Inductive Sensors
Single or Dual Loop Detectors
Type LD with teach-in

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.

Type Selection

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Single loop</td>
<td>SPDT</td>
<td>LDP1SA1BM24</td>
<td>LDP1SA1B115</td>
<td>LDP1SA1B230</td>
</tr>
<tr>
<td>Dual loop</td>
<td>SPST</td>
<td>LDP2TA2BM24</td>
<td>LDP2TA2B115</td>
<td>LDP2TA2B230</td>
</tr>
</tbody>
</table>

Specifications

- Single or Dual 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
- Direction logic – only LDP2

Ordering Key

- Type
- Plug mounting
- Loop inputs
- Function
- Adjustment
- Outputs
- Relay versions
- Power supply

Frequency range 13 - 120 kHz
Loop inductance 15 - 1500 µH
Operating frequency (f) Relay output 1 HZ
Response time 400 ms

Environment
- Overvoltage category III (IEC 60664)
- Degree of protection IP 20 (IEC 60529, 60947-1)
- Pollution degree 2 (IEC 60664/60664A, 60947-1)

Temperature
- Operating -40º to +70ºC (-40º to + 158ºF)
- Storage -50º to +85ºC (-58º to +185ºF)

Housing material NORYL SE1, light grey

Weight
- AC supply 150 g
- AC/DC supply 85 g

Approvals
UL508, CSA

CE marking Yes

Specifications are subject to change without notice (10.07.2009)
Mode of Operation

Application
The LDP Vehicle Loop Detector is based on microprocessor technology, which has enabled a large number of functions to be implemented. The functions are primarily for use in the Parking/Access Control Industry like control for gates, barriers, fences, etc. Standard operations are 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 startup 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 manually 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 causes 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 too large and flashing when a short circuit occurs or a loop is too small.

Sensitivity
8 sensitivity settings are available on the dip-switches 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 become ready for vehicle detection.

Relay output
The single loop detector has two SPDT relays – one for presence output and one for pulse output. The dual loop detector has two SPST relays – one for presence output and one for pulse output. The single loop detector has two SPDT relays – one for presence output and one for pulse output.

Pulse output (one shot):
Each loop.

Pulse output (one shot):
The pulse output can be setup to activate on detection of a vehicle or when the vehicle leaves the loop. 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. The pulse 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 period 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. The frequency function will only change the frequency of one channel of the dual loop detector. Important: Be careful when installing the detector next to another inductive load, as this can have an effect on the detector and cause false detections.
LDP2 / Direction Logic Mode

Power Supply

Vehicle Passing, 1 to 2

Vehicle Passing, 2 to 1

Relay 1, Pulse

Relay 2, Pulse

Loop 1 Loop 2

ON OFF

ON OFF

tP: 0.2/1.0s tON: 2 s

tP: 0.2/1.0s tON: 2 s

LDP2 / Presence Mode

Power Supply

Vehicle Passing

Relay 1, Presence

Relay 2, Presence

Loop 1 Loop 2

ON OFF

ON OFF

tON: 2 s

tON: 2 s

LDP2 / Pulse Entering

Power Supply

Vehicle Entering

Relay 1, Pulse

Relay 2, Pulse

Loop 1 Loop 2

ON OFF

ON OFF

tP: 0.2/1.0s tON: 2 s

tP: 0.2/1.0s tON: 2 s

LDP2 / Pulse Leaving

Power Supply

Vehicle Leaving

Relay 1, Pulse

Relay 2, Pulse

Loop 1 Loop 2

ON OFF

ON OFF

tP: 0.2/1.0s tON: 2 s

tP: 0.2/1.0s tON: 2 s
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 button 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.

<table>
<thead>
<tr>
<th>Loop circumference (m)</th>
<th>No. of turns</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;10</td>
<td>2</td>
</tr>
<tr>
<td>6-10</td>
<td>3</td>
</tr>
<tr>
<td>&lt;6</td>
<td>4</td>
</tr>
</tbody>
</table>

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.

If a vehicle is detected, and the corresponding direction is indicated, both loops must be in a non-activated condition again before the next object can be detected.

**For Direction logic mode**
set Dipswitch 5 to “Entering” and Dipswitch 7 to “Presence”.

**Dip Switch Settings**

<table>
<thead>
<tr>
<th>Minimum</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**Direction logic**

**Function**
The Dual loop detector (LDP2) is implemented with direction logic as standard. The function enables the detector to give a pulse output on relay#1 for a vehicle travelling from loop 1 to loop 2 and a pulse output on relay#2 for a vehicle travelling from loop 2 to loop 1.

If a vehicle is detected, and the corresponding direction is indicated, both loops must be in a non-activated condition again before the next object can be detected.

**For Direction logic mode**
set Dipswitch 5 to “Entering” and Dipswitch 7 to “Presence”.

**Relay 1**

**Loop 1**

**Loop 2**

**Direction**

**Relay 2**

**Loop frequency “Cross talk”**

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

**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 button 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.**
**Dimension Drawing**

Plug version

**Wiring Diagram**

**LDP1**

**LDP2**

**Pin configuration**

<table>
<thead>
<tr>
<th>Pin n.</th>
<th>Single Channel Detector</th>
<th>Dual Channel Detector</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Supply</td>
<td>Supply</td>
</tr>
<tr>
<td>2</td>
<td>Supply</td>
<td>Supply</td>
</tr>
<tr>
<td>3</td>
<td>Pulse relay NO</td>
<td>NO Loop #1</td>
</tr>
<tr>
<td>4</td>
<td>Pulse relay COM</td>
<td>Loop #1</td>
</tr>
<tr>
<td>5</td>
<td>Presence relay NO</td>
<td>Loop #2</td>
</tr>
<tr>
<td>6</td>
<td>Presence relay COM</td>
<td>Loop #2</td>
</tr>
<tr>
<td>7</td>
<td>Loop</td>
<td>Pulse/Presence relay #2 NO</td>
</tr>
<tr>
<td>8</td>
<td>Loop</td>
<td>Pulse/Presence relay #2 COM</td>
</tr>
<tr>
<td>9</td>
<td>Earth</td>
<td>Earth</td>
</tr>
<tr>
<td>10</td>
<td>Presence relay NC</td>
<td>Pulse/Presence relay #1 NO</td>
</tr>
<tr>
<td>11</td>
<td>Pulse relay NC</td>
<td>Pulse/Presence relay #1 COM</td>
</tr>
</tbody>
</table>

**Accessories**

- 11-pole circular socket ZPD11

**Delivery Contents**

- Detector
- Packaging: Carton box

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