User Manual

Dual Loop Detector-LD01

Date: August 2020

Doc Version: 1.0

English

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About the Company

ZKTeco is one of the world's largest manufacturer of RFID and Biometric (Fingerprint, Facial, Finger-vein) readers. Product offerings include Access Control readers and panels, Near & Far-range Facial Recognition Cameras, Elevator/floor access controllers, Turnstiles, License Plate Recognition (LPR) gate controllers and Consumer products including battery-operated fingerprint and face-reader Door Locks. Our security solutions are multi-lingual and localized in over 18 different languages. At the ZKTeco state-of-the-art 700,000 square foot I5O9001-certified manufacturing facility, we control manufacturing, product design, component assembly, and logistics/shipping, ali under one roof.

The founders of ZKTeco have been determined for independent research and development of biometric verification procedures and the productization of biometric verification SDK, which was initially widely applied in PC security and identity authentication fields. With the continuous enhancement of the development and plenty of market applications, the team has gradually constructed an identity authentication ecosystem and smart security ecosystem, which are based on biometric verification techniques. With years of experience in the industrialization of biometric verifications, ZKTeco was officially established in 2007 and now has been one of the globally leading enterprises in the biometric verification industry awning various patents and being selected as the National High-tech Enterprise for 6 consecutive years. Its products are protected by intellectual property rights.

About the Manual

This manual introduces the operations of Dual Loop Detector-LOO1.

AII figures displayed are for illustration purposes only. Figures in this manual may not be exactly consistent with the actual products.

Document Conventions

Conventions used in this manual are listed below:

GUI Conventions

For Software

Convention	Description
Bold font	Used to identify software interface names e.g. **OK, Confirm, Cancel**
>	Multi-level menus are separated by these brackets. For example, File > Create > Folder.

For Device

Convention	Description
<>	Button or key names for devices. For example, press <OK>
[ ]	Window names, menu items, data table, and field names are inside square brackets. For example, pop up the [New User] window
/	Multi-level menus are separated by forwarding slashes. For example, [File/Create/Folder].

Symbols

Convention	Description
	This implies about the notice or pays attention to, in the manual
	The general information which helps in performing the operations faster
	The information which is significant
	Care taken to avoid danger or mistakes
	The statement or event that warns of something or that serves as a cautionary example.

Table of Contents

1 Installation Instructions

The LD01 is a dual channel microprocessor based detector designed specifically for parking and vehicle access control applications.The primary function of the detector is to detect vehicle presence by means of an inductance change caused by the vehicle passing overa wire loop buried under the road surface.

The various modes are selected by changing the position of switches on the front of the unit. The detector oscillator is multiplexed to eliminate any possibility of crosstalk between the loops connected to the detector. The switches allow for different loop frequency settings, sensitivity settings and modesettings.

The unit has a number of initial selectable options for configuration of the relay outputs.

The LD01 provides visual outputs (LED) on the front of the enclosure and relay change-over contacts at the 11 pin connector at the rear of the enclosure. The power LED indicates that the unit has been powered. The channel status LED's below indicate that a vehiele is present over the loop and when there is a fault on the loop. The Presence relays are normally fail-secure and will close on a vehicle detector loop failure but not ifthere is a powerfailure.

2 Technical Data

Items	Description
Tuning	Fully automatic
Self-tuning Range	50 to 1OOOμH
Sensitivity	Four step switch selectable
Frequency	Four step switch selectable Frequency dependent on loop size
Modes	Output relays operate in the Presence (fail-secure), Pulse or Direction logic modes
Presence Time	Switch selectable: Limited presence Permanent presence
Pulse Output Duration	500 millisecond options
Response Times	20 milliseconds
Visual Indication	1 x Power LED - Red 2 x Channel Status LED - Green
Relay Outputs	2 x Relays rated - 5A @ 230 VAC
Reset	Reset by push button on front of enclosure

Power Requirements	12 - 24V AC/DC ± 15% 120V AC ± 15% (50 to 60Hz) 230V AC ± 15% (50 to 60Hz)
Operating Temperature	-40℃ to +85℃
Mounting Position	Shelf or DIN rail mounting

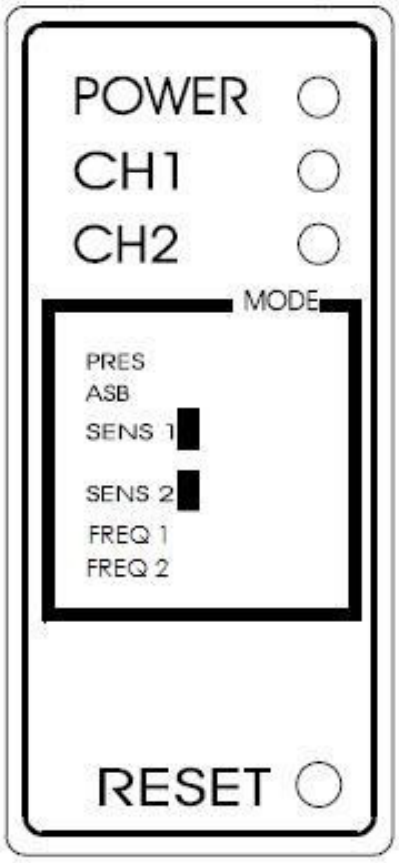
3 Switch Setting Selections

3.1 Frequency Switch

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

Loop2 Frequency: SW1 OFF – High, ON – Low

Loop1 Frequency: SW2 OFF – High, ON – Low



The frequency switches allow the loop frequency to be shifted higher or lower depending on the switch position. The frequency of the loopis 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 1~2 meters 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.

When the switch selection is altered, the frequency of the loop will changes and you must be reset the detector.

3.2 Sensitivity

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

CH1	**SW6**	**SWS**	
CH2	**SW4**	**SW3**	
	Off	Off	- Higher
	On	Off	-High
	Off	On	-Low
	On	On	- Lower

3.3 Automatic Sensitiviti Boost

Automatic sensitivity boost is a mode which alters the undetect level of the detector . This mode is selected by switch No. 7 on the front of the enclosure and is set as follows:

SW7	
Off	- Disabled
On	- Enabled

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

3.4 Presence Time

The presence time may be set to permanent presence orto limited presence. In permanent presence mode the detector will continuously compensate for all environmental changes whilst there is a vehicle present over the loop. In limited presence mode there will be a finite time that the detector will remain in detect. This time is dependent on the change of inductance that the vehicle caused. The presence mode is set with switch No. 8 and is set as follows:

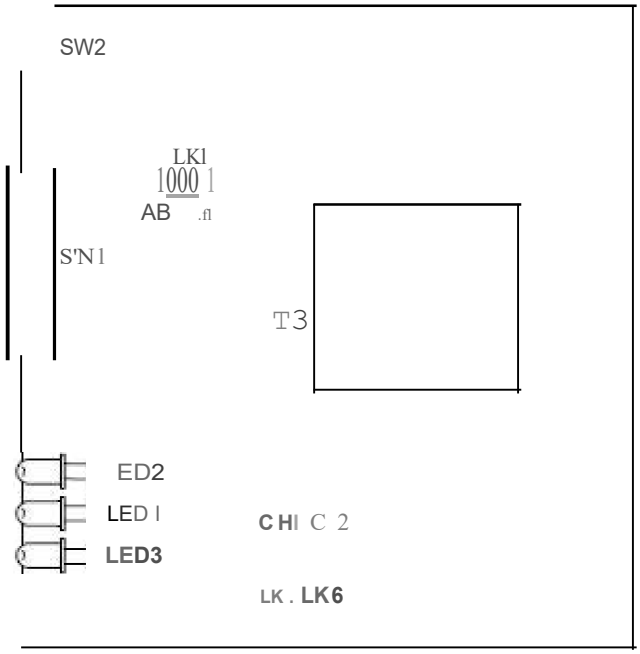
SW8	
Off	- Limited Presence
On	- Permanent Presence

3.5 Reset Switch

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

3.6 Internal Link Selection

There are 3 link positions located inside the LD01 which are used to alter the output relay configuration of the detector. The links have been placed inside the unit to avoid incorrect operation due to selection by an unauthorised operator.



LK1 (AB)	
	PRESENCE AB-LOGIC
mm	PU.SE A8-IOGfC:
	NO AB-

LK5 , LIK6 [C H I . C 2)	
	PULSE
	PRESENCE

4 Front Panel Indicator

While the detector is tuning, the Channel LEO will indicate the "mode" status of the detector.

1) Any Channel output operating in the presence or pulse modes will come on and extinguish when the system is tuned.
2) When the AB Logic mode is selected, the Channel LEOs will alternatively flash slow and extinguish when the system is tuned.

If a loop fault exists the Channel LEO will come on and flash indicating a fault. If the fault is self-healing the detector will continue to operate.

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

The Power LED at the top of the unit will remain on to indicate that the unit is powered.

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 clase as possible to the loop.

5.1 Operational Constraints

Crosstalk

When two loop configurations are in clase 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.

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 mínimum 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 5.3. The ideal mínimum 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 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 mínimum rating 1SA.

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 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 1O metres should be installed using two turns of wire, while loops of less than 1O metres in circumference, should have three turns or more. 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

AII permanent loop installations should be installed in the roadway by cutting slots with a masonary cutting disc or similar devise. A 45ºcrosscut 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 SLOTWIDTH: 4mm

NOMINAL SLOT DEPTH : 30mm TO 50mm

A slot must also be cut from the loop circumference at one comer 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 thefeeder 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.

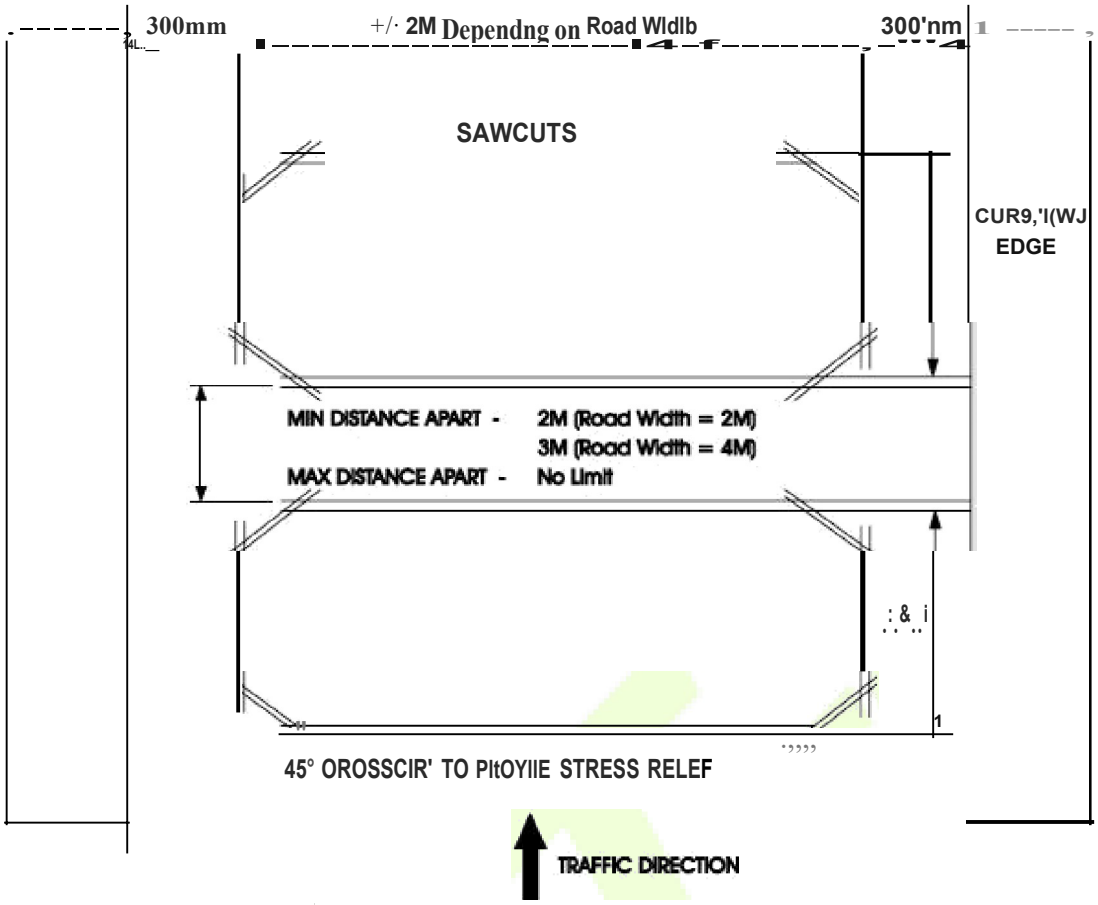


Figure 5.1 Adj,a cent loops connected to different detector modules

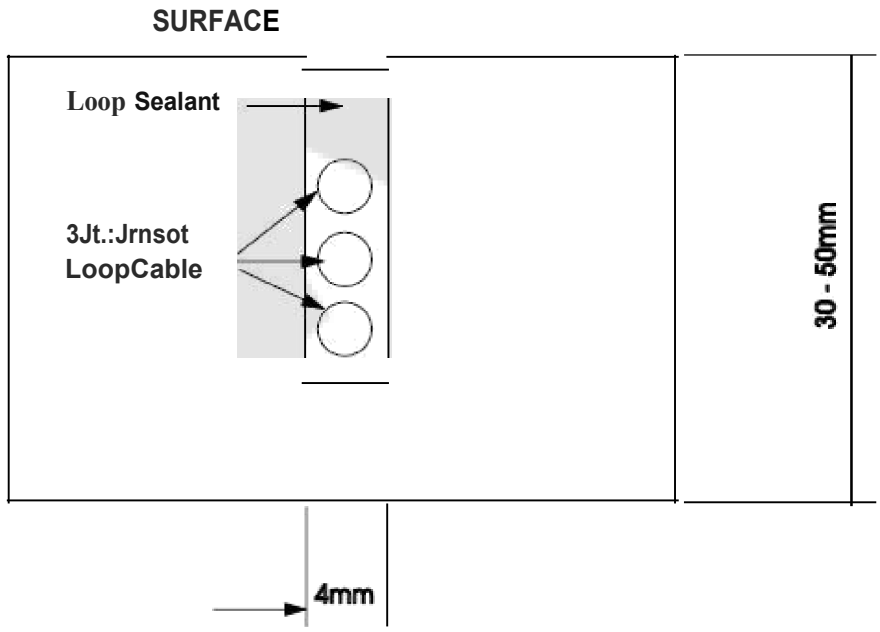


Figure 5.2 S]ot detail

6 Configuration

6.1 LD01 Detector Connector

PIN	DESIGNATION		
1	Live	}	12-24V input
2	Neutral		AC/DC
3	Channel2		Common
4	No Use		
5	Channel **1**		Common
6	Channel **1**		N/O
7	Channel **1**	}	loop Twist
8	Channel **1**		loop this pair
9	Channel2	}	loop Twist
10	Channel 2		loop this pair
11	Channel2		N/O

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