

Inductive Sensors

Single Loop Detector

Type LD with teach-in

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 – only LDP1
- Selectable frequency – prevents cross-talk

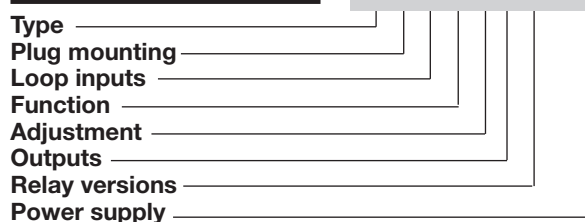
Product Description

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 230-4



Type Selection

| Mounting | Relay | Ordering no. Supply: 24 VAC/DC | Ordering no. Supply: 115 VAC | Ordering no. Supply: 230 VAC |
|-------------|-------|-----------------------------------|---------------------------------|---------------------------------|
| Single loop | SPDT | LDP1SA1BM24-4 | LDP1SA1B115-4 | LDP1SA1B230-4 |

Specifications

| | | | | |
|---|-------------------|--|--|--------------------------------|
| Rated operational voltage (U_B) Pin 2 & 9 | 230 115 M24 | 195 to 265 VAC, 45 to 65 Hz 98 to 132 VAC, 45 to 65 Hz 19.2 to 28.8 VAC/DC | Frequency range | 13 - 120 kHz |
| Rated insulation voltage | | <2.0 kVAC (rms) | Loop inductance | 15 - 1500 µH |
| Rated impulse withstand voltage | | 4 kV (1.2/50 µs) (line/neutral) | Operating frequency (f) Relay output | 1 HZ |
| Rated operational power | | | Response time | 400 mS |
| AC supply | | 3 VA | Environment | |
| AC/DC supply | | 1.5 VA / 1.5 W | Overvoltage category | III (IEC 60664) |
| Power on delay (t_v) | | < 10 sec Typ. 4 sec | Degree of protection | IP 20 /IEC 60529, 60947-1) |
| Outputs | | | Pollution degree | 2 (IEC 60664/60664A, 60947-1) |
| Minimum switching current | | 10 mA @ 12 V | Temperature | |
| Rated insulation voltage | | 250 VAC (rms) (cont./elec.) | Operating | -20° to +70°C (-4° to +158°F) |
| Relay Rating (AgNi 90/10) | | µ (micro gap) | Storage | -50° to +85°C (-58° to +185°F) |
| Resistive loads | AC1 | 1 A / 250 VAC (250 VA) | Housing material | NORYL SE1, light grey |
| | DC1 | 1 A / 30 VDC (30 W) | Weight | |
| Mechanical life (typical) | | ≥ 15 x 10 ⁶ operations @ 18'000 imp/h | AC supply | 150 g |
| Electrical life (typical) | AC1 | > 250'000 operations | AC/DC supply | 85 g |
| Sensitivity | | 8 sensitivity settings available | Approvals | UL508, CSA |
| | | | CE marking | Yes |



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 red 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

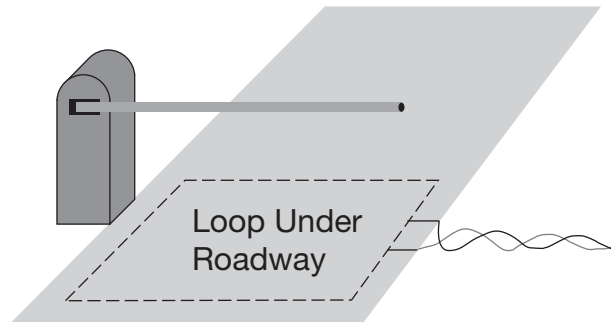
This feature sets the undetected level to maximum sensitivity and is used to prevent loss of detection of high-bed vehicles.

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.

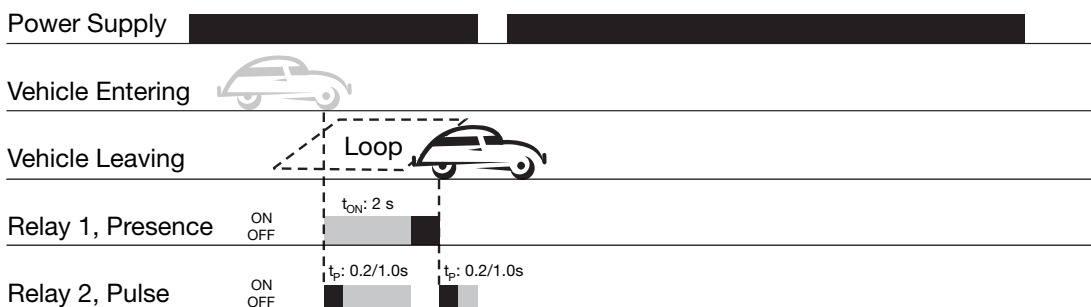
The frequency function will only change the frequency of one channel of the dual loop detector.

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

LDP1 / Presence and Pulse mode



Dip Switch Settings

Sensitivity

Minimum Maximum

| | | | | | | | |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> | 1 <input type="checkbox"/> |
| 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> | 2 <input type="checkbox"/> |
| 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> | 3 <input type="checkbox"/> |

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

LDP1-4

| | | | | |
|----------------------------|---------|----------------------------|----------|-----------------------------|
| 4 <input type="checkbox"/> | 1 sec | 4 <input type="checkbox"/> | 0.2 sec | Pulse length |
| 5 <input type="checkbox"/> | Leaving | 5 <input type="checkbox"/> | Entering | Pulse mode |
| 6 <input type="checkbox"/> | Off | 6 <input type="checkbox"/> | 2 sec | On delay |
| 7 <input type="checkbox"/> | Off | 7 <input type="checkbox"/> | On | Sensitivity boost |
| 8 <input type="checkbox"/> | A | 8 <input type="checkbox"/> | B | Loop frequency "Cross talk" |

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

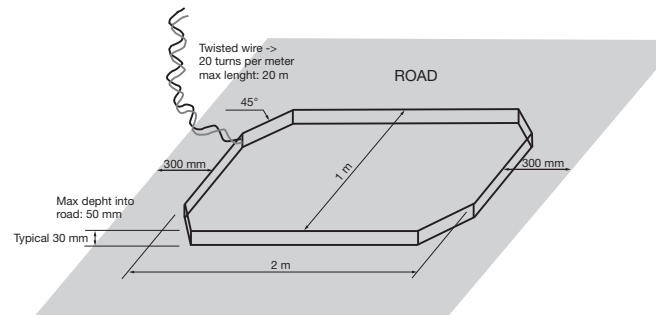
The number of turns strongly depends on the circumference of the loop. The smaller the loop, the more turns are required.

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.

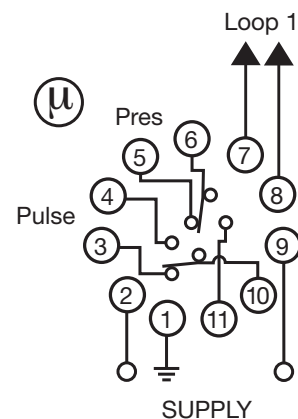
| Loop circumference (m) | No. of turns |
|------------------------|--------------|
| >10 | 2 |
| 6-10 | 3 |
| <6 | 4 |



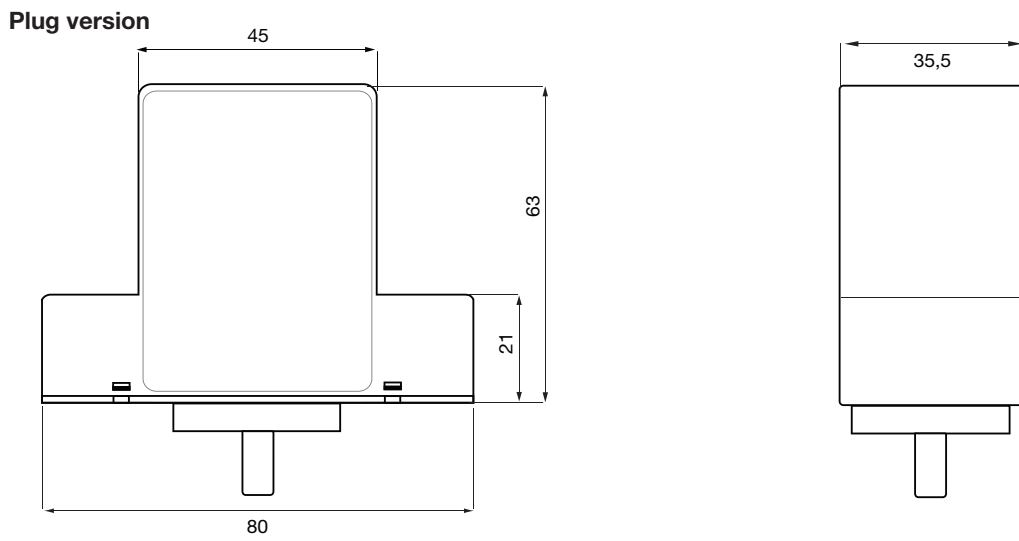
Pin configuration

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

Wiring Diagram



Dimension Drawing



Accessories

- 11 pole corcular socket ZPD11

Delivery Contents

- Detector
- Packaging: Carton box