TOE 40/3

USER GUIDE

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VEKTOR

Contents

1 INTRODUCTION

The PD130 is a single channel microprocessor based detector designed specifically for parking and vehicle access control application. The PD130 has been designed using the most up-to-date technology in order to meet the requirements of a vast number of parking applications (in terms of operating conditions and options available to the user.)

The primary function of the detector is to detect vehicle presence by means of an inductance change, caused by the vehicle passing over a wire loop buried under the road surface.

The detector has been designed for ease of installation and convenience. The various modes are selected by changing the positions of the switch on the front of the unit.

The switches allow for different loop frequency settings, sensitivity settings and mode settings.

The PD130 provides visual output (LED) on the front of the enclosure and relay changeover contacts are taken on the 11-pin connector at the rear of the enclosure. The LED indicates the power has been applied to the unit, that a vehicle is present over the loop and if there is a fault on the loop. The Presence relay is fail-safe and will close on a vehicle detect or in the event of power failure or a loop fault.

2 TECHNICAL DATA

2.1 Functional Data

Tuning	Fully automatic
Self-timing range	20 µH to 1500 µH
Sensitivity	Four step switch selectable High 0.02% ΔL/L Medium High 0.05% ΔL/L Medium Low 0.10 % ΔL/L Low 0.50% ΔL/L
Frequency	Four step switch selectable Frequency dependent on loop size
Automatic Sensitivity Boost	Switch selectable
Filter	Switch selectable 2 second filter
Presence Relay	Fail-safe
Presence Time	Switch selectable: Limited presence Permanent presence
Pulse Relay	Switch selectable: Pulse on detect Pulse undetect
Pulse Output Duration	150 milliseconds
Response Times	100 milliseconds
Drift Compensation Rate	Approx. 1% ΔL/L per minute
Visual Indication	1 x Power LED – Red 2 x Channel Status LED - Green
Detects Outputs	Relays rated - 5A @ 230 VAC
Reset	Push button on PCB
Surge Protection	Loop isolation transformer, gas discharge tubes, and Zener diode clamping on loop input

2.2 Electrical Data

Power requirements	12 V -10% to 24 V +10% (PD134) 120 VAC ±10% (48 to 60Hz) 230 VA ±10% (48 to 60Hz) Requirement: 1.5 VA Maximum @ 230 V

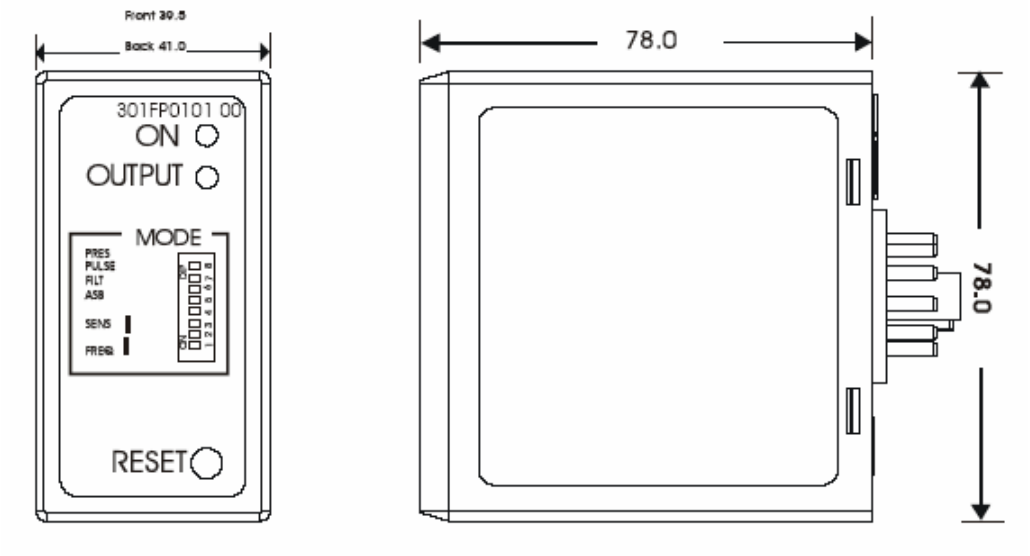
2.3 Environmental Data

Storage Temperature	-40°C to ±85°C
Operating Temperature	-40°C to +70°C
Humidity	Up to 95% relative humidity without condensation
Circuit protection	Conformal coating over the PCB and all components

IP Rating	IP30

2.4 MECHANICAL DATA

Housing Material	ABS blend
Mounting Position	Shelf or DIN rail mounting
Connections	11-pin Submagnal (JEDEC No. Bi 1-88)
Size of Housing	78mm (H) X 41mm (W) X 78mm (D)



2.5 APPROVALS

CE Regulations:	EN 300330	Equipment Type: III Class of Equipment: 2
	EN 50293	Performance Criteria B
Safety:	EN 60950	

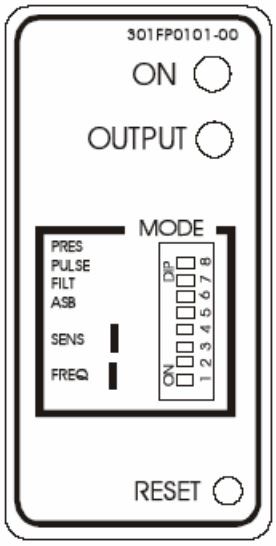
3 OPERATING PROCEDURES

3.1 Hardware Set-Up

The PD130 single channel parking detector is designed to be shelf or DIN rail mounted, with the controls and visual indicators at the front, and wiring at the rear of the enclosure.

The power, loop and relay outputs are all connected to the single 11-pin plug, which is mounted at the rear of the enclosure.

3.2 Switch Setting Selections



3.2.1 Frequency Switch

The frequency switches are the lower two switches, numbered 1 and 2. There are four frequency selections and are set out as follows:

SW2	SW1	
Off	Off	High
On	Off	Medium-High
Off	On	Medium-Low
On	On	Low

The frequency switches allow the operating frequency of the loop to be shifted higher or lower depending on the switch position. The frequency of the loop is determined by the loop size, and the frequency of the switch simply causes a frequency shift on the loop.

Where more than one detector is used, the detectors must be set-up to ensure that there is no cross talk (interference) between the detectors. This can be achieved by ensuring that the loops of the two 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. Loop inductance increases as loop size, number of turns in the loop and feeder length increases.

3.2.2 Sensitivity

The sensitivity of the detector allows the detector to be selective as to the change of inductance necessary to produce a detect. There are four sensitivity selections and are set as follows: -

SW4	SW3	
Off	Off	High
On	Off	Medium-High
Off	On	Medium-Low
On	On	Low

3.2.3 Automatic Sensitivity Boost

Automatic sensitivity boost is a mode which alters the undetect level of the detector. This mode is selected by switch No. 5 on the front of the enclosure and is as follows: -

SW5	
Off	Disabled
On	Enabled

Automatic sensitivity boost causes the sensitivity level to be boosted to a maximum on detection of a vehicle, irrespective of current sensitivity level and maintained at this level during the entire presence of the vehicle over the loop. When the vehicle leaves the loop and the detection is lost, the sensitivity level reverts to the pre-selected level.

3.2.4 Filter Mode

The filter mode is selected with the mode switch No. 6. The filter produces a delay turn-on time of two seconds when a vehicle occupies the loop. This is to enable small, unwanted objects to pass over the loop without being detected. The filter option may be used on any sensitivity setting and is selected as follows: -

SW6	
Off	Disabled
On	Enabled

3.2.5 Pulse Relay

The pulse relay may be made to operate on detect (entry) or on undetect (exit) of a vehicle. This option is selected with Switch No. 7 and is configured as follows: -

SW7	
Off	Pulse on Detect
On	Pulse on undetect

3.2.6 Presence Time

The presence time may be set to permanent presence or to limited presence. In permanent presence mode the detector will continuously compensate for all environmental changes whilst there is a vehicle present over the loop, The presence mode is set with switch No. 8 and is configured as follows: -

SW8	
Off	Limited Presence
On	Permanent Presence

3.2.7 Reset Switch

The detector automatically tunes to the inductive loop connected to it when the power is applied, whether on initial installation or after any break in power supply. Should it be necessary to retune the detector, as may be required after changing any of the switches or after moving the detector from one installation to another, momentary operation of the RESET switch will initiate the automatic tuning cycle.

3.3 FRONT PANEL INDICATOR

While the detector is tuning, the ON (Red) LED will glow. The OUTPUT LED (Green) will flash at a rate of 1 Hz. This is used to indicate the frequency of the loop to the user. Every flash of the Green LED is equivalent to 10kHz. It will stop when the operating frequency is reached. This operation is also performed whenever the reset button is depressed.

The ON (Red) LED will glow permanently to indicate that the unit is functional. The red LED also serves as an optical interface to the DU100 Diagnostic Unit.

If faults exist with the loop the green LED will come on and flash off at the rate of 2Hz indicating the fault. If the fault is self-healing, the detector will continue to operate but the LED will remain on, indicating to the user that a fault has occurred. The LED will go off for a moment during an undetect indicating this, thereafter returning on. This condition can be restored by removing the power or by depressing the reset button.

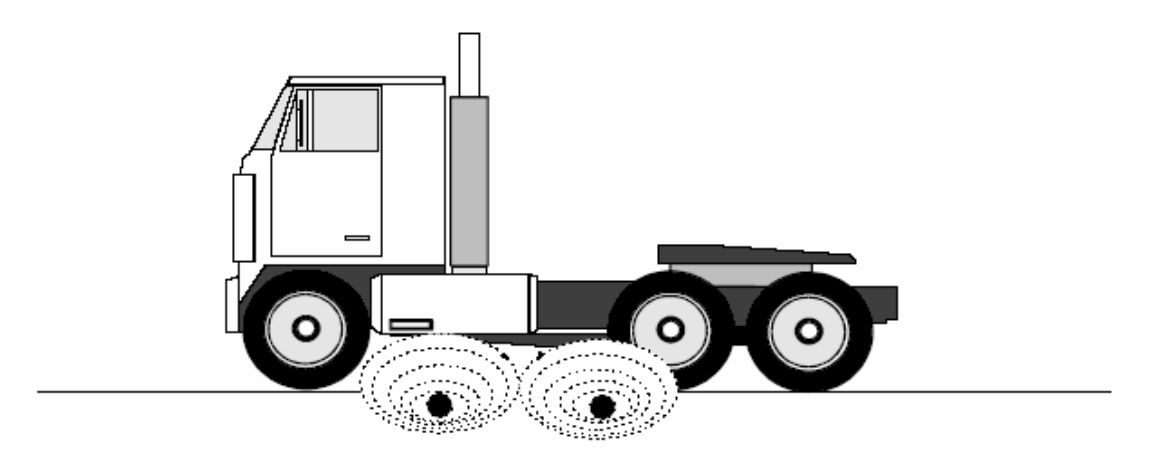
The green LED will also glow whenever a vehicle is detected passing over the inductive loop.

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 with an inductance in the range 20 to1500 microhenries (µH).

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 systems 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 sensitivity switches on the front of the enclosure.

Sensitivity levels of the PDI3O have been carefully optimised for parking and vehicle access control applications. The detection of small unwanted objects such as bicycles and trolleys can be eliminated by selecting lower sensitivity levels whilst high-bed vehicles and vehicle/trailer combinations will not loose detection by using **A**utomatic **S**ensitivity **B**oost (ASB) option.

ASB operates as follows. When ASB is disabled, the undetect level is dependent on the sensitivity setting of the detector. Hence as the detector is made less sensitive, the undetect level will reduce accordingly. When the ASB is enabled, the undetect level will always be the same irrespective of the sensitivity setting and will be equivalent to the undetect level when the sensitivity is on maximum setting.

4.3 Modes Of Operation

In the presence mode the detector will give a continuous output during the presence of a vehicle over the inductive loop. As the detector is designed with the permanent presence feature, the detector will indicate vehicle presence for an unlimited period of time. If the permanent presence is not selected, then the detect time will be dependent on the change of inductance. The presence time on the limited presence setting will be approximately 1 hour for 3%.ΔL/L.

The pulse relay outputs a pulse of 150 milliseconds duration. When set to “pulse on detect” the detector will give a pulse on detection of a vehicle. When set to “pulse on undetect” the detector will give a pulse output when the vehicle leaves the loop.

The presence output is known as a fail-safe output. This implies that in the event of a power failure the detector will give a detect output. The pulse outputs are not fail-safe and will not operate if a failure occurs.

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.

The response times of the PD130 have been adjusted to prevent false operation in electrically noisy environments, but retain adequate response to vehicles in parking and vehicle access control applications.

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 bearing the following constraints in mind, and strictly following the installation instructions. The detector must be installed in a convenient weatherproof location as close as possible to the loop.

5.1 Product Safety Requirements

The unit must be EARTHED.

Disconnect the power before working on the unit.

On 120 VAC and 230 VAC models a readily accessible disconnect device must be incorporated into the mains wiring (as per EN60950 Section 1.7.2).

On all models the power supply to the unit MUST have short circuit protection and over current protection installed at the power supply source (As per EN 60950 section 1.7.11) typically this will be a 5 Amp Magnetic Circuit Breaker for AC models and a fuse for DC models.

This product must be installed in an enclosure, as the IP rating of the detector is IP 30.

No user serviceable parts inside. Warranty void if cover removed.

Only use CE approved 11-pin relay bases such as Part No. RB1 or equivalent.

As an alternative to the 11-pin relay base, a 11-pin wiring harness, Part No. WH1, which can only be used in SELV voltage (less than 60 VDC or less than 42 VAC) applications.

5.2 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 phenomenon, known as crosstalk, can cause false detects and detector lock up.

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 electric 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 5.4.

The spacing between the loop and steel reinforcing should be greater than 150 mm although this is not always practically possible. The slot depth should be kept as shallow as possible, taking care that the feeder remains exposed after the sealing compound has been applied.

5.3 Loop And Feeder Specification

The loop and feeder should preferably constitute a single un-joined length of insulated multi-strand copper conductor, with a minimum 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.

5.4 Sensing Loop Geometry

NOTES: 1) The circumference of the loop must not exceed 30 metres.

2) The area of the loop must not exceed 30m^2 and must not be less than 1m^2.

3) The loop must be constructed as detailed below.

Sensing loops should, unless site conditions prohibit, be rectangular in shape and should normally be installed with the longest sides at right angle to the direction of traffic movement. These sides should ideally be 1 metre apart.

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, should have three turns or more. Loops having a circumference measurement of 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.

5.5 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 SLOT DEPTH: 30mm to 50mm

A slot must also be cut from the loop circumference at one corner of the loop, leading 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 is 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.

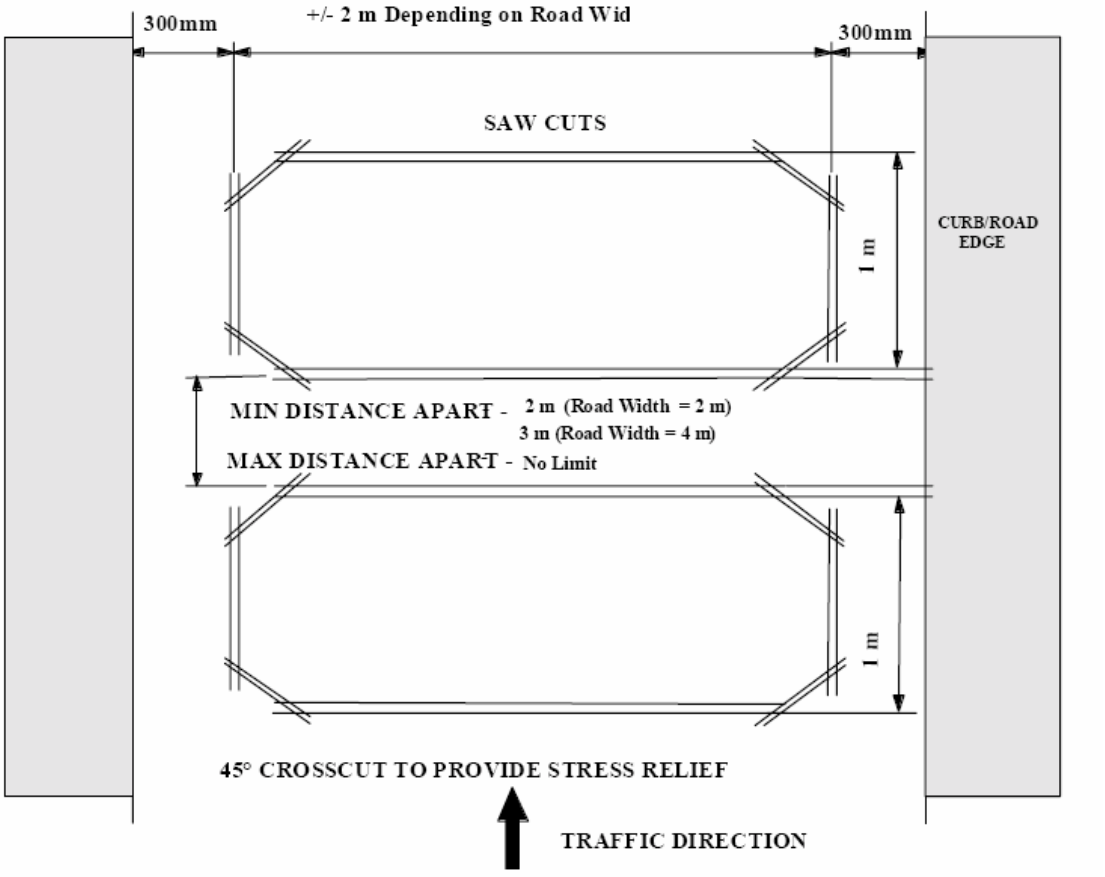


Figure 5.1 Adjacent loops connected to different detector modules

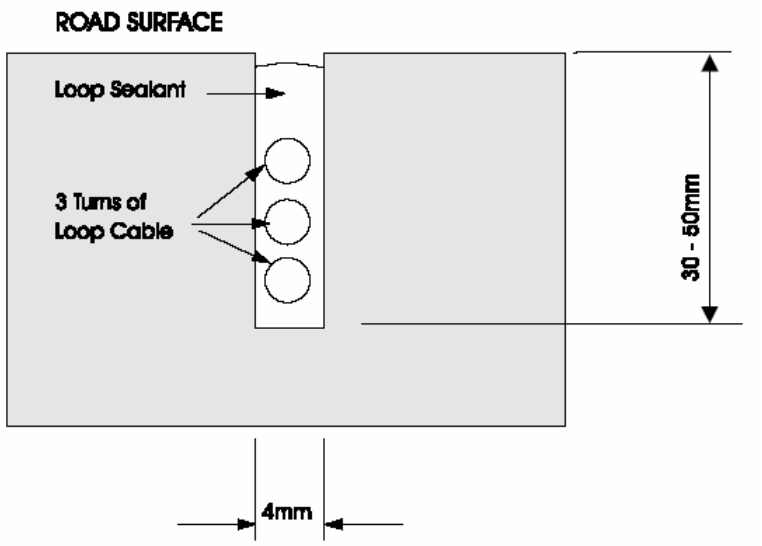


Figure 5.2 Slot Details

6 CONFIGURATION

The connector PIN assignments vary from model to model. Refer to the label on the side of the unit for connector PIN assignment.

NOTE 1: The tables below show the PIN assignments for standard PD130 models. On other models the pin assignments may change.

NOTE 2: All relay contact descriptions refer to the tuned and undetected state.

6.1 PD131 DETECTOR

11-pin connector wiring for PD13I DETECTOR

WH1 Wiring Harness Wire COLOUR	11 PIN Connector Pin No.	FUNCTION	
Red	1	Live	Power supply
Black	2	Neutral	120V 10% 50/60 Hz
Grey	3	Pulse Relay N/O	
Green	4	Earth	
Brown	5	Presence Relay NIO	
Yellow	6	Presence Relay Common	
Blue	7	Loop	Twist this Pair
White	8	Loop	
Violet	9	Pulse Relay Common	
Pink	10	Presence Relay N/C	
Orange	11	Pulse Relay N/C	

The wiring harness wire colour to PIN No. assignment only applies to wiring harness Part No. WH1

Other wiring harnesses will have different wire colour to PIN No. assignments.

6.2 PD132 DETECTOR

11-pin connector wiring for PD132 DETECTOR

WH1 Wiring Harness Wire COLOUR	11 PIN Connector Pin No.	FUNCTION	
Red	1	Live	Power supply 230V 10% 50/60 Hz
Black	2	Neutral	
Grey	3	Pulse Relay N/O	
Violet	4	Pulse Relay Common	
Yellow	5	Presence Relay NIO	
Brown	6	Presence Relay Common	
Blue	7	Loop	Twist this Pair
Blue	8	Loop	
Green/Yellow	9	Earth	
Pink	10	Presence Relay N/C	
White	11	Pulse Relay N/C	

The wiring harness wire colour to PIN No. assignment only applies to wiring harness Part No. WH1

Other wiring harnesses will have different wire colour to PIN No. assignments.

6.3 PD134 DETECTOR

11-pin connector wiring for PD134 DETECTOR

WH1 Wiring Harness Wire COLOUR	11 PIN Connector Pin No.	FUNCTION	
Red	1	Live	Power supply 12V –10% to 24V +10%
Black	2	Neutral	
Grey	3	Pulse Relay N/O	
Violet	4	Pulse Relay Common	
Yellow	5	Presence Relay NIO	
Brown	6	Presence Relay Common	
Blue	7	Loop	Twist this Pair
Blue	8	Loop	
Green/Yellow	9	Earth	
Pink	10	Presence Relay N/C	
White	11	Pulse Relay N/C	

The wiring harness wire colour to PIN No. assignment only applies to wiring harness Part No. WH1

Other wiring harnesses will have different wire colour to PIN No. assignments.

7 APPLICATIONS

The PD130 single channel detector can be used in a variety of applications in the parking and door/gate environments:

- To arm card readers and ticket dispensers.
- As a barrier/gate/door closing detector.
- As a barrier/gate/door opening detector (Free exit).
- To generate pulses for counting vehicles.

Some of the features that make the PD130 ideal for these purposes have been described in the preceding paragraphs.

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 the Green LED flashes (ON for 1 second and OFF for 1/2 second)	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. Re-cut as per installation instructions. Replace unit.
After tuning, the loop output LED flashes intermittently 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 correctly connected and adequately twisted.

8.2 DU100 Detector Diagnostic Unit

The DU Diagnostic unit is a hand-held test instrument that has been designed to operate with the PD130 detector to provide installation / service personnel with positive verification of the correct installation and operation of the vehicle detector.

The following parameters may be verified using this instrument:

1. Detector type and version
2. Loop status — Display of loop frequency and magnitude of current change of loop inductance %ΔL/L.
3. Frequency — Readout of the actual loop operating frequency and the magnitude of the frequency drift since the last re-tune
4. Sensitivity — Displays the Minimum and Maximum changes of Inductance %ΔL/L that caused a detect since the last re-tune.
5. Status — Displays the current status of the detector i.e. Undetect, Detect, Open circuit, Short circuit or Indeterminate.
6. Time — The time in days and hours since the last re-tune and the reason for the last re-tune i.e. Reset: manual or power failure, Loop short circuit, Loop open circuit, Indeterminate or an Inductance change of greater than 15% ΔL/L (typical)

   This historical information is invaluable for providing information about intermittent faults.

7. Crosstalk — Allows for the comparison of the operating frequencies of detector loops in close proximity to each other. If the operating frequencies are too close the DU100 test will indicate a failure.

It is highly recommended that after installation of a detector (or if the loop has been changed in any way) that the DU100 Diagnostics Unit is used to verify the correct operation of the detector. A record of the readings should be kept so that if there is a problem in the future a comparison can be made to identify what has changed. The form in Appendix A could be used to record these readings.

8.2.1 Interpretation of DU readings

8.2.1.1 Frequency

For the PD130 Detector the Minimum frequency is 12 kHz and the Maximum frequency is 85 kHz.

If a 20 µH loop is connected directly (no feeder cable) to the Detector and the Frequency switches are set to “High Frequency” the typical frequency would be 84 kHz.

If a 1500 µH loop is connected directly (no feeder cable) to the Detector and the Frequency switches are set to ‘Low Frequency” the typical frequency would be 13 kHz.

If the Frequency reading from the DU100 is close to the Minimum Frequency the inductance of the LOOP is too small - you need to add turns to the loop.

If the Frequency reading from the DU100 is close to the Maximum Frequency the inductance of the LOOP is too high and you need to remove turns from the loop.

If the detector is operating close to either limit it is possible that either the frequency drift caused by environmental changes or the shift in frequency caused by a large ΔL/L detect will cause the frequency to go outside the limits and cause a retune.

8.2.1.2 Frequency drift

The PD130 Detector can handle environmental conditions that causes the frequency to drift up to at a rate of approximating 1% ΔL/L per minute.

If the Drift reading approaches this value the detector will have problems tracking the environmental change.

If the drift is higher than say 0.5% ΔL/L per minute this will indicate a possible fault with the loop or feeder cable. Possibly the wire insulation has deteriorated and moisture is causing a short to earth or that wires of the loop are no longer encapsulated and are moving.

8.2.1.3 Sensitivity

For a standard loop of 1.0 metres by 2.0 metres with 2 turns (circumference less than 10 m) and a ten meter feeder cable the following table shows typical sensitivity values for different vehicle types:

VEHICLE TYPE	%ΔL/L
Metal Supermarket Trolley Bicycle	0.04
Motorbike	0.12
Articulated Truck	0.38
Four Wheel Drive	0.40
5 Ton Tip Truck	0.45
Motor Car	> 1.00
Forklift	> 1.00

8.2.1.4 Time

This is a powerful tool in identifying problems with an installation. The time since the last retune of the detector will let you know when the event occurred and the reason will inform you of what caused the event.

8.2.1.5 Cross talk

For information about resolving crosstalk refer to **"Loop Detector Theory"**

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-metallic 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:

The OUTPUT LED will light up

The PRESENCE output relay will operate

The PULSE relay will operate momentarily (approximately 150ms duration)

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

This device, together with the DU100 hand-held test instrument, will allow comprehensive analysis of the operating characteristics of the detector.

APPENDIX A —REQUEST FOR TECHNICAL SUPPORT FORM

For technical support please fill in the form below and send it to your supplier. It is recommended that you complete this form during installation as a record of the installation. If there is a problem later on you can identify what has changed.

For locating faults in “Inductive Loop Vehicle Detector” installations it is highly recommended that you use the DU DIAGNOSTICS UNIT. Please refer to the **“DU100 Training Presentation”** for details of how to operate the DU100.

Contact Details:

Your Name: _____ Your company: _____

Telephone No _____ Mobile No. _____

FAX No. _____

Postal address: _____

_____

_____

Product Model (i.e. PD134) _____

Product Serial Number: _____

Site Name: _____ Detector No. (at the site): _____

What are the settings of the switches on the front of the unit ON or OFF

Switch 1 _____ (FREQ Frequency)

Switch 2 _____ (FREQ Frequency)

Switch 3 _____ (SENS Sensitivity)

Switch 4 _____ (SENS Sensitivity)

Switch 5 _____ (ASB Automatic Sensitivity Boost)

Switch 6 _____ (FILT Filter)

Switch 7 _____ (PULSE Pulse on detect or un-detect)

Switch 8 _____ (PRES Presence Limited or Permanent)

What application is this unit used in (short description)

_____

_____

_____

_____

_____

POWER SUPPLY DETAILS:

Nominal Voltage: _____ V Minimum Voltage: _____ V Maximum Voltage: _____ V

AC or DC? _____ If AC then the Frequency _____ Hz

LOOP DETAILS

Size of loop: m by m Shape of loop: _____

Number of Turns:

Size of wire used (mm^2 or AWG) _____

Type of wire insulation and thickness of insulation:_____

How far below the surface is the loop: _____ mm

Are there any metal objects below the loop such as concrete reinforcing, water pipes, etc., if yes please give details:

Are there any power cables below the loop if yes please give details:

Are there any other loops in the area, if so how many? _____ and how close to this loop are they? _____ m

FEEDER CABLE DETAILS

Length of feeder cable_____m

Size of wire used (cross sectional area of copper mm^2 or AWG)_____

(should be 1.5 mm^2 or larger)

Type of wire insulation and thickness of insulation: _____(should be_____)

Type of feeder cable used (screened, armoured, multicore, etc.)

In the feeder cable how many twists per meter are there?_____

(should be more than 20 per metre)

Are there any other cables close to this feeder cable? If so please give details:

_____

_____

_____

FEEDER CABLE AND LOOP DETAILS

DC resistance of Feeder plus Loop: _____ ohms

Inductance of Feeder plus Loop: _____ Micro Henries

Loop and feeder resistance to earth (with detector unplugged) using a 500V Megger: _____ Ohms (should be greater than 10 Mega Ohms)

READINGS FROM DU100 DIAGNOSTICS UNIT

Frequency:_____kHz Loop Frequency Drift:_____%

If you do not have a DU100 when the detector tunes, how many times does the green LED flash?_____

Inductance Change for each type of vehicle that is encountered on this site. (Use the maximum sensitivity reading from the DU100 and reset the detector between each reading):

Bicycle: _____ % ΔL/L

Motorbike: _____ % ΔL/L

Car: _____ % ΔL/L

Articulated truck: _____ % ΔL/L

Four wheel drive: _____ % ΔL/L

5 Ton Tip Truck: _____ % ΔL/L

Forklift: _____ % ΔL/L

Other specify: type _____ Change _____ % ΔL/L.

Sensitivity M _____ % ΔL/L Max: _____ % ΔL/L

Status (Undetect, Detect. Open circuit, Short circuit or Indeterminate) _____

Time since last retune: _____ days _____ hours

Reason for Retune (Reset: manual or power failure, Short circuit, Open circuit. Indeterminate. Inductance change of greater than 5% ΔL/L (typical):

_____

Crosstalk (Pass/Fail) _____ If fail, actual frequencies of the two problem detector loops

Frequency 1: _____ kHz Frequency 2: _____ kHz