

VIII. 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 of a loop is 2/3 the shortest leg (A or B) of the loop. Example: Short leg = 6 feet, Detection Height = 4 feet.
2. As the length of leg A is increased, distance C must also increase.

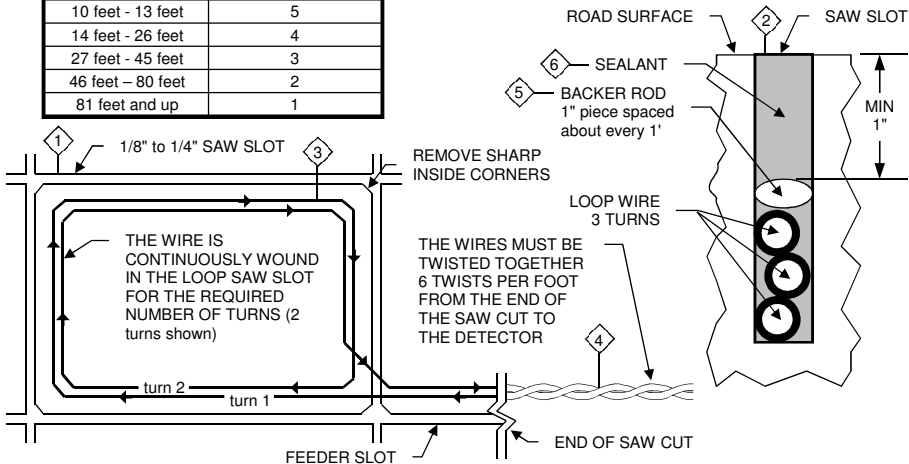
A =	6 ft	9 ft	12 ft	15 ft	18 ft	21 ft
C =	3 ft	4 ft	4.5 ft	5 ft	5.5 ft	6 ft

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

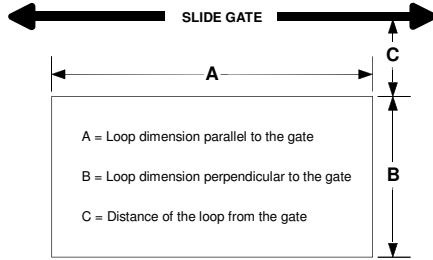
Loop Installation - Saw Cut Type:

1. Mark the loop layout on the pavement.
2. Set the saw to cut to a depth (typically 2" to 2.5") that ensures 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 sharp inside corners that can damage the loop wire insulation. 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 contraction and expansion characteristics similar to those of the pavement material.

LOOP PERIMETER	NUMBER OF TURNS
10 feet - 13 feet	5
14 feet - 26 feet	4
27 feet - 45 feet	3
46 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



Operating Instructions Model J Series

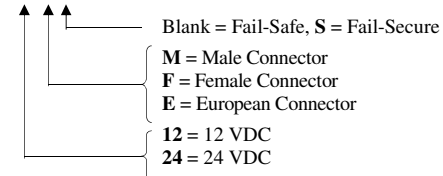
PC BOARD LOOP DETECTORS

WITH SP1 OPTION - 500ms PULSE OUTPUT

I. General:

Please verify source voltage before applying power. The model designation indicates the input power required, connector type, and Fail-Safe / Fail-Secure configuration for the detector as follows.

Model J-xx-x-x-SP-1



The detector is factory configured for either Fail-Safe or Fail-Secure operation (see unit label). The output state of the output relay in either Fail-Safe or Fail-Secure mode is listed in the table below.

Relay	Fail-Safe		Fail-Secure	
	Power Failure	Loop Failure	Power Failure	Loop Failure
A	Call	Call	No Call	No Call
B	No Call	No Call	No Call	No Call

II. Indicators and Controls

i. Power / Detect / Fail LEDs:

The detector has one green and two red LED indicators that are used to provide an indication of the detector's power status, output state, and/or loop failure conditions. The table below lists the various indications and their meanings.

Status	PWR (Power) LED	DET (Detect) LED	FAIL LED
Off	No power or low power	No vehicle present	Loop OK
On	Normal power to detector	Vehicle present	Open Loop
Flash	N/A	4 Hz - 2 second timing delay	1 Hz - Shorted Loop 3 Hz - Prior Loop Failure

Note: If the supply voltage drops below 75% of the nominal supply voltage, the power LED will turn off, providing a visual check of low supply voltage. Model J detectors will operate with supply voltage as low as 70% of nominal supply voltage.

ii. Rotary Switch (Sensitivity):

The eight-position rotary switch selects one of eight (8) sensitivity levels as shown in the table below. 0 is lowest and 7 is highest, with normal (factory default) being 3. Use the lowest sensitivity setting that will consistently detect the smallest vehicle that must be detected. Do not use a sensitivity level higher than necessary.

Position	0	1	2	3*	4	5	6	7
-ΔI/L	1.28%	0.64%	0.32%	0.16% *	0.08%	0.04%	0.02%	0.01%

* Factory default setting.

iii **DIP Switches:**

Switch	ON	OFF	Factory Default
1	Presence Mode B Relay	Pulse Mode B Relay	Off
2	Exit Pulse B Relay	Entry Pulse B Relay	Off
3	Fault Output B Relay (Overrides Switches 1 & 2)	Presence / Pulse B Relay	Off
4	Two Second Delay	No Delay	Off
5	Sensitivity Boost	No Boost	Off
6	Limited Presence	True Presence™	Off
7	Frequency		On
8	(See Table under Frequency Section)		Off

Relay B Output Mode (DIP Switches 1 and 2):

Relay B has four (4) modes of operation: Pulse-on-Entry, Pulse-on-Exit, Presence, and Fault. Fault mode is selected with DIP switch 3. (See the Relay B Fault Output section below for details.) DIP switches 1 and 2 are used to configure the Presence and/or Pulse output modes of Relay B.

When set to operate in Pulse mode (DIP switch 1 set to **OFF**), Relay B can be set to provide a 500 millisecond pulse when a vehicle enters or exits the loop detection zone. DIP switch 2 is used to select Pulse-on-Entry or Pulse-on-Exit. When DIP switch 2 is **OFF**, Pulse-on-Entry is selected. When DIP switch 2 is **ON**, Pulse-on-Exit is selected.

When set to operate in Presence mode (DIP switch 1 set to **ON**), Output B presence hold time is the same as Output A.

The table below shows the various combinations of switch settings and Relay B modes of operation.

Switch	Pulse-on-Entry *	Pulse-on-Exit	Presence	Presence
1	OFF *	OFF	ON	ON
2	OFF *	ON	OFF	ON

* Factory default setting.

Relay B Fault Output (DIP Switch 3):

When DIP switch 3 is in the **ON** position, Output B will operate in Fault mode. When operating in Fault mode, Relay B will provide a fault indication only when a loop fault condition exists. If a loss of power occurs, Relay B will operate as a Fail-Secure output. If the loop fault condition self-corrects, Relay B will resume operation in the No Fault output state. The factory default setting is **OFF** (Relay B Presence or Pulse).

NOTE: Setting this switch to the **ON** position overrides the settings of DIP switches 1 and 2.

Output Delay (DIP Switch 4):

A two second delay of Outputs A and B can be activated by setting DIP switch 4 to the **ON** position. Output delay is the time the detector outputs are delayed after a vehicle first enters the loop detection zone. If the two second Output Delay feature is activated, the output relays will only be turned on after two seconds have passed with a vehicle continuously present in the loop detection zone. If the vehicle leaves the loop detection zone during the two second delay interval, detection is aborted and the next vehicle to enter the loop detection zone will initiate a new full two second delay interval. The detector provides an indication that a vehicle is being detected but that the outputs are being delayed, by flashing the front panel DET LED at a four Hz rate with a 50% duty cycle. The factory default setting is **OFF** (no Output Delay).

Sensitivity Boost (DIP Switch 5):

DIP switch 5 can be turned **ON** to increase sensitivity during the detect period without changing the sensitivity during the no detect period. The boost feature has the effect of temporarily increasing the sensitivity setting by up to two levels. When a vehicle enters the loop detection zone, the detector automatically boosts the sensitivity level. As soon as no vehicle is detected, the detector immediately returns to the original sensitivity level. This feature is particularly useful in preventing dropouts during the passage of high bed vehicles. The factory default setting is **OFF** (no Sensitivity Boost).

Presence Hold Time (DIP Switch 6):

Output A always functions as a presence output. DIP switch 6 can be used to select one of two presence hold times; Limited Presence or True Presence™. Both modes provide a Call output when a vehicle is present in the loop detection zone. True Presence™ is selected when DIP switch 6 is **OFF**. If DIP switch 6 is **ON**, Limited Presence is selected. Limited Presence will typically hold the Call output for about one to three hours. True Presence™ will hold the Call as long as the vehicle is present in the loop detection zone provided that power is not interrupted or the detector is not reset. TruePresence™ time applies only for normal size automobiles and trucks and for normal size loops (approximately 12 ft² to 120 ft²). The factory default setting is **OFF** (True Presence™ Mode).

Frequency (DIP Switches 7 and 8):

In situations where loop geometry forces loops to be located in close proximity to one another, it may be necessary to select different frequencies for each loop to avoid loop interference, commonly known as crosstalk. DIP switches 7 and 8 can be used to configure the detector to operate at one of four frequencies corresponding to **Low**, **Medium / Low**, **Medium / High**, and **High** as shown in the table below.

NOTE: After changing any frequency switch setting(s), the detector must be reset by momentarily changing one of the other switch positions or by momentarily changing the sensitivity setting.

Switch	Frequency			
	Low (0)	Medium / Low (1) *	Medium / High (2)	High (3)
7	ON	ON *	OFF	OFF
8	ON	OFF *	ON	OFF

* Factory default setting.

III. **Reset:**

Changing any DIP switch position (except 7 or 8) or the Sensitivity level setting will reset the detector. After changing the frequency selection switches, the detector must be reset.

IV. **Call Memory:**

When power is removed for two seconds or less, the detector automatically remembers if a vehicle was present and a Call was in effect. When power is restored, the detector will continue to output a Call until the vehicle leaves the loop detection zone (loss of power or power dips of two seconds or less will not bring a gate arm down onto cars as they wait at the gate).

V. **Failed Loop Diagnostics:**

The FAIL LED indicates whether or not the loop is currently within tolerance. If the loop is out of tolerance, the FAIL LED indicates whether the loop is shorted (one Hz flash rate) or open (steady ON). If and when the loop returns to within tolerance, the FAIL LED will flash at a three flashes per second rate to indicate that an intermittent loop fault has occurred and has been corrected. This flash rate will continue until another loop fault occurs, the detector is reset, or power to the detector is interrupted.

VI. **Pin Connections:**

Female Connector Pin	Male Connector Pin	Euro Connector Pin	Function
1	10	10	Loop
2	9	9	Loop
3	8	8	DC Common
4	7	7	DC +
5	6	6	Reset
6	5	5	Relay B, Normally Open (N.O.)
7	4	4	Relay B, Common
8	3	3	Relay A, Normally Open (N.O.)
9	2	2	Relay A, Normally Closed (N.C.)
10	1	1	Relay A, Common

Notes: All pin connections listed above are with power applied, loop(s) connected, and no vehicle detected.

A detector reset occurs when Pin 5 is connected to Pin 3 on the **Female** connector or when Pin 6 is connected to Pin 8 on the **Male** or **Euro** connector.

VII. **Warnings:**

Separately for each loop, the lead-in should be a twisted pair created by twisting 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.