSTOMER INFORMATION

■ Detector Operation

All functional selections are made by the setting of switches on the front panel of the detector. There are no selections available inside the detector. Special functions (where available) are to be accessed via the RS232 port located on the front panel (see separate information supplied with special adapter cable required for connection).

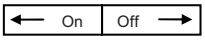
Frequency Selection (Switches 7 & 8) These two switches are used in combination to set four frequency bands appropriate for the inductive load presented by the sensing loop. When both switches are in the OFF position the frequency is at the lowest allowed by the load of the sensing loop. Selecting a combination of the switches as below changes the resonant frequency in increments. The magnitude of the shift in frequency is proportional to the load of the sensing loop connected to the detector. The operating frequency of adjacent sensing loops should be adjusted to be at least 15% apart in the absence of vehicles. The magnitude of the shift is indicated below;

-14% to -18%

-10% to -14%

-6% to -10%

Highest Frequency (F)

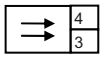


Response Delay (Switch 6) This switch activates a two second response to a detection. In the OFF position the response time of the detector is 100mS. When switched to the ON position the response delay is activated. If a signal is sensed which has a magnitude capable of causing a detection but which does not persist for more than two seconds then there is no output from the detector. This feature is useful where short undesirable detections must to be filtered out.

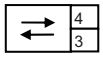
Pulse Edge (Switch 5) When in the OFF position, the pulse relay is activated an the onset of a detection event for a fixed period of 160mS (so-called 'pulse on entry'). When switched to the ON position the pulse relay is activated at the end of detection event for a period of 160mS after activation of the pulse relay has ceased (so-called 'pulse on exit'). In the pulse on entry setting the pulse and presence relays outputs are activated simultaneously. Should the event persist for less than 160mS both relay outputs deactivate at this early time. In the pulse on exit setting the pulse relay does not activate until the cessation of the presence relay output and persists for 160mS thereafter. The time of this pulse output can be prematurely shortened if a subsequent event is then detected during this time (a highly unlikely event).

Sensitivity Selection (Switches 4 & 3) The detect sensitivity is set by a combination of switches 4 & 3. The sensitivity is expressed as $\delta L/L$, the minimum change in inductance required to cause a detection with 0.02% being the most sensitive setting. Settings are as follows:

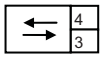
$\delta L/L$ = 0.02%



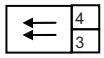
$\delta L/L$ = 0.05%

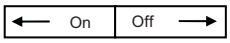


$\delta L/L$ = 0.10%



$\delta L/L$ = 0.50%





Presence Time (Switch 2) In the OFF position presence is limited and is of a duration proportional to size of the target stationary over the sensing loop. The relationship of presence time to signal size is not a straight line function. A typical vehicle produces a presence time of 90 minutes in this mode if the sensitivity is set to $\delta L/L$=0.02%. When in the ON position the permanent presence feature is activated. This feature retains a presence output whilst a typical vehicle is over the sensing loop for an indefinite period without retuning. This feature should be activated when vehicles are expected to be present over the sensing loop for extended periods.

AGD (Switch 1) When in the OFF position normal sensitivity for detection is in use. When in the ON position Auto Gain on Detection (AGD) is implemented. When a detection occurs the sensitivity is automatically increased (boosted) to the most sensitive setting available, namely $\delta L/L$=0.02% regardless of which setting has been selected on switches 4 & 3 on the front panel. Upon cessation of detection the sensitivity reverts to that set on the front panel. This feature is used to prevent premature cessation of a detect state when the setting of the sensitivity is other than $\delta L/L$=0.02%.

■ Detector Fault Monitoring

The detector monitors its own performance. Should the connection to the sensing loop present an unusually high impedance or a short circuit then the power on LED will flash once per second to indicate the occurrence. The LED will continue to flash even if the fault is self healing so that a maintenance engineer will be able to recognize that the fault has occurred. The fault condition may be cleared by pressing the reset. It is possible that connection of a sensing loop of sufficiently low enough inductance may result in an oscillating frequency which is too high (depending on the settings of the frequency selection switches 7 & 8). Under these conditions, if the frequency is greater than 130KHz then the internal microcontroller will shut down the oscillator completely. If the detector shuts down the oscillator both LEDs will flash alternately at a rate of once per second.