

Inductive Sensors Single Loop Detectors Type LD with teach-in spec. 3209

CARLO GAVAZZI



- Single loop detector
- Automatically adjustment of detection level
- Manual sensitivity for compensations of variations
- Easy installation via 11 pin circular plug
- Rated operational voltage: 24 VAC/DC, 115 VAC or 230 VAC
- Pulse or presence relay output
- Output 1A/250 VAC SPDT relay
- LED indication for power, relay status and loop fault
- Sensitivity boost
- Selectable frequency – prevents cross-talk

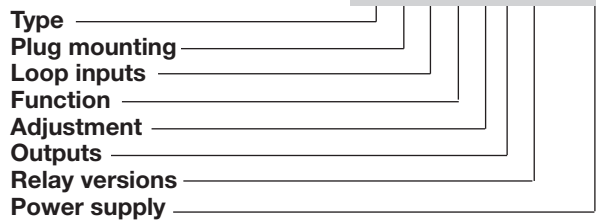
Product Description

Loop detectors for detection of vehicles. The vehicle loop detector is designed to handle all parking, drive-through and access control applications for controlling doors, gates, barriers or fences.

The principle is based on a change in the inductance within the loop when a metallic object (vehicles) is passing. The microprocessor evaluates the changes.

Ordering Key

LDP1 SA1 B 230



Type Selection

Mounting	Relay	Ordering no. Supply: 24 VAC/DC	Ordering no. Supply: 115 VAC	Ordering no. Supply: 230 VAC
Single loop	SPDT	LDP1SA1BM24 3209	LDP1SA1B1153209	LDP1SA1B2303209

Specifications

Rated operational voltage (U_B)			Frequency range	13 - 120 kHz
Pin 2 & 1	230	195 to 265 VAC, 45 to 65 Hz	Loop inductance	15 - 1500 µH
	115	98 to 132 VAC, 45 to 65 Hz	Operating frequency (f)	
	M24	19.2 to 28.8 VAC/DC	Relay output	1 HZ
Rated insulation voltage		<2.0 kVAC (rms)	Response time	400 mS
Rated impulse withstand voltage		4 kV (1.2/50 µs) (line/neutral)	Environment	
Rated operational power			Overtoltage category	III (IEC 60664)
AC supply		3 VA	Degree of protection	IP 20 /IEC 60529, 60947-1)
AC/DC supply		1.5 VA / 1.5 W	Pollution degree	2 (IEC 60664/60664A, 60947-1)
Delay on operate (t_v)		< 10 sec Typ. 4 sec	Temperature	
Outputs			Operating	-40° to +70°C (-40° to + 158°F)
Minimum switching current		10 mA @ 12 V	Storage	-50° to +85°C (-58° to +185°F)
Rated insulation voltage		250 VAC (rms) (cont./elec.)	Housing material	NORYL SE1, light grey
Relay Rating (AgNi 90/10)		µ (micro gap)	Weight	
Resistive loads	AC1	1 A / 250 VAC (250 VA)	AC supply	150 g
	DC1	1 A / 30 VDC (30 W)	AC/DC supply	85 g
Mechanical life (typical)		≥ 15 x 10 ⁶ operations	Approvals	UL508, CSA
		@ 18'000 imp/h	CE marking	Yes
Electrical life (typical)	AC1	> 250'000 operations		
Sensitivity		8 sensitivity settings available		



Mode of Operation

Application

The LDP Vehicle Loop Detector is based on micro-processor technology, which has enable a large number of functions to be implemented. The functions is primarily for use in the Parking/Access Control Industry like control for gates, barriers, fence,s etc. Standard operations is implemented including programmable pulse and presence option.

Principle

The Vehicle Loop Detector is based on the inductive principle, using a coil of wire buried in the driveway and connected to the loop detector.

The change in inductance will be measured as a change in frequency. The output relay activates, when the loop is activated and releases again when the loop returns to a non-activated condition.

Setup

The loop has to be in a passive condition (no object in the loop area) during start-up and adjustment. The loop detector will automatically calibrate when the reset button has been activated, which will be indicated by the yellow LED flashing. The functioning can now be checked by activating the loop with the actual object. Now the yellow LED will go on, and the output relay will be activated according to the dip-switch settings.

If the loop detector does not react, the sensitivity must be manual adjusted by means of the dip-switches. **Important:** reset the system after changing the Dip-switch settings.

Temperature compensation
The frequency will increase as a result of decreasing temperatures and vice versa. To compensate for this, or any other situation that courses slowly change in frequency, the LD auto tunes constantly. That means if the frequency changes slowly there will be no detection. The auto tune function compensates for both increasing or decreasing in frequency.

Fault detection
This function is useful if the cable disconnect. The alarm will be indicated via the red LED in front of the housing. This LED is constantly lighting when the loop is open or to large and flashing when a short circuit occurs or a loop is to small.

Sensitivity
8 sensitivity settings are available on the dip-switch-

es in front of the module, to allow flexibility in configuration and application (Compensation for variation in loop construction).

Reset switch
The reset switch enables the detector to be manually reset during commissioning and testing. The detector will re-tune the sensing loop and becoming ready for vehicle detection.

Relay output
The single loop detector has two SPDT relays – one for pulse output and one for presence output. Pulse output (one shot): It is possible to select the length of the output period to 0.2s or 1 second. The pulse output can be setup to activate on detection of a vehicle or when the vehicle leaves the loop. Presence output: The output will be activated as long as there is a vehicle parked in the loop. It will be possible to activate a filter (ON-delay of 2 seconds), which prevents a false detection from a small or fast moving object.

Pulse output mode
The relay activates only for a short periode when the vehicle enters or leaves the loop.

Permanent output mode
The relay will remain active as long as there is a vehicle parked in the loop.

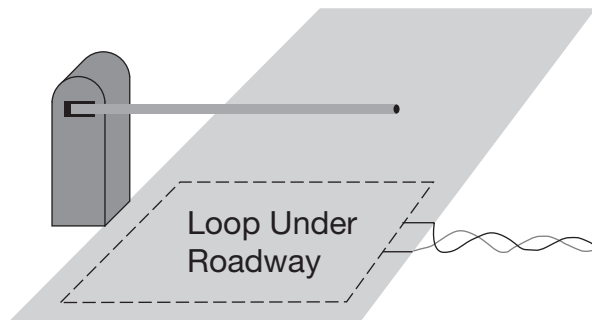
Pulse length
Extends the pulse length from 0.2 sec to 1 sec.

On-delay
Prevents false detections of small or fast moving objects.

Sense boost (only single channel loop detector)
This feature sets the undetected level to maximum sensitivity and is used to prevent loss of detection of high-bed vehicles.

Selectable frequency
The frequency of the loop is determined by the inductance of the loop and the frequency switch setting. If the frequency switch is on, the frequency is reduced. It may be necessary to change the frequency to prevent cross talk between adjacent loops.

Important: Be carefully when installing the detector next to another inductive load, as this can have an effect on the detector and cause false detections.



Operation Diagram

Description	Single Channel Detector	Comments
Sense adjust	Dip-switch 1,2,3	8 levels
Relay pulse output length	Dip-switch 4	0.2 or 1 second
Relay pulse output mode	Dip-switch 5	Entering or leaving vehicle
Relay output filter (on-delay)	Dip-switch 6	2 seconds
Sense boost	Dip-switch 7	
Change Frequency	Dip-switch 8	"Cross talk"
Pulse relays/presence relays		2 functions



Dip Switch Settings

- LDP1**
 → ON
- DIP switches
- 1 Sense Level Select - MSB
 - 2 Sense Level Select
 - 3 Sense Level Select - LSB
 - 4 Pulse length 1 sec.
 - 4 Pulse length 0.2 sec.
 - 5 Pulse mode leaving
 - 5 Pulse mode entering
 - 6 On delay off
 - 6 On delay 2 sec.
 - 7 Sense boost Off
 - 7 Sense boost On
 - 8 Change Frq. Off
 - 8 Change Frq. On
- On

Important:
 Reset the detector after changing the Dip-switch settings

Sensitivity adjustment

Sense Level	DIP1	DIP2	DIP3	Change in L (%)
0	OFF	OFF	OFF	0.01
1	OFF	OFF	ON	0.02
2	OFF	ON	OFF	0.05
3	OFF	ON	ON	0.1
4	ON	OFF	OFF	0.2
5	ON	OFF	ON	0.5
6	ON	ON	OFF	1.0
7	ON	ON	ON	2.0

Loop Diagram

Loop installation

The loop geometry must be adapted to the respective application. The setup will be optimal if the loop has the same size as the object to be detected.

After determining the loop geometry, a groove must be cut in the ground for installing the loop.

Cut an inclined groove of 45° angle at the corners of the loop, which will protect it from excessive wear.

Clean the groove for moisture and place the wire as tight as possible along the bottom of the groove.

Before sealing up the groove, it is recommendable to check the loop inductance using a measuring device. Optimum value: 80-300 µH.

When sealing up the groove, ensure that the temperature of the sealing compound does not exceed the max temperature of the loop insulation, as this might cause an earth fault.

Loop turns

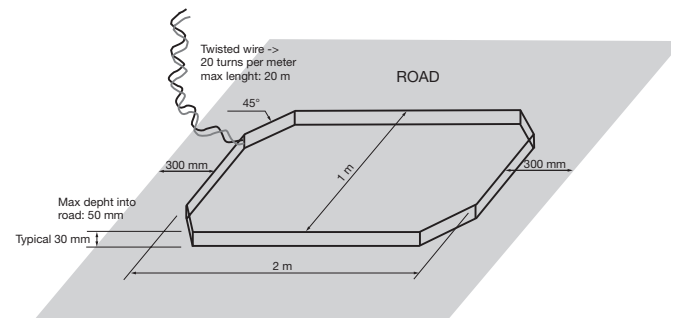
The number of turns strongly depends on the circumference of the loop. The smaller the loop, the more turns are required.

Cable Recommendations

- Use 1.5mm squared cable.
- Use silicon coated cable, if placed directly into the ground
- Use 2m of spacing between two adjacent loops.
- Use screened feeder cable in electrically noisy environments or where feeder runs parallel

to power cables.

Loop circumference (m)	No. of turns
>10	2
6-10	3
<6	4

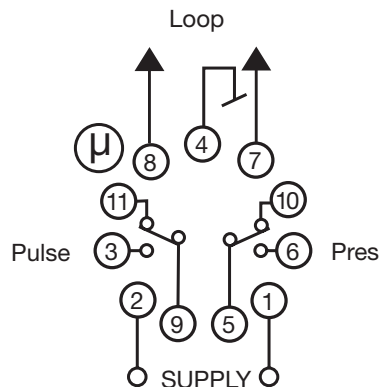




Pin configuration

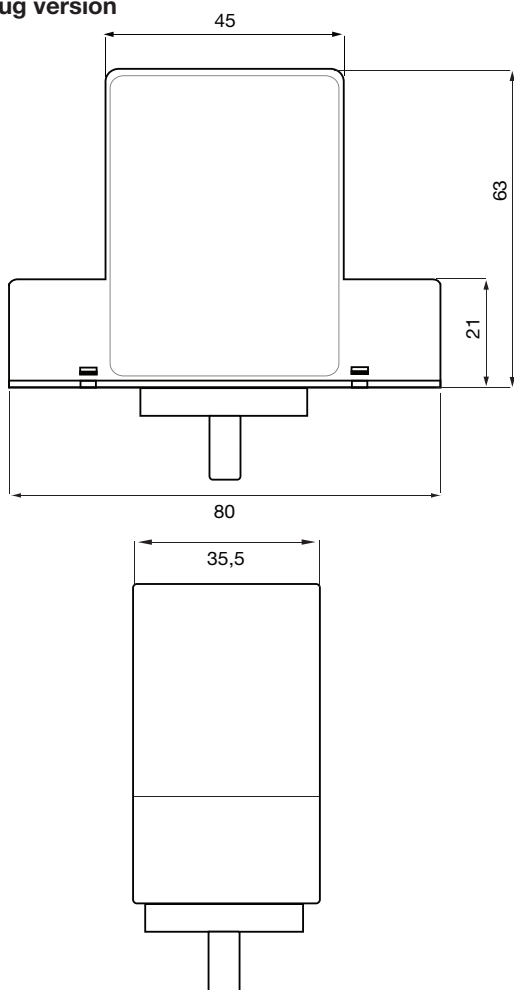
Pin n.	Single Channel Detector
1	Supply
2	Supply
3	Pulse relay NO
4	Earth
5	Presence relay COM
6	Presence relay NO
7	Loop
8	Loop
9	Pulse relay COM
10	Presence relay NC
11	Pulse relay NC

Wiring Diagram



Dimension Drawing

Plug version



Delivery Contents

- Detector
- Packaging: Carton box

Accessories

- 11 pole circular socket ZPD11