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TD250D
USER MANUAL

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SAFETY PRECAUTION

Before installing or removing the TD250D detector,

ensure that the power supply has been switched off.

1. INTRODUCTION

The TD250D series of microprocessor based vehicle detectors have the same performance characteristics as the reliable, proven TD420 series Eurocard detectors.

This comprehensive range of boxed dual channel detectors are packaged according to industry standards and are ideal for use in traffic control and toll equipment vehicle detection applications.

The function of the detector is to detect vehicle presence by means of an inductance change caused by the vehicle passing over a loop buried in the road surface. The detector is designed for ease of installation and presence times and sensitivities can be individually set for each channel by a DIP switch on the front panel of the unit. Frequency and four different operating modes may be selected by means of a DIP switch mounted on the front panel. The TD250D provides outputs in the form of LED’s on the faceplate and change-over relay contacts. The LED has three possible states. They are no-detect, loop fault and output delay / extend active. The relays are fail safe, meaning they will close on a vehicle detect or in the event of a power failure. A common fault relay provides an output in the event of a faulty loop or a power failure. The TD250D is a versatile detector, which may be used in a number of applications which include vehicle counting, speed measuring and for vehicle actuated (VA) control in conjunction with traffic controllers.

The TD250D, while providing separate vehicle presence outputs per channel, may also be configured to operate in any of the following modes:

- Direction Logic (AB)
- Delay Mode
- Extend Mode

The TD250L logic detector is also available and may be configured to operate in any of the following modes:

- Direction Logic
- Speed Logic
- Headway Logic

An output will be provided when pre-set speed or headway threshold has been exceeded, and can be utilised for switching variable warning signs or for gathering traffic statistics.

2. TECHNICAL DATA

2.1 Functional Data

Self-tuning range	15 to 2000µH
Sensitivity	Four step selectable: High 0.02% ∆ L/L Medium-High 0.05% ∆ L/L Medium-Low 0.1% ∆ L/L Low 0.5% ∆ L/L
Frequency	Four step selectable: High, Medium-High, Medium Low, and Low Frequency dependent on loop geometry
Presence Time	Four step selectable: 1 Second 4 Minutes 40 Minutes
Pulse Output	Approximately 150ms
Response Times	Turn-on 30ms ± 5ms Turn-off 40ms
Drift Compensation Rate	Approximately 1% ∆ L/L per minute
Indications	1 x Run Indicator - Red Steady On 1 x Tri-coloured LED per channel Green – Detect Red – Fault Orange – Timer functions: delay / extend
Detect Outputs	Sealed relays rated at 1A @ 220V AC Single changeover contact per channel
Output Relay Mode	Switch selectable (Presence relays are fail-safe)

MODE	OUTPUT
1. Normal	Presence (CH1) and (CH2)
2. AB Logic	A to B (CH1) and B to A (CH2)
3. Delay (Speed-TD250L)	Presence (CH1) and Delayed Turn-On CH2
4. Extend (Headway-TD250L)	Presence (CH1) and Delayed Turn-Off (CH2) Headway CH1 and CH2

Fault Output	Common fault output Change over relay contact
Reset	Push button on front panel

Delay Timings	Delay turn-on 30 seconds in 2 second steps
Extend Timing	Delay tun-off 7.5 seconds in 0.2 second steps
Delay Extend Override	230V AC input overrides delay times
Speed Logic Option	0 – 150kph in 10 kph steps
Headway Logic Option	0 – 3 seconds in 0.2 second steps
Surge Protection	Loop isolation transformers, Zener diode clamping on loop inputs and gas discharge tube protection

2.2 Electrical Data

Power requirements:

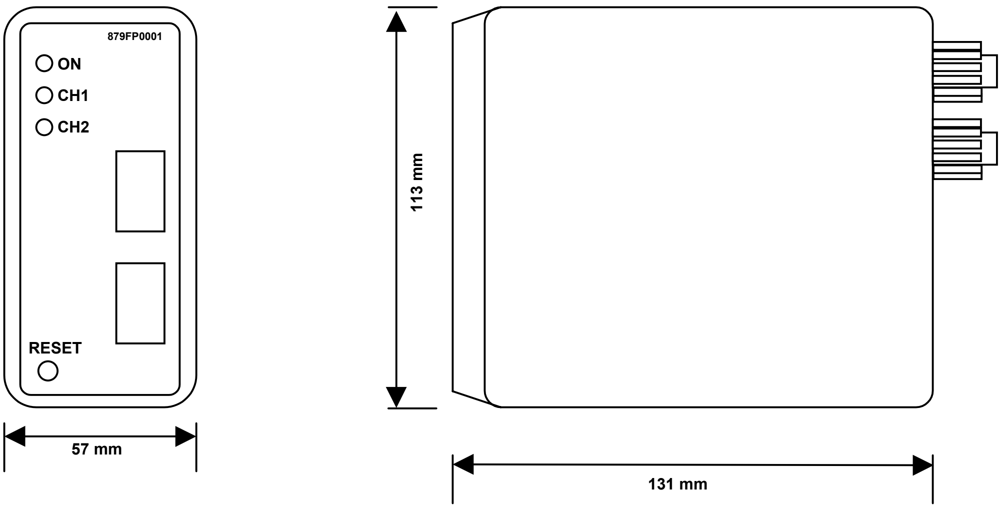
TD252, TD250L	230V AC ± 15% (48 to 60Hz)

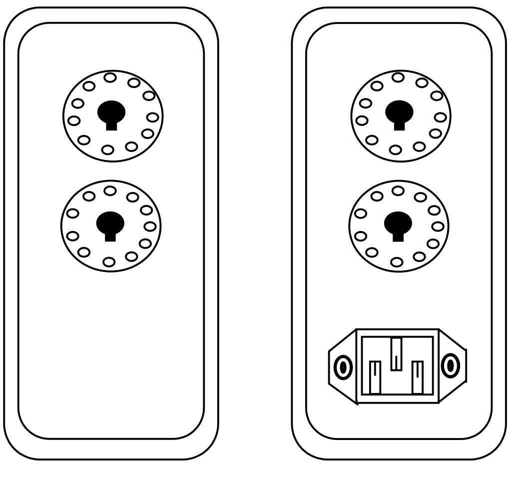
2.3 Environmental Data

Storage Temperature	-40°C to +85°C
Operating Temperature	-40°C to +80°C
Humidity	Up to 95% relative humidity without condensation

2.4 Mechanical Data

Housing material	ABS blend
Mounting Position	Shelf mounting
Connections	TD252 / TD250L 2 x 11-pin submagnal type (86CP11)
Size of Housing	131mm (Deep) x 113mm (High) x 57mm (Wide)





Mechanical Diagrams

3. OPERATING INSTRUCTIONS

3.1 Controls and Indicators

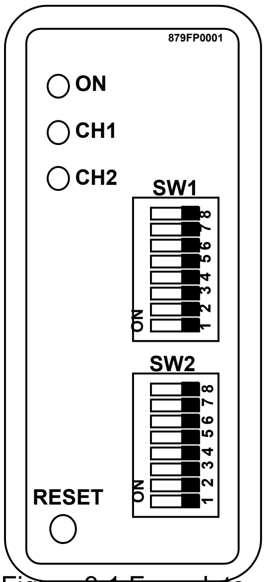


Figure 3.1 Faceplate

There are 3 visual indicators on the detector module. These are explained below:

Operation Indicator:

Red LED This remains on to indicate the unit is powered.
This LED is also used as a link to the diagnostic unit.

Channel Status Indicators:

Tri-colour LED's - One per channel with four possible states:

1. Clear (off) Tuned and in the undetect state.
2. Green In the detect state
3. Red Either in the tuning state or there is a fault on the loop.
4. Orange Indicates that the delay / extend timer is active. (CH 2 only)

On initial power-up the detector will automatically begin to tune to the loops. The channel status indicators will be red. When the loops have tuned the indicators will go off (clear). If the loop cannot be tuned then the indicator for that channel will remain red.

After a successful tune, and subsequent vehicle presence over a loop, the detector will give a detect and the status indicator will turn green for the duration of the vehicle presence. If the detector is in timing mode, the channel status indication on Channel 2 will be orange for the duration of the timing mode.

3.2 Switch Setting Selections

Two 8-way DIP switches on the front panel of the unit allow for various configuration options to be selected.

SW1 provides individual sensitivity and presence selections for CH1 and CH2.

SW2 sets the detector in the various operating modes and timing selections (for delay / extend modes or variable speed and headway). SW2 also allows for 4 different frequency selections to be made.

3.2.1 Reset Switch

The detector automatically tunes to the inductive loops connected to it within 4 seconds after applying power. Should it be necessary to retune the detector, as may be required after changing the position of any of the switches, momentary operation of the RESET switch will initiate the tuning cycle.

3.2.2 Presence Time Settings (SW1 - S5, S6 and S1, S2)

CH1 and CH2 presence time is selected by DIP switch SW1, S5, S6 and S1, S2 respectively.

	SW1		
Presence Time	S5	S6	CH1
	S1	S2	CH2
1 second	On	On	
4 minutes	On	Off	
40 minutes	Off	On	
Infinity - no fixed time-out	Off	Off	

The Presence time as shown above may be altered according to the requirements.

The 1 second setting will give a pulse on detection of a vehicle with a duration of 1 second. The detector will immediately re-adjust to the normal operating point and will give another detect in the event of a further change in the loop inductance, i.e. the detector may be used as a passage detector in this mode.

The 4 minute and 40 minute settings work in the same way as the 1 second setting, however the detector will now give outputs of 4 minutes or 40 minutes. If the vehicle which caused the inductance change moves off the loop then the detector will go out of detect and the time will be reset to zero for the next detect cycle. The detector may undetect before the expired time period if the change in inductance for the vehicle is small.

The “infinite” setting does not have a fixed time out and the detect period is dependent on the magnitude of the inductance change caused by the vehicle over the loop.

3.2.3 Sensitivity Settings (SW1 – S7, S8 and S3, S4)

The sensitivity of the detector can be individually set for each channel and allows the detector to be selective as to the change of inductance necessary to produce a detect. Four possible sensitivity settings are available.

	SW1		
Sensitivity	S7	S8	CH1
	S3	S4	CH2
Low (0.5% Δ L/L)	On	On	
Medium-Low (0.1% Δ L/L)	On	Off	
Medium-High (0.05% Δ L/L)	Off	On	
High (0.02%Δ L/L)	Off	Off	

3.2.4 Frequency Switch (SW2 - S1, S2)

Switches 1 and 2 on the 8-way DIP switch SW2 are used to shift the loop oscillator frequency to prevent crosstalk with other detector units. The various frequencies are selected as follows:

	SW2	
Frequency	S1	S2
High	Off	Off
Medium-High	On	Off
Medium -Low	Off	On
Low	On	On

The frequency switch allows the loop frequency to be shifted higher or lower depending on the switch position. The two channels shift in frequency simultaneously as they are multiplexed and share a common oscillator. The two channels will not necessarily be at the same frequency, as the frequency is determined by the loop size and feeder length and the frequency switch simply causes a frequency shift.

Where a single detector is being used the frequency switch may be at any setting. However, where more than one detector is used the detectors must be set-up to ensure that there is no crosstalk between the detectors. This can be achieved by ensuring that the loops of the detectors are spaced sufficiently apart (approximately 2 metres between adjacent edges) and also ensuring that the detectors are set to different frequencies. As a general rule, the detector connected to the inductive loop with the greatest inductance should be set to operate at the lowest frequency setting. Loop inductance increases as loop size, number of turns in the loop and feeder length increases.

3.2.5 Timer Delay and Extend Settings (SW2 – S3, S4, S5, S6)

When the unit has been configured in one of the timer modes (SW2 – S7, S8) the following switches have relevance. They are used to select the variations of time intervals in the time delay or extend modes. Time options available are given below:-

S6	S5	S4	S3	Delay Mode	Extend Mode
OFF	OFF	OFF	OFF	0 Seconds	0 Seconds
OFF	OFF	OFF	ON	2 Seconds	0.5 Seconds
OFF	OFF	ON	OFF	4 Seconds	1.0 Seconds
OFF	OFF	ON	ON	6 Seconds	1.5 Seconds
OFF	ON	OFF	OFF	8 Seconds	2.0 Seconds
OFF	ON	OFF	ON	10 Seconds	2.5 Seconds
OFF	ON	ON	OFF	12 Seconds	3.0 Seconds
OFF	ON	ON	ON	14 Seconds	3.5 Seconds
ON	OFF	OFF	OFF	16 Seconds	4.0 Seconds
ON	OFF	OFF	ON	18 Seconds	4.5 Seconds
ON	OFF	ON	OFF	20 Seconds	5.0 Seconds
ON	OFF	ON	ON	22 Seconds	5.5 Seconds
ON	ON	OFF	OFF	24 Seconds	6.0 Seconds
ON	ON	OFF	ON	26 Seconds	6.5 Seconds
ON	ON	ON	OFF	28 Seconds	7.0 Seconds
ON	ON	ON	ON	30 Seconds	7.5 Seconds

3.2.6 *Detector Mode Settings (SW2 – S7, S8)*

These two switches are used to select the various mode of operation of the detector and are as follows:-

NORMAL MODE (SW2 – S7 (OFF), S8 (OFF)):

This is the normal mode and the detector will operate as a vehicle detector with no additional features. Each channel will operate independent of the other and will detect the presence of a vehicle.

AB LOGIC MODE (SW2 – S7 (OFF), S8 (ON)):

In this mode the detector is used as a direction sensor and the primary task is to indicate the direction of travel over the loops.

If a vehicle enters Loop A (Channel 1) and then proceeds to Loop B, a valid pulse will be issued on Loop A relay output as the vehicle leaves Loop A.

If a vehicle now enters Loop B (Channel 2) and then proceeds to Loop A, a valid pulse will be issued on Loop B relay output as the vehicle leaves Loop B. In this way the direction of a vehicle can be determined.

DELAY MODE (SW2 – S7 (ON), S8 (OFF))

In this mode channel 2 (Loop B) is configured in the delay mode. This mode is used when the user wishes to delay the output on the detector as the vehicle enters Loop B. The Channel indicator for Loop B will illuminate but the colour will be orange indicating that a time delay action is in operation. If the vehicle is still over Loop B at the expiry of the time, the detector will generate a valid output on the Channel 2 relay. If the vehicle should leave Loop B before the time has expired, no output will be generated.

Consult section 3.2.5 for Delay Timer Settings.

EXTEND MODE (SW2 – S7 (ON), S8 (ON)):

In this mode Channel 2 (Loop B) is configured in the extend mode. This mode is used when the user wishes to extend the output on the detector as the vehicle leaves Loop B. The Channel indicator for Loop B will function as normal as the vehicle enters Loop B but the colour will turn to orange as the vehicle leaves Loop B indicating that a time extend action is in operation. When the time expires, Channel 2 output will undetect and the Channel indicator will turn off. If another vehicle enters the loop while the time extend is still in operation, the Channel indicator will re-assume the detect state and the time extend reset. No output status will be observed.

Consult section 3.2.5 for Extend Timer Settings.

3.2.7 *Logic Option Mode Setting (SW2 – S7, S8)(Model TD250L)*

1. **Normal Mode (SW2 – S7 (Off), S8(Off))**

   As per section 3.2.6.

2. **AB Logic Mode (SW2 – S7 (Off), S8 (On))**

   As per section 3.2.6.

3. **Speed Logic Mode SW2 – S7 (On), S8 (Off))**

In this mode channel 2 output relay is configured to provide a pulse output when a pre-set speed threshold has been exceeded. The input to this mode is provided by both channel 1 and channel 2 sensor loops, which are required to be spaced at exactly one metre between adjacent edges. See figure 3.2.

The speed threshold can be in the range 0 – 150 kph, with 10kph steps selectable. It should be emphasised that this output is intended to be utilised in the switching of variable warning signs, for traffic analysis purposes or for extending phases in a traffic control application, and is **not** suitable for speed prosecution applications.

Channel 1 output relay is configured to provide a presence output in this mode, with the actual presence time determined by the position of SW1, S6 and S5. An application for this relay could be to drive a counter which would give you a total vehicle count figure, whilst channel 2 output could be used to establish the number of vehicles exceeding the pre-set threshold.

4. **Headway Logic Mode (SW2 – S& (On), S8 (On))**

Headway can be defined as the following interval between vehicles, and is taken from the point of detection of the following vehicle, and is measured in seconds. In this mode both channels are configured to provide pulse outputs in the event of the vehicle headway being less than the pre-set threshold, with these two outputs operating entirely independent of each other. Se figure 3.3

The Headway threshold can be in the range 0 – 3 seconds, and can be set in the steps of 0.2 seconds. It is intended that the pulse output, which is of 150 milliseconds duration, be used to switch a variable warning sign should the vehicle headway be less than the pre-set threshold, or alternatively for traffic analysis surveys. This list should not be considered to be exhaustive as other applications for these logic modes are possible.

3.2.8 Speed and Headway Settings (SW2, S3 – S6) (Model TD250L only)

S6	S5	S4	S3	Speed Mode (kph)	Headway Mode
OFF	OFF	OFF	OFF	0	0 Seconds
OFF	OFF	OFF	ON	10	0.2 Seconds
OFF	OFF	ON	OFF	20	0.4 Seconds
OFF	OFF	ON	ON	30	0.6 Seconds
OFF	ON	OFF	OFF	40	0.8 Seconds
OFF	ON	OFF	ON	50	1.0 Seconds
OFF	ON	ON	OFF	60	1.2 Seconds
OFF	ON	ON	ON	70	1.4 Seconds
ON	OFF	OFF	OFF	80	1.6 Seconds
ON	OFF	OFF	ON	90	1.8 Seconds
ON	OFF	ON	OFF	100	2.0 Seconds
ON	OFF	ON	ON	110	2.2 Seconds
ON	ON	OFF	OFF	120	2.4 Seconds
ON	ON	OFF	ON	130	2.6 Seconds
ON	ON	ON	OFF	140	2.8 Seconds
ON	ON	ON	ON	150	3.0 Seconds

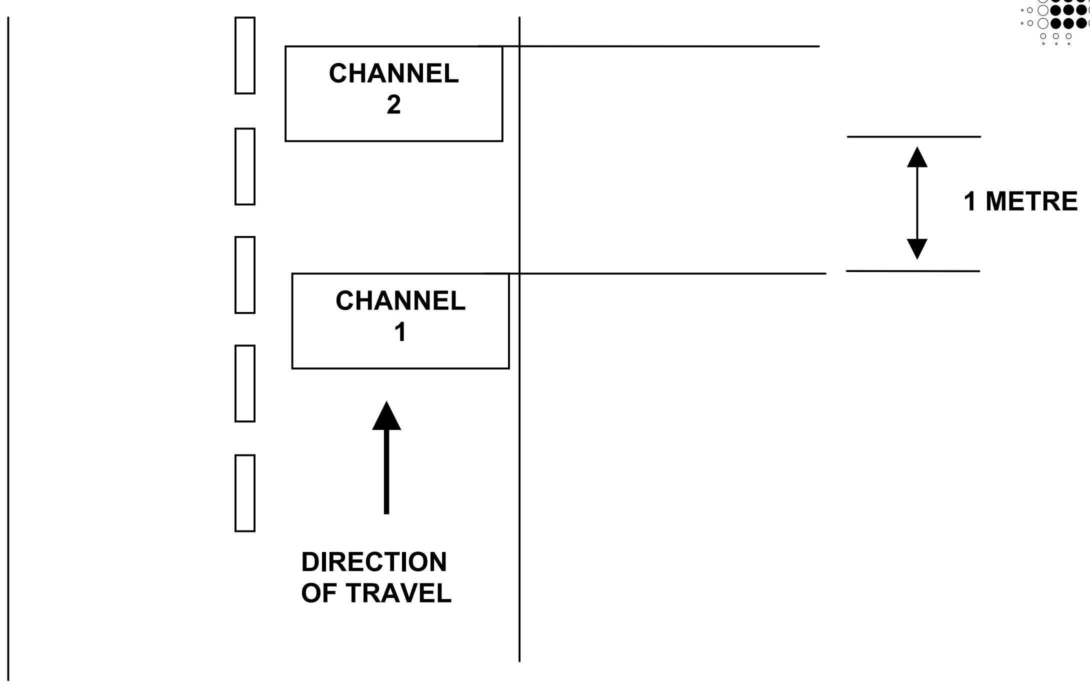


Figure 3.2 Speed Logic Loop Layout

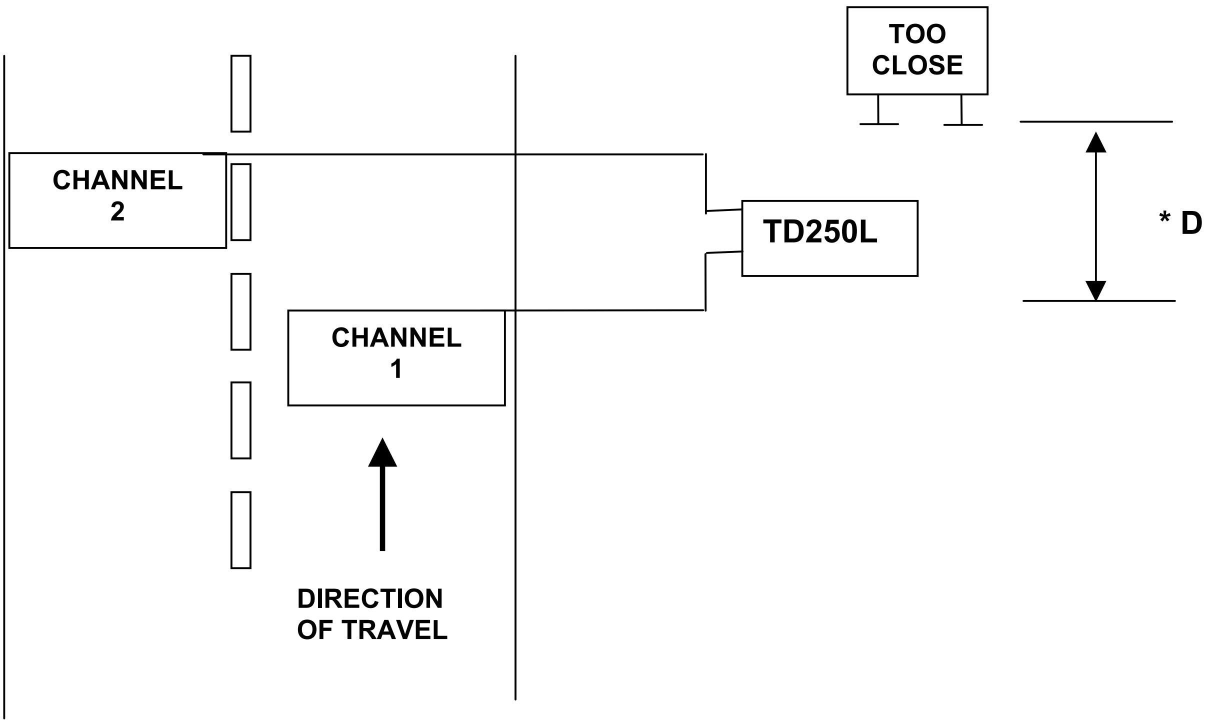


Figure 3.3: Typical Headway Logic Loop Layout

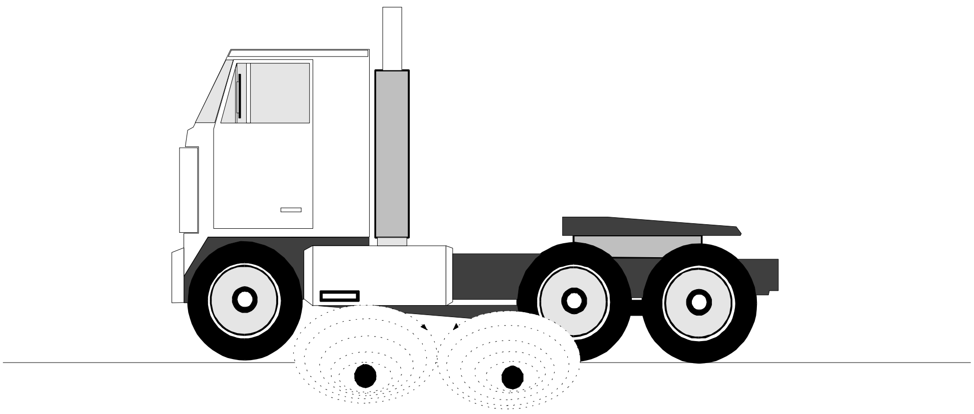
* Distance will vary according to average vehicle speed
and the required time of warning sign illumination.
D (Distance in Metres) = S (Speed in ms-1) x T (Time in seconds)

4. PRINCIPLE OF OPERATION

The inductive loop vehicle detector senses the presence of a vehicle over an area defined by a loop of two or more turns of wire laid under the road or pavement surface. This loop of wire is connected to the detector by a twisted pair of wires called a loop feeder.

A vehicle passing over a sensing loop causes a small reduction in the inductance of the loop, which is sensed by the detector. The sensitivity of the detector is adjustable to accommodate a wide range of vehicle types as well as different loop and feeder combinations.

Upon detection of a vehicle passing over the loop the detector operates its output relays which may be used to indicate controls associated with the installation.



4.1 Detector Tuning

Tuning of the detector is fully automatic. When power is applied to the detector upon installation of the system, or when a reset is initiated, the detector will automatically tune itself to the loop to which it is connected. The detector will tune to any loop in the inductance range of 15 to 2000 microhenries. This wide range ensures that all loop sizes and feeder combinations will be accommodated in the tuning range of the detector. Once tuned, any slow environmental change in loop inductance is fed to a compensating circuit within the detector, which keeps the detector correctly tuned.

4.2 Detector Sensitivity

Sensitivity of the detection system is dependent on factors such as loop size, number of turns in the loop, feeder length and the presence of metal reinforcing beneath the loop.

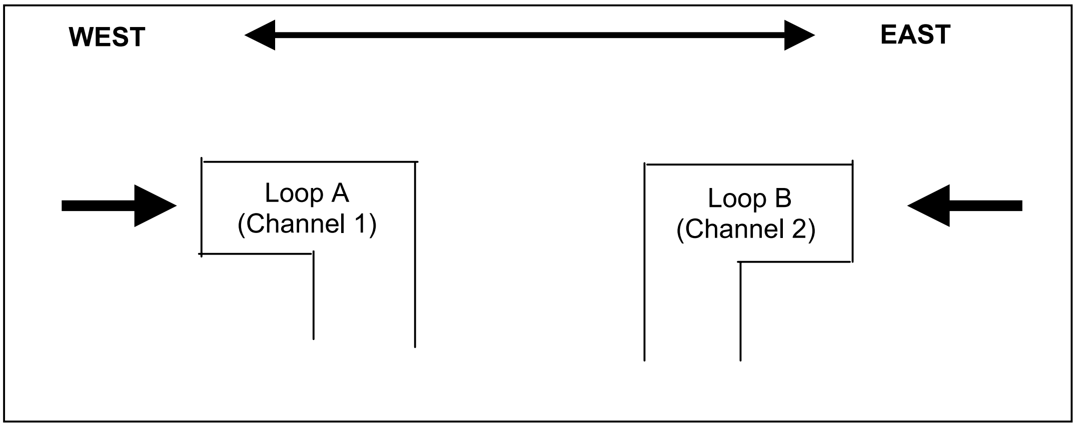
The nature of the application determines the required sensitivity which may be adjusted by means of the front panel switches. Sensitivity levels on the TD250D have been carefully optimised for traffic applications. The detection of small, unwanted objects can be eliminated by selecting lower sensitivity levels, whilst high-bed vehicles and vehicle / trailer combinations will not loose detection on the high sensitivity settings.

4.3 Modes of Operation

The TD250D can operate in four different modes:

In the NORMAL mode the detector provides a continuous output during the presence of a vehicle over the inductive loop. The maximum possible duration of output is determined by the presence time setting. The various presence time modes are covered in section 3.2.2

AB LOGIC is a direction logic mode, and is capable of determining direction of travel of a vehicle. Two loops are laid in the direction of travel to provide the input for this mode.



A vehicle travelling from West to East will provide an output pulse “A to B “ on the channel 1 output relay. Conversely, a vehicle travelling from East to West will produce an output pulse “B to A” on the channel 2 output relay. This mode is used to activate equipment requiring vehicle direction inputs such as automatic fee collection equipment, vehicle counters, or warning devices in one-way systems.

The DELAY MODE of operation retards the onset of the detector output when a vehicle enters the loop. The delay between the “actual detect” and the retarded output is set on the time switches (S3, S4, S5 and S6) on SW2.

In the EXTEND MODE the undetect rather than the detect time is delayed by a period determined by the time switches on SW2. The delay and extend modes can be disabled externally by applying 230V AC on the delay override input. The detector will operate in the normal mode.

A common application of the Delay / Extend modes is in the control of the green turning phase at intersections.

4.4 Response Times

The response time of the detector is the time taken from when a vehicle moves over the loop to when the detector gives an output on that channel. The response times of the TD250D have been adjusted to prevent false operation in electrically noisy environments, but retains adequate response to vehicles travelling at very high speeds.

4.5 Sequential Polling

The TD250D two-channel detector employs scanning techniques which positively eliminate crosstalk between loops connected to the same module. This is due to the fact that only one channel is energised at a time. Advantage should be taken of this by allocating adjacent loops, or loops sharing close proximity feeder runs, to the same detector unit.

4.6 Fault Output

This is a normally open relay contact which appears on the 11-pin plugs on the backplate of the detector. The fault output is used to indicate the functional status of the detector. If the TD250D has tuned correctly to all loops then the fault output will indicate no fault. The fault output will be activated when a loop is faulty such as open or short circuit, or when the power has been removed from the unit. The fault monitor signals from a number of detectors may be wired out individually or coupled together to provide a common fault indication.

5. INSTALLATION GUIDE

Optimum functioning of the detector module is largely dependent on factors associated with the inductive sensor loop connected to it. These factors include choice of material, loop configuration and correct installation practice. A successful inductive loop vehicle detection system can be achieved by bearing the following constraints in mind, and strictly following the installation instructions.

5.1 Operational Constraints

Crosstalk

When two loop configurations are in close proximity, the magnetic fields of one can overlap and disturb the field of the other. This phenomena, known as crosstalk, can cause false detects and detector lock-up. Should the loops be connected to the same dual channel detector crosstalk will not occur, due to the fact that sequential polling of the loops takes place, resulting in only one loop being energised at a given time.

Crosstalk between adjacent loops operating from different detector modules can be eliminated by:

1. Careful choice of operating frequency. The closer together the two loops, the further apart the frequencies of operation must be.

2. Separation between adjacent loops. Where possible a minimum spacing of 2 metres between loops should be adhered to.

3. Careful screening of feeder cables if they are routed together with other electrical cables. The screen must be earthed at the detector end only.

Reinforcing

The existence of reinforced steel below the road surface has the effect of reducing the inductance, and therefore the sensitivity, of the loop detection system. Hence, where reinforcing exists 2 turns should be added to the normal loop, as referred to in section 5.3.
The ideal minimum spacing between the loop and the cable and steel reinforcing is 150mm, although this is not always practically possible. The slot depth should be kept as shallow as possible, taking care that no part of the loop or the feeder remains exposed after the sealing compound has been applied.

5.2 Loop and Feeder Specification

The loop and feeder should preferably constitute a single unjoined length of insulated copper conductor, with a minimum rating of $1.5mm^2$ cross sectional area.

Joints in the loop or feeder are not recommended. Where this is not possible, joints are to be soldered and terminated in a waterproof junction box. This is extremely important for reliable detector performance.

5.3 Sensing Loop Geometry

Sensing loops should, unless site conditions prohibit, be rectangular in shape and should normally be installed with the longest sides at right angles to the direction of traffic movement. These sides should ideally be 1 metre apart. The only factor which governs maximum separation between loops is the feeder length, with 100 metres being the maximum recommended length. The length of the loop will be determined by the width of the roadway to be monitored. The loop should reach to within 300mm of each edge of the roadway.

In general, loops having a circumference measurement in excess of 10 metres should be installed using two turns of wire, while loops of less than 10 metres in circumference, but greater than 6 metres, should have three turns. Loops having a circumference measurement less than 6 metres should have four turns. It is good practice at time of installation to construct adjacent loops with alternate three and four turn windings.

5.4 Loop Installation

All permanent loop installations should be installed in the roadway by cutting slots with a masonry cutting disc or similar device. A 45° crosscut should be made across the loop corners to reduce the chance of damage that can be caused to the loop at right angle corners.

NOMINAL SLOT WIDTH: 4mm Nominal
NOMINAL SLOT DEPTH: 30mm to 50mm

A slot must also be cut from the loop circumference at one corner of the loop to the roadway edge to accommodate the feeder.

A continuous loop and feeder is obtained by leaving a tail long enough to reach the detector before inserting the cable into the loop slot. Once the required number of turns of wire are wound into the slot around the loop circumference, the wire is routed again via the feeder slot to the roadway edge.

A similar length is allowed to reach the detector and these two free ends are twisted together to ensure they remain in close proximity to one another. (Minimum 20 turns per metre). Maximum recommended feeder length is 100 metres. It should be noted that the loop sensitivity decreases as the feeder length increases, so ideally the feeder cable should be kept as short as possible.

The loops are sealed using a “quick-set” black epoxy compound or hot bitumen mastic to blend with the roadway surface.

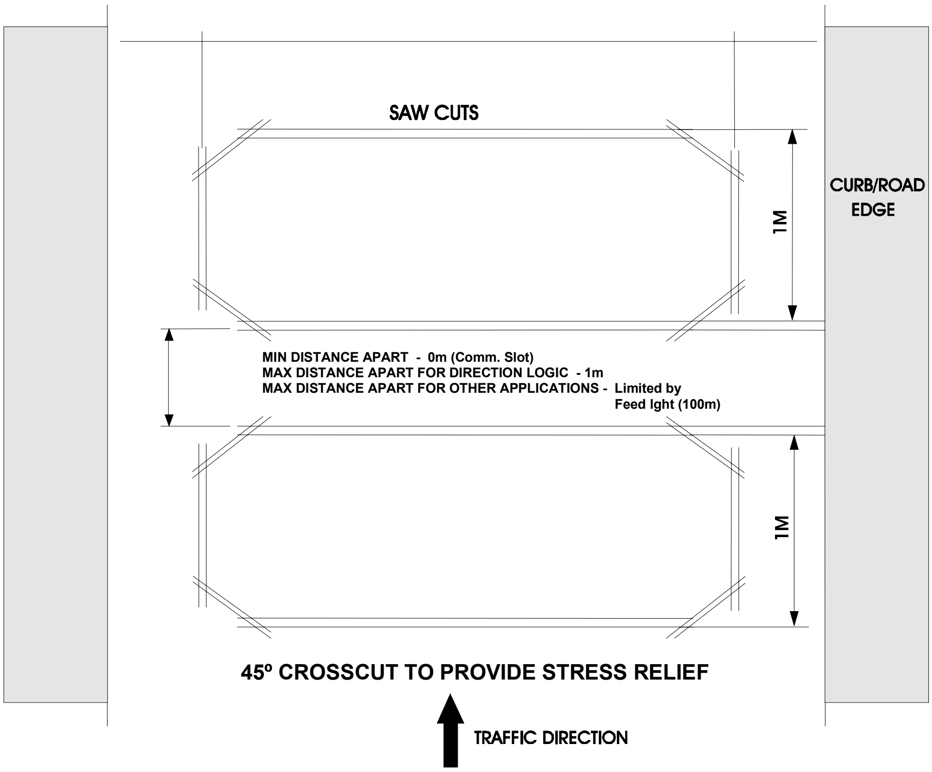


Figure 5.1 Adjacent loops connected to a TD250D detector

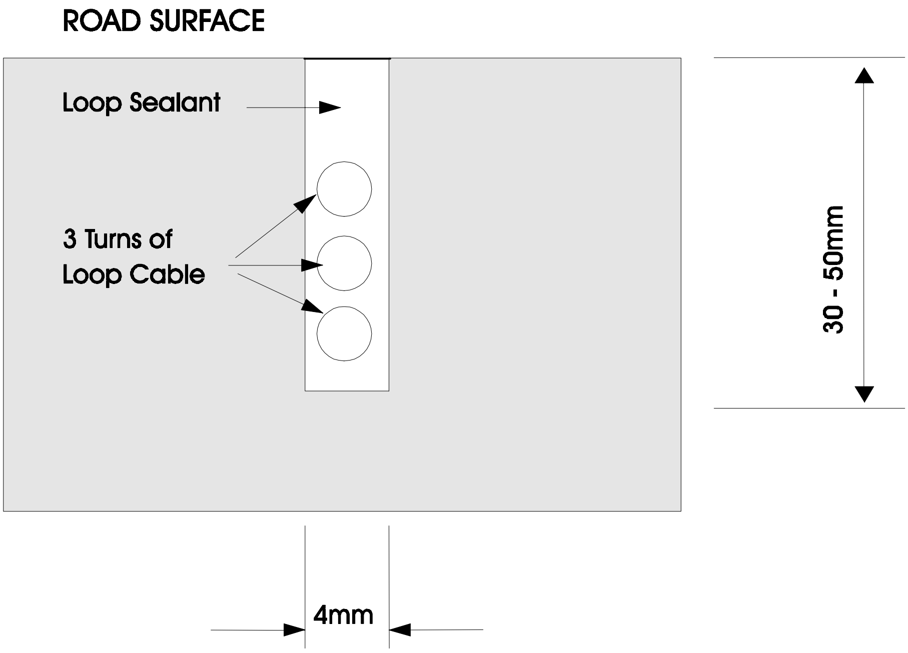


Figure 5.2 Slot details

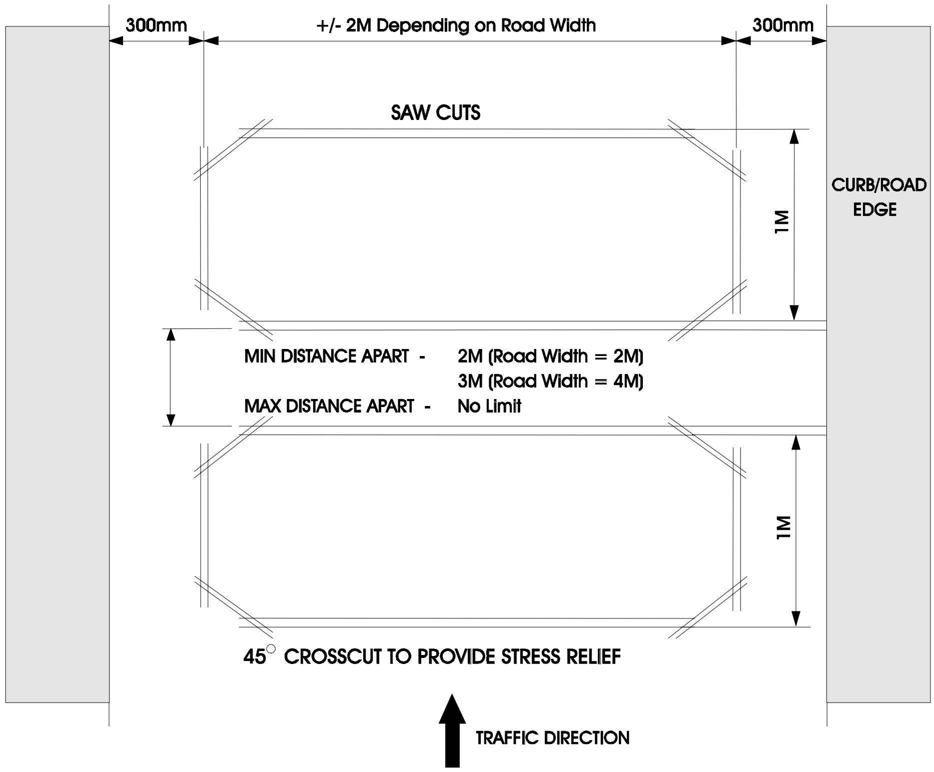


Figure 5.3 Adjacent loops connected to different modules

6. CONFIGURATION

Note: All relay contact descriptions refer to the tuned and undetected state.

TD252 230V AC 879FT0014
11 PIN CONNECTOR WIRING

PIN	CHANNEL	COLOUR	DESIGNATION
1	1	Red	Live — 230V AC input ± 15%
2	1	Black	Neutral — 50 / 60 Hz
3	1 & 2	Grey	Fault 2 N/O
4	1 & 2	Mauve	Fault Com
5	1 & 2	Yellow	Presence N/O
6	1 & 2	Brown	Presence Com
7	1 & 2	Blue	Loop
8	1 & 2	Blue	Loop
9	1	Green / Yellow	Earth
10	1 & 2	Pink	Presence N/C
11	2	White	Delay override (230V mains output)

TD250L 230V AC 879FT0016
11 PIN CONNECTOR WIRING

PIN	CHANNEL	COLOUR	DESIGNATION
1	1	Red	Live — 230V AC INPUT ± 15%
2	1	Black	Neutral — 50 / 60 Hz
3	1 & 2	Grey	Fault N/O
4	1 & 2	Mauve	Fault Com
5	1 & 2	Yellow	Output N/O
6	1 & 2	Brown	Output Com
7	1 & 2	Blue	Loop
8	1 & 2	Blue	Loop
9	1	Green / Yellow	Earth
10	1 & 2	-	Output N/C
11	2	-	Not used

TD252 FRENCH 230V 879FT0015
11 PIN CONNECTOR WIRING

PIN	CHANNEL	COLOUR	DESIGNATION
1	2	White	Delay override
2	1	Black	Neutral 230V AC
3	1 & 2	Grey	Fault N/O
4	1	Green / Yellow	Earth
5	1	Yellow	Presence N/O
6	1 & 2	Brown	Presence Com
7	1 & 2	Orange	Loop — Twist this
8	1 & 2	Orange	Loop — pair
9	1	Red	Live 230V AC input ± 15%
10	1 & 2	Mauve	Fault Com
11	1 & 2	Pink	Presence N/C

TD251 SAINCO 230V AC 879FT0018

11 PIN CONNECTOR WIRING

PIN	COLOUR	DESIGNATION
1	Red	Live — 230V AC ± 15%
2	Black	Neutral — 50 / 60 Hz
3	Grey	Channel 2 N/O
4	Green / Yellow	Earth
5	White	Channel 1 Common
6	White	Channel 1 N/O
7	Blue	Channel 1 Loop — Twist this
8	Blue	Channel 1 Loop — pair
9	Grey	Channel 2 Common
10	Yellow	Channel 2 Loop — Twist this
11	Yellow	Channel 2 Loop — pair

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11 PIN CONNECTOR WIRING

PIN	COLOUR	DESIGNATION
1	Red	Live — 120V AC ± 15%
2	Black	Neutral — 50 / 60 Hz
3	Grey	Channel 2 N/O
4	Green / Yellow	Earth
5	White	Channel 1 Common
6	White	Channel 1 N/O
7	Blue	Channel 1 Loop — Twist this
8	Blue	Channel 1 Loop — pair
9	Grey	Channel 2 Common
10	Yellow	Channel 2 Loop — Twist this
11	Yellow	Channel 2 Loop — pair

7. APPLICATIONS

The TD250D two-channel detector can be used in a variety of applications in the traffic environment.

- Traffic counting
- Speed discrimination
- Queue detection
- Vehicle actuated traffic control
- Toll equipment

8. CUSTOMER FAULT ANALYSIS

8.1 Fault Finding

FAULT	CAUSED BY	REMEDY
Red LED does not glow on power up.	If the indicator is off then there is a fault on the power connection to the unit.	Check power feed to the unit.
After the initial tune period one of the channel indicators is still red.	Unit cannot tune to the loop due to faulty loop or feeder connection. Loop may be too small or too large. Faulty detector unit.	Check loop installation and connections. Recut as per installation instructions. Replace unit.
After tuning, the loop output indicator flashes green *intermitently* and the relay chatters.	The loop is getting spurious detects due to: a) Crosstalk with adjacent detector. b) Faulty loop or feeder connection.	a) Change frequency setting. b) Check that the feeders are adequately twisted.
On detect the output indicator turns orange instead of green.	The unit is configured in the delay mode.	Set the detector in the NORMAL operating mode.
On undetect the channel indicator changes from green to red.	The unit is configured in the extend mode.	Set the detector in the NORMAL operating mode.
On detect one channel indicator turns green but the relay is not activated.	The detector is operating in the AB logic mode.	Change the operating mode to normal.

8.2 DU100 – Detector Diagnostic Unit

The DU100 hand-held test instrument has been designed to operate with theTD250D detector to provide installation / service personnel with positive verification of the correct operation of the vehicle detector and its installation.

The following parameters may be verified using this instrument:

1. Loop status: Open, short-circuit or occupied.

2. Detector sensitivity: Actual sensitivity ($\Delta L/L$) and the associated maxima ($\Delta L/L_{max}$) and minima ($\Delta L/L_{min}$) may be determined.

3. Frequency display: Readout of the actual loop operating frequency and crosstalk evaluation. The DU100 will automatically monitor for likelihood of interference between adjacent loops.

4. Fault status: Historical data is retained in the detector to indicate historical operating conditions. This information is invaluable in providing intermittent faults and disproving product liability claims.

For further information refer to the DU100 User Manual.

8.3 Functional Test

To test a detector, connect it to an inductive loop with a total inductance in the order of 300 microhenries. (This may be achieved in the workshop by winding (x) turns of wire on a non-metal former of diameter (y)).

x = 19 turns 0.25mm wire
y = 238mm (9.4 inches)

Bring a small metal object approximately the size of a matchbox close to the loop coil. The following will happen on detection:

NORMAL MODE:

The output LED will light up green and the presence output relay will operate immediately. On removal of the metal object the output LED will then turn off and the presence output relay will resume its undetected state.

DELAY MODE:

The detect cycle is as follows:
On detect the output LED will light up and for a period determined by the switch settings. Once this period elapses the output LED will change to green and the presence relay will operate. Both LED and presence rely will turn-off immediately when the metal object is removed.

EXTEND MODE:

The output LED will light up green and presence relay will be operated immediately on detect. When the metal object is removed the LED changes to orange for a period determined by the time switch settings. When this time delay expires the LED turns off and the presence relay resumes its normal undetect state.

DELAY OVERRIDE:

The delay override feature is tested by applying 230V AC on the delay override input while the output LED emits an orange light. The following will happen:

Delay Mode: The output LED changes to green and the presence relay is operated.

Extend Mode: The output LED and presence relay turn off.

Fault Output: An open / short circuit across any loop input or the removal of power from the detector will operate the fault relay.

To check the sensitivity, presence time et cetera, use should be made of a calibrated tester which comprises of a calibrated loop similar to the one described above with a movable vane which can be moved over the loop at pre-determined heights.