

Application Note

DU100 Vehicle Detector Diagnostic Unit

The Nortech DU100 Diagnostic Unit is a hand held test instrument capable of providing installation/service personnel with positive verification of the correct operation of a vehicle detector installation. It may only be utilised in conjunction with diagnostic compatible vehicle detector products from Nortech.

Current operational and historical data are transferred from the vehicle detector to the DU100 by means of an optical link. Data transmission from the vehicle detector unit occurs continuously so no service disruption is necessary. Received data is verified for integrity by means of a cyclic redundancy check (CRC), processes, and then displayed on a LCD screen.

The DU100 is capable of providing the following information:

1. Loop Mode (Loop)

The loop frequency and change in inductance are displayed for a selected loop. This mode can be used to monitor the change in loop frequency and inductance as a vehicle traverses the loop.

The inductance change is a measure of the magnitude of detection. Typical passenger vehicles register a peak change of the order of 1% - 3% Δ L/L. Poorly designed or poorly installed loop installations can lead to this value being significantly reduced.

This parameter can also be utilised to determine whether the inductance change registered by a particular vehicle (e.g. high undercarriage of a commercial vehicle) is of sufficient magnitude to break through the sensitivity threshold of the vehicle detector. The relevant sensitivity threshold value may be obtained from the detector data sheet and is typically 0.02% Δ L/L.

2. Frequency Mode (Freq)

The loop frequency and frequency drift (since last reset/retune) are displayed for a selected loop.

The frequency drift measurement gives an indication of the quality of a loop installation. Drift in the loop frequency is caused by ambient temperature changes, ingress of moisture into the loop slot and cable and variations in operating conditions due to the influence of strong electromagnetic fields such as electrical power transmission systems. The drift value is an historical value and is cleared each time the detector resets/retunes.

The loop frequency value represents the frequency of the AC signal energising the inductive loop and should be in the range of 20 KHz - 150 KHz. It is determined both by switch settings on the detector and loop geometry (size and number of turns). Loops in close proximity to one another that are connected to different vehicle detector units require a frequency spacing of approx. 2KHz to avoid interfering with each other. (This problem is known as crosstalk).

3. Sensitivity (Sens)

The minimum and maximum change in the loop inductance during vehicle detection is displayed for a selected loop.

The maximum value (MAX) corresponds to the greatest magnitude of detection for all vehicles since the last reset of the vehicle detector. If the vehicle detector is manually reset before a vehicle traverses the loop, the MAX display will indicate the highest detection level over the vehicle profile. Typical levels for a passenger vehicle are 1% - 3% Δ L/L.



As the sensitivity of the installation can be severely degraded by poor layout or proximity of ferrous metal, this value is useful for site-to-site comparisons (i.e. using the same vehicle).

The minimum value (MIN) indicates the smallest magnitude of inductance change (resulting in a detect) for all vehicles, since the last reset of the vehicle detector. Over a relatively short span of time, this value will tend towards the sensitivity setting of the vehicle detector.

4. Status (Stat)

The loop status of a selected loop is displayed.

Possible loop status conditions include:

- i. Undetect
- ii. Detect
- iii. Open circuit
- iv. Short circuit
- v. Indeterminate

5. Time (Time)

Elapsed time (in days and hours) since the last reset/retune and the reason for the reset/retune are displayed.

This information is particularly useful for detecting intermittent faults that are self-healing.

Possible reasons for reset/retune include:

- i. Reset: manual reset (pushbutton) or power failure
- ii. Short circuit
- iii. Open circuit

6. Crosstalk (Xtlk)

This feature provides an automatic check of the operating frequencies of a number of closely situated loops at an installation.

This mode allows comparison of loop frequencies for potential crosstalk situations on a pass / fail basis. The comparison can also be manually investigated, using the loop frequency mode.

The DU100 unit captures the operating frequency of one of the loops and uses this as the reference frequency.

The DU100 is then used to interrogate all other detector units with closely located loops. If the newly captured frequency is too close in proximity to the stored value, the test will fail.

The frequency settings of the detector are used to separate the frequency of the various loops and eliminate interference (crosstalk).

Refer to the product User Manual for more information.