

VIII. Loop Installation:

The vehicle detection characteristics of an 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:

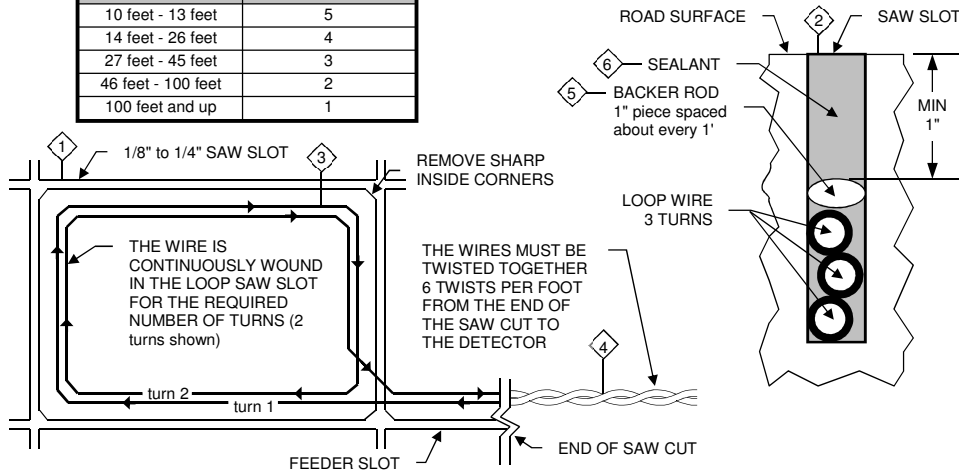
- The detection height of a loop is 2/3 the shortest leg (A or B) of the loop. Example: Short leg = 6 feet, Detection Height = 4 feet.
- As the length of leg A is increased, distance C must also increase.

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

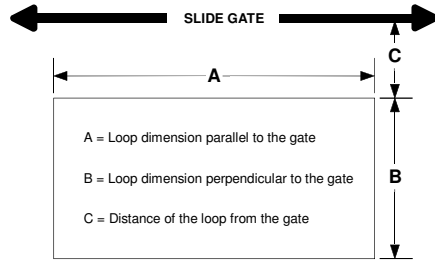
Loop Installation - Saw Cut Type

- Mark the loop layout on the pavement. Remove sharp inside corners that can damage the loop wire insulation.
- 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 all debris from the saw slot with compressed air. Check that the bottom of the slot is smooth.
- 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.
- The wire must be twisted together a minimum of 6 twists per foot from the end of the saw slot to the detector.
- 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.
- 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 - 100 feet	2
100 feet and up	1



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



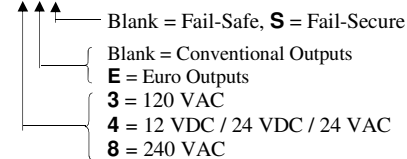
Operating Instructions Model BXC SP4 Series

SINGLE CHANNEL LOOP DETECTOR with VARIABLE RESPONSE TIMES

I. General:

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

Model BXC-x-x-x SP4



The detector is factory configured for either Fail-Safe or Fail-Secure operation (see unit side label). The output state of each 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	POWER LED	DETECT LED	LOOP FAIL LED
Off	No power or low power	Output(s) Off	Loop OK
On	Normal power to detector	Output(s) On	Open Loop
Flash	N/A	4 Hz - Two second timing delay activated	1 Hz - Shorted Loop 3 Hz - Prior Loop Failure

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

ii. Front Panel DIP Switches:

Switch	ON	OFF	Factory Default
1	Frequency		OFF
2	(See Table under Frequency Section)		OFF
3	Two Second Delay	No Delay	OFF
4	Sensitivity Boost	No Boost	OFF
5	Sensitivity		ON
6	(See Table under Sensitivity Section)		OFF
7	Exit Pulse or Fault Output B Relay	Entry Pulse or Presence Output B Relay	OFF
8	Presence Mode B Relay	Pulse Mode B Relay	OFF

Frequency (DIP Switches 1 and 2):

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 1 and 2 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 pressing the front panel **RESET** pushbutton.

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

* Factory default setting.

Output Delay (DIP Switch 3):

A two second delay of Outputs A and B can be activated by setting DIP switch 3 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 **DETECT** LED at a four Hz rate with a 50% duty cycle. The factory default setting is **OFF** (no Output Delay).

Sensitivity Boost (DIP Switch 4):

DIP switch 4 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).

Sensitivity (DIP Switches 5 and 6):

DIP switches 5 and 6 select one of the four (4) sensitivity levels available as shown in the table below. 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.

Switch	Sensitivity Level (-AL/L)			
	0.32% (0)	0.16% (1) *	0.08% (2)	0.02% (3)
5	OFF	ON *	OFF	ON
6	OFF	OFF *	ON	ON
Response Time (milliseconds)				
	11 ± 1.5	19.5 ± 2.5	33.5 ± 4.5	117 ± 16

* Factory default setting.

Relay B Output Mode (DIP Switches 7 and 8):

Relay B has four (4) modes of operation: Pulse-on-Entry, Pulse-on-Exit, Presence, and Fault. DIP switches 7 and 8 are used to configure the output mode of Relay B.

When set to operate in Pulse mode (DIP switch 8 set to **OFF**), Relay B can be set to provide a 75 millisecond pulse when a vehicle enters or exits the loop detection zone. DIP switch 7 is used to select Pulse-on-Entry or Pulse-on-Exit. When DIP switch 7 is **OFF**, Pulse-on-Entry is selected. When DIP switch 7 is **ON**, Pulse-on-Exit is selected.

When DIP switch 8 is set to **ON** (Presence / Fault output), DIP switch 7 selects the Relay B Presence or Fault mode of operation. When DIP switch 7 is **OFF**, Output B presence hold time is the same as Output A. When DIP switch 7 is in the **ON** position, Relay B will output a Fault signal only when a loop fault condition exists. If the loop fault self-corrects, Relay B will resume operation in the No Fault output state.

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

Switch	Pulse-on-Entry *	Pulse-on-Exit	Presence	Fault
7	OFF *	ON	OFF	ON
8	OFF *	OFF	ON	ON

* Factory default setting.

III. Reset:

Pushing the front panel **RESET** pushbutton or changing any DIP switch position (except 1 or 2) 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 **LOOP FAIL** LED indicates whether or not the loop is currently within tolerance. If the loop is out of tolerance, the **LOOP 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 **LOOP 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 (Reno A & E Wiring Harness Model 802-4):

Pin	Wire Color	Conventional Function	Euro Function
1	Black	AC Line / DC +	AC Line / DC +
2	White	AC Neutral / DC Common	AC Neutral / DC Common
3	Orange	Relay B, Normally Open (N.O.)	Relay B, Normally Open (N.O.)
4	Green	No Connection	Relay B, Common
5	Yellow	Relay A, Common	Relay A, Normally Open (N.O.)
6	Blue	Relay A, Normally Open (N.O.)	Relay A, Common
7	Gray	Loop	Loop
8	Brown	Loop	Loop
9	Red	Relay B, Common	No Connection
10	Violet or Black / White	Relay A, Normally Closed (N.C.)	Relay A, Normally Closed (N.C.)
11	White / Green or Red / White	Relay B, Normally Closed (N.C.)	Relay B, Normally Closed (N.C.)

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

VII. Warnings:

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