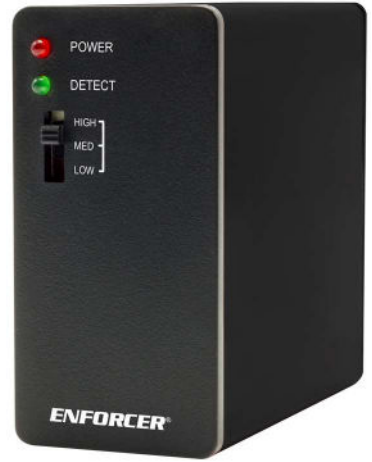


Loop Detector

LD-1123-PAQ

Installation Manual



The LD-1123-PAQ Loop Detector is designed to be used with gates or other vehicle detection systems. The LD-1123-PAQ is connected to an input loop which is buried in the pavement. If a vehicle is over the input loop, the detector sends a signal to perform such actions as opening a gate, holding a gate open, or indicating that a vehicle is in a bay.

- Single loop input
- 3 Adjustable sensitivity settings
- 2 Form "C" relay outputs
- 11-pin connector
- ABS plastic housing
- Power-on automatic reset
- Automatic drift compensation for varying environmental conditions
- Auto fault detection
- Terminal block included

Parts List

1x Loop Detector

1x Terminal Block

1x Manual

Specifications

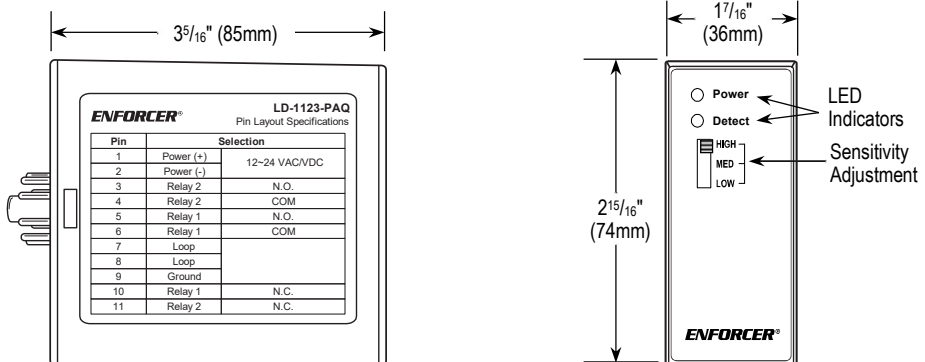
Operating voltage		12~24 VAC/VDC
Current draw	Standby	40mA@12VDC / 40mA@24VDC
	Active	50mA@12VDC / 60mA@24VDC
Sensitivity		High, Med, Low
Reaction time		100ms
Output relay		Pulses relay #1 or #2 (default) on entry; selectable via DIP Switch #1*
Presence time		Permanent (default) or 5min†; selectable via DIP Switch #2*
Delay time on exit		No delay (default) or 2.5s; selectable via DIP Switch #3*
Loop frequency		20kHz or 170kHz (default); selectable via DIP Switch #4*
Loop induction range		80~300 μH
Fault output		Relay #2‡ is continually energized and the green LED stays on
Pulse output time		200ms
LEDs	Red	Power indicator
	Green	Status indicator (vehicle detected or fault)
Input/output protection		Built-in surge and transient protection
IP Rating		IP54
Case material		Black ABS plastic
Operating humidity		Up to 95% without condensation
Operating temperature		-40°~149° F (-40°~65° C)
Dimensions		2 ¹⁵ / ₁₆ "x1 ⁷ / ₁₆ "x3 ⁵ / ₁₆ " (74x36x85 mm)
Weight		7.2-oz (203g)

*See *DIP Switch Settings*, pgs. 3-4.

†5min presence output setting should only be selected if a secondary safety device is in use.

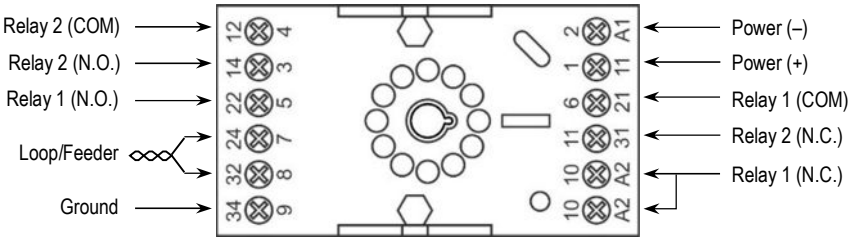
‡Depending on settings, see *DIP Switch Settings*, pgs. 3-4.

Overview



Terminal Block and Connections

Remove the terminal block from the loop detector to access the terminal screws.



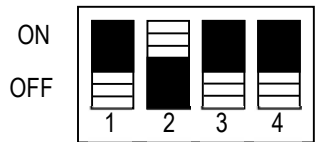
DIP Switch Settings

The DIP switch is located behind the faceplate. To remove the faceplate, insert a flathead screwdriver between the faceplate and loop detector body and twist to pop off the faceplate. The catches are located at the top and bottom of the faceplate.

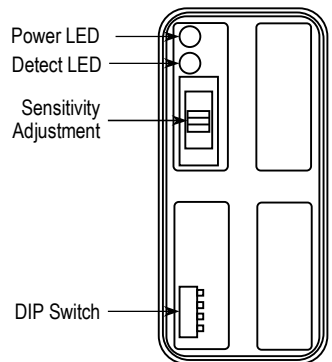
DIP Switch Functions

- Output relay:** Sets the presence relay and pulse/fault relay.
 - If DIP Switch #1 is OFF (default), then relay #1 is the presence relay and relay #2 is the pulse/fault relay.
 - If DIP Switch #1 is ON, then the relay operation is swapped.
- Presence time:** Sets the presence relay energized time.
 - If DIP Switch #2 is OFF, then the presence relay will automatically de-energize 5 minutes after the vehicle presence is detected.*
 - If DIP Switch #2 is ON (default), then the presence relay will remain energized as long as a vehicle presence is detected.
- Delay time on exit:** Sets the presence relay de-energize operation.
 - If DIP Switch #3 is OFF (default), then the presence relay will de-energize immediately upon vehicle exit.
 - If DIP Switch #3 is ON, then the presence relay will de-energize after a 2.5 second delay.

Default DIP Switch Positions



LD-1123-PAQ (faceplate removed)



*The limited 5-minute presence output setting should only be selected if a secondary safety device is also in use.

DIP Switch Settings (continued)

4. **Loop frequency:** Sets the loop frequency. Prevents crosstalk if two loops are buried close to each other.
- If DIP Switch #4 is OFF (default), then the loop frequency is set to high (170kHz).
 - If DIP Switch #4 is ON, then the loop frequency is set to low (20kHz).

DIP Switch Settings

#	1	2	3	4
	Output relay	Presence time	Delay time on exit	Loop frequency
ON	Relay #1 pulse, relay #2 presence	Permanent presence (default)	2.5 Second delay	Low, 20kHz
OFF	Relay #1 presence, relay #2 pulse (default)	Limited presence* (5min)	No delay (default)	High, 170kHz (default)

*The limited 5-minute presence output setting should only be selected if a secondary safety device is also in use.

Possible Relay Outputs[†]

Status	Relay #1	Relay #2 (entry pulse)	Relay #2 (fault output)
No vehicle detected	De-energized	De-energized	De-energized
Vehicle enters loop range	Energized	200ms pulse	De-energized
Vehicle presence in loop	Energized	De-energized	De-energized
Vehicle exits loop range	De-energized	De-energized	De-energized
Fault in loop circuit	De-energized	De-energized	Energized

[†]The relay operations shown are based on DIP Switch #1 being set to OFF (default). If DIP Switch #1 is set to ON, then the relay operation is swapped.

LED Indicators

The loop detector has two LEDs:

- Red indicates power.
- Green indicates the current status (after power-up self-test, depending on settings).
 - Detection status
 - Off – No vehicle detected.
 - On – Vehicle detected.
 - Flashing slowly – Detector calibrating.
 - Fault warning
 - Flashing quickly – Loop fault (no loop detected, loop short circuit, loop inductance exceeds permitted range).

Installation Notes

Loop and Feeder

- The induction loop and feeder cable (not included) should be insulated multi-strand copper conductor with a minimum of $1/16$ sq. inch (1.5mm²) cross-sectional area (#18 AWG or larger) made of a single un-spliced length of cable from the detector, around the loops, and back to the detector.
- Loop or feeder splicing is not recommended. Make sure that the cable is long enough to also account for the twisting of the feeder. Where this is not possible, splices should be soldered and terminated in a waterproof junction box.
- The loop length will be determined by the width of the roadway to be monitored. In general, loops with a circumference in excess of 32 feet (10m) should have 3 turns of the loop cable or more. Loops with a circumference of less than 20 feet (6m) should have 4 turns.
- Use 1~2-inch sections of backer rod sized to fit snugly in the slot and placed above the cable every 1~2 feet to keep the cable at the bottom of the slot to provide for maximum protection.

Metal Reinforcement

- The existence of metal reinforcement such as steel rebar below the road surface could change the loop inductance. In such a case, add an additional two turns to the loop.
- "Feeder" refers to the portion of the cable between the loop and the loop detector. The feeder wires should be twisted together at least 6 times per foot (20 times per meter).

Crosstalk

When two loops are in close proximity, the magnetic field of one may overlap and disturb the field of the other. This phenomenon, known as crosstalk, can cause false detection and detector lockup.

To eliminate crosstalk:

1. Keep a minimum spacing of 40 inches (1m) between adjacent loops.
2. Carefully screen feeder cables. If they are routed together with other electric cables, the end of the feeder cable connected to the detector must be grounded to earth.
3. Adjust the loop frequencies via DIP Switch #4 (see *DIP Switch Settings*, pgs. 3~4).

Detector mounting

The detector should be mounted in a protected location that is near the loop and easily accessible for troubleshooting. Ideally, a technician should be able to see the loop from the detector location. The feeder cable length should not exceed 16 feet (5m).

Sensitivity Adjustment

Three levels of sensitivity can be set by the slide switch located on the front face of the unit:

- **High** – High sensitivity
- **Med** – Medium sensitivity
- **Low** – Low sensitivity

Loop Installation

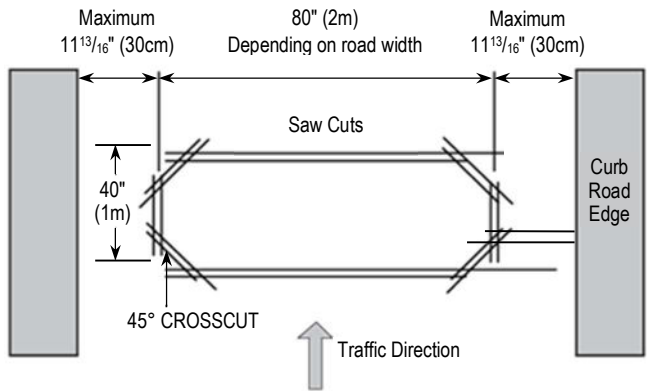
The inductive loop should be installed under the surface of the road. The loop should be at least 4 feet (1.2m) from the path of any gate or other large metal object to avoid interference. Cut slots in the road with a masonry cutting disc or similar device. Make a 45° crosscut 8~12 inches (20~30 cm) from the corners of the loop to reduce the chance of damage to the loop that could happen with right angle corners.

- Nominal slot width: $\frac{3}{16}$ " (4mm), wide enough so that the loop fits easily with some gap for the sealant to fully enclose the loops.
- Nominal slot depth: $\frac{13}{16}$ "~ $1\frac{15}{16}$ " (30~50 mm).

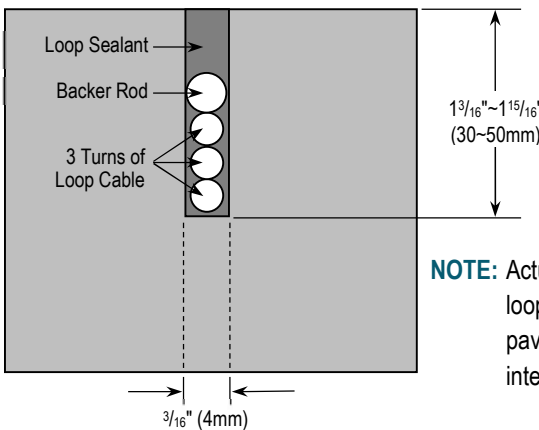
Cut a slot at one corner of the loop to the roadway edge for the loop feeder cable. Clean all debris from each cut with compressed air and check for any sharp edges to avoid damage to the loop. Seal the loops using quick-set black epoxy compound or hot bitumen mastic (adhesive) to blend with the roadway surface.

NOTE WHEN TWO OR MORE INDUCTIVE LOOPS ARE MOUNTED ADJACENT TO EACH OTHER:

- When the road width is 80" (2m), the minimum distance between loops should be 40" (1m).
- When the road width is 160" (4m), the minimum distance between loops should be 40" (1m).



Road Surface



NOTE: Actual depth depends on number of loops. Depth may be less in concrete pavement to reduce potential for interference from rebar.

Wire Harness

The wiring harness LD-ACC-WH (not included) is also available in place of the terminal block.

The wiring harness connections are shown below.



LD-ACC-WH Shown

Wiring Harness Connections

Item	Color	Pin No.	Connection Notes
Wire 1	Black	Pin 1	Power (+)
Wire 2	White	Pin 2	Power (-)
Wire 3	Red	Pin 3	Relay 2 — N.O.
Wire 4	Purple	Pin 4	Relay 2 — COM
Wire 5	Blue	Pin 5	Relay 1 — N.O.
Wire 6	Yellow	Pin 6	Relay 1 — COM
Wire 7	Brown	Pin 7	Loop
Wire 8	Grey	Pin 8	Loop
Wire 9	Green with yellow	Pin 9	Ground
Wire 10	Pink	Pin 10	Relay 1 — N.C.
Wire 11	Green	Pin 11	Relay 2 — N.C.

Troubleshooting

Sensor does not detect the vehicle	<ul style="list-style-type: none">• Make sure that the unit is powered up (red LED is lit) and has completed the initial self-test.• Adjust the sensitivity setting.• Check for fault in the loop or loose connection to detector.
Sensor's green LED lights when vehicle is detected, but there is no output	<ul style="list-style-type: none">• Check wiring between the sensor and device to be triggered.
Detector continues to detect even after a vehicle leaves the loop	<ul style="list-style-type: none">• Check for fault in the loop or loose connection to detector.
Detector sometimes detects even when there is no vehicle over the loop	<ul style="list-style-type: none">• Check for faults in the loop or loose connection to detector.• Check for crosstalk between adjacent loops – adjust frequency.• Check whether the loop is being triggered by other metallic objects nearby – gates, metal doors, pavement reinforcement.• Loop may not be securely installed in pavement to prevent movement or moisture intrusion
Green LED flashes quickly	<ul style="list-style-type: none">• Check for loop short circuit.• Check for loose connection between the loop and detector.• Ensure loop inductance does not exceed permitted range.

IMPORTANT: Users and installers of this product are responsible for ensuring that the installation and configuration of this product complies with all national, state, and local laws and codes. SECO-LARM will not be held responsible for the use of this product in violation of any current laws or codes.

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