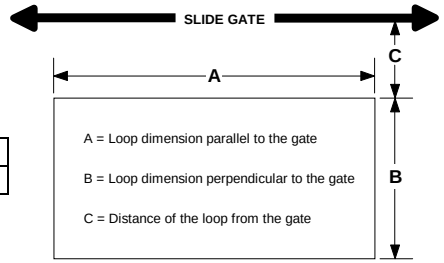
Loop Installation

The vehicle detection characteristics of the inductive loop detector are greatly influenced by the loop size and proximity to moving metal objects such as gates. Vehicles such as small motorcycles and high-bed trucks can be reliably detected if the proper size loop is selected. If the loop is placed too close to a moving metal gate, the detector may detect the gate. The diagram below is intended as a reference for the dimensions that will influence the detection characteristics.



General Rules

1. The detection height for a loop is 2/3rds the shortest leg (A or B) of the loop. Example: Short leg = 6' then Height = 4'.
2. As leg A is made longer, distance C will need to increase.

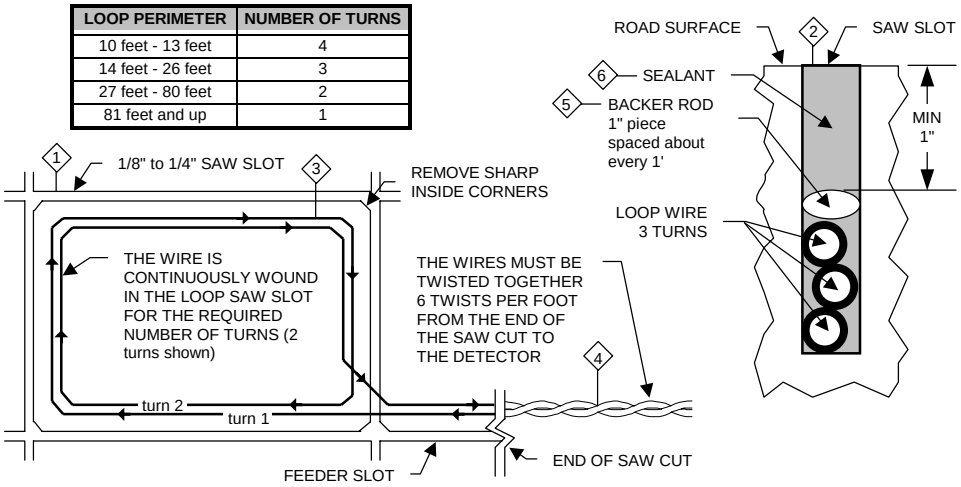
A =	6 ft	9 ft	12 ft	15 ft	18 ft	21 ft
C =	3 ft	4 ft	4.5 ft	5 ft	5.5 ft	6 ft

3. For reliable detection of small motorcycles, legs A and B should not exceed 6 feet.

Loop Installation - Saw Cut Type

1. Mark the loop layout on the pavement. Remove sharp inside corners that can damage the loop wire insulation.
2. Set the saw to cut to a depth (typically 2" to 2.5") that insures a minimum of 1" from the top of the wire to pavement surface. The saw cut width should be larger than the wire diameter to avoid damage to the wire insulation when placed in the saw slot. Cut the loop and feeder slots. Remove all debris from the saw slot with compressed air. Check that the bottom of the slot is smooth.
3. It is highly recommended that a continuous length of wire be used to form the loop and feeder to the detector. Loop wire is typically 14, 16, 18, or 20 AWG with cross-linked polyethylene insulation. Use a wood stick or roller to insert the wire to the bottom of the saw slot (do not use sharp objects). Wrap the wire in the loop saw slot until the desired number of turns is reached. Each turn of wire must lay flat on top of the previous turn.
4. The wire must be twisted together a minimum of 6 twists per foot from the end of the saw slot to the detector.
5. The wire must be held firmly in the slot with 1" pieces of backer rod every 1 to 2 feet. This prevents the wire from floating when the loop sealant is applied.
6. Apply the sealant. The sealant selected should have good adhering properties with similar contraction and expansion characteristics to that of the pavement material.

LOOP PERIMETER	NUMBER OF TURNS
10 feet - 13 feet	4
14 feet - 26 feet	3
27 feet - 80 feet	2
81 feet and up	1



Recommended Loop Wire: Reno LW-120 for 1/8" slots
Reno LW-116-S for 1/4" slots

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O P E R A T I N G I N S T R U C T I O N S F O R

Model BX-LP Series

LOW POWER LOOP DETECTOR

I. General

Please verify source voltage before applying power. The model designations indicate the input voltage required for each detector as follows:

	Relay		Solid State
Model	BX-LP	BX-LP-24	BX-LP-SS
Input Voltage	10.8-13.2VDC	21.6-26.4VDC	10.8-26.4VDC
Output Ratings	6A, 150VDC, 300VAC, 180W		3.9 A at 10VDC
Current Draw	1.1 - 5mA in NO DETECT ~ 30 mA in DET or Fail-Safe		1.1 – 5mA with outputs ON or OFF (See Sensitivity section)

Note: Both the relay and solid state versions of the BX-LP consume 1.1 to 5.0 mA of current when the outputs are OFF. Current draw in NO DETECT state is shown in the table under Sensitivity Level Rotary Switch.

Output	Fail Safe, Loop Failure	Fail Secure, Loop Failure
A	Output ON	Output OFF
B	Output OFF	Output OFF

II. Indicators and Controls

Status	DET Detect LED	FAIL LED
Off	Output OFF or 3 minutes expired	Loop OK
On	Output ON (within 3 minutes of power-up)	N/A
Flash	4 Hz - timing 2 second delay	1 flash/second - Failed Loop 1 flash/5 seconds - Intermittent Loop Failure

Note: The DET LED automatically deactivates 3 minutes after power-up or reset to conserve power.

Sensitivity Level Rotary Switch

The 8-position rotary switch selects one of eight sensitivity levels as shown below. 0 is lowest and 7 is highest, with normal (factory default) being 3. Use the lowest sensitivity setting that detects the desired vehicles.

Position	0	1	2	3	4	5	6	7
ΔL/L	1.28%	0.64%	0.32%	0.16%	0.08%	0.04%	0.02%	0.01%
mA Draw	1.1mA	1.3mA	1.5mA	2.5mA	3.0mA	3.5mA	3.5mA	5.0mA

Front Panel DIP Switches

Switch	On	Off	Factory Default
1	*See Table under Frequency Section*		Off
2			Off
3	Limited Presence	True Presence	Off
4	Sensitivity Boost	No Boost	Off
5	2 Second Delay	No Delay	Off
6	Fail Safe (Output A)	Fail Secure (Output A)	Off
7	Exit Pulse (Output B)	Entry Pulse (Output B)	Off
8	Presence Mode (Output B)	Pulse Mode (Output B)	Off

Frequency (DIP switches 1 and 2)

Switch	Low	Medium-Low	Medium-High	High
1	On	Off	On	Off
2	On	On	Off	Off

Loop frequency is controlled by DIP switches 1 and 2 on the front panel. Sometimes, where loops are in close proximity, it is necessary to select a different frequency for each loop to avoid loop interference – commonly known as crosstalk. Four frequencies are available as shown in the above table. High is the default frequency.

Limited Presence/True Presence (DIP switch 3)

Output A is always a presence output. The detector has two presence hold times: Limited Presence and True Presence. When set for True Presence (DIP switch 3 OFF), the detector will hold the output call for as long as a vehicle is present in the loop detection area and power is not removed or reset applied. True Presence time applies only for normal size automobiles and trucks and for normal size loops (approx. 12 ft^2 to 120 ft^2). When set for Limited Presence (DIP switch 3 ON), the detector will typically hold the Call for about one to three hours when a vehicle is in the detection zone.

Sensitivity Boost (DIP Switch 4)

DIP switch 4 can be turned ON to increase sensitivity only during the detect period without changing the sensitivity of a vacant loop. When a vehicle enters the loop, the detector then automatically boosts the loop sensitivity but only during the detect condition. As soon as no vehicle is detected, the detector immediately returns to the original sensitivity level. This feature helps prevent dropouts during the passage of high-bed vehicles and is particularly useful in sliding gate situations.

Output Delay (DIP Switch 5)

A 2 second delay of outputs A and B can be activated by setting DIP switch 5 to the ON position. Output delay is the time the detector output is delayed after a vehicle first enters the loop detection area. If the 2 second Output Delay feature is activated, the output relays will only be turned on after 2 seconds has passed with a vehicle continuously present in the loop detection area. If a vehicle leaves the loop detection area during the 2 second delay interval, detection is aborted and the next vehicle to enter the loop detection area will initiate a new full 2 second delay interval. By flashing the front panel DET LED at 4 Hz with a 50% duty cycle, the detector indicates that a vehicle is being detected but that the output is being delayed.

Fail Safe/Fail Secure (DIP switch 6)

When in the ON position, the detector will operate in Fail Safe mode during a loop fault. If a loop failure occurs while Fail Safe is activated, Output A activates. When in the OFF position, the detector will operate in Fail Secure mode during a loop fault. If a loop failure occurs while Fail Secure is activated, Output A DOES NOT activate. Factory default is Fail Secure.

Entry Pulse/Exit Pulse (DIP switch 7)

In Pulse Mode (with DIP switch 8 set to OFF), the detector can be programmed to output a 250 millisecond pulse only upon vehicle entry over the loop or only upon vehicle exit from the loop. DIP switch 7 has no effect on output A (the presence output).

Presence/Pulse (DIP Switch 8)

Relay B has 2 modes of operation: Presence and Pulse. When in Pulse mode (DIP switch 8 set to OFF), the 250 ms pulse can be set for entry pulse or exit pulse via DIP switch 7. When in Presence mode, the presence hold time is the same as Output A.

III. Reset

Changing any DIP switch position (except 1 or 2) will reset the detector. After changing the frequency selection switches, the detector will require a reset. A reset will clear failed loop indications.

IV. Failed Loop Diagnostics

The FAIL LED indicates whether or not the loop is currently within tolerance. If out of tolerance, the LED indicates whether the loop failed (1 flash per second) or had an intermittent loop failure (1 flash every 5 seconds).

V. Pin Connections (Harness Model 802-4)

Pin	Color	Relay	Solid State
1	Black	DC +	DC +
2	White	DC -	DC -
3	Orange	Relay B, Normally Open	Output B, Open Drain
4	Green	No Connection	No Connection
5	Yellow	Relay A, Common	DC –
6	Blue	Relay A, Normally Open	Output A, Open Drain
7	Gray	Loop	Loop
8	Brown	Loop	Loop
9	Red	Relay B, Common	DC -
10	Black/White	Relay A, Normally Closed	No Connection
11	Red/White	Relay B, Normally Closed	No Connection

Note: All contacts shown above are with power applied, loops connected, and no vehicle present. Output B always operates in Fail Secure mode when loop or power fails.

VI. Warnings

Separately for each loop, a twisted pair should be created consisting of only two (2) loop wires all the way from the loop to the detector (including through all wiring harnesses) at approximately six (6) full twists per foot. For trouble free operation, it is ***highly recommended*** that all connections ***(including crimped connectors)*** be soldered.