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MODEL B SERIES
SINGLE CHANNEL LOOP DETECTORS
INSTALLATION AND OPERATING INSTRUCTIONS

I. General

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

Model B-xx-xx-x ← **Blank** = Fail-Safe, **S** = Fail-Secure

- **Blank** = Internal DIP switches set to True Presence™ / Pulse-on-Entry
- **DP** = Internal DIP switches set to True Presence™ / True Presence™
- **SB** = Internal DIP switch set to enable Sensitivity Boost
- **3** or **1** = 120 VAC
- **4** or **5** = 12 VDC / 24 VDC / 24 VAC
- **8** or **35** = 240 VAC

NOTE: Models B-3, B-4 and B-8 are fitted with a rear mounted, 11 pin, and Amphenol style connector. Models B-1, B-5, and B-35 are fitted with a rear mounted, 10-pin, MS style connector.

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	PWR (Power) LED	DET (Detect) LED	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 (50% duty cycle) Two second timing delay activated	1 Hz (50% duty cycle) Shorted Loop 1 Hz (5% duty cycle) Waiting for release of **FREQ** push-button to enter diagnostics mode (See Failed Loop Diagnostics)

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

ii. Frequency LEDs:

The four red LED indicators provide an indication of the current detector operating frequency.

iii. Front Panel Pushbutton Switches:

Two momentary contact pushbutton switches are used to control the following.

RESET - Push the front panel mounted pushbutton labeled **RESET** to reset the detector.

FREQ - 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. The front panel mounted pushbutton labeled **FREQ** can be used to configure the detector to operate at one of four (4) frequencies corresponding to ***Low***, ***Medium / Low***, ***Medium / High***, and ***High***. Press the **FREQ** pushbutton to toggle through and select one of the four frequency settings.

NOTE: After changing the frequency setting, the detector must be reset by pressing the front panel **RESET** pushbutton.

iv. Internal DIP Switches

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

* Sensitivity Boost (SB) models have DIP switch 5 set to the ***ON*** position.
** Dual Presence (DP) models have DIP switch 8 set to the ***OFF*** position.

Sensitivity (DIP Switches 1, 2, and 3)

DIP switches 1, 2, and 3 select one of the eight (8) sensitivity levels available as shown in the table below. 0 is the lowest setting, 3 is normal, and 7 is the highest setting. 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							
	0	1	2	3 *	4	5	6	7
1	OFF	OFF	OFF	OFF *	ON	ON	ON	ON
2	OFF	OFF	ON	ON *	OFF	OFF	ON	ON
3	OFF	ON	OFF	ON *	OFF	ON	OFF	ON

* Factory default setting.

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 period of detection 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) unless sensitivity boost (SB) operation is specified, in which case the factory default setting is ***ON*** (Sensitivity Boost).

Relay B Pulse Mode (DIP Switch 6)

Relay B is the pulse output. Its pulse output mode is controlled by DIP switch 6. Relay B can be configured to output a single 250 millisecond pulse when a vehicle enters the loop detection zone (Pulse-on-Entry) or when a vehicle leaves the loop detection zone (Pulse-on-Exit). Pulse-on-Entry is selected when DIP switch 6 is ***OFF***.

Pulse-on-Exit is selected when DIP switch 6 is ***ON***. DIP switch 6 has no effect on Relay A (the presence output). The factory default setting is ***OFF*** (Pulse-on-Entry).

NOTE: The setting of this DIP switch has no effect on the output mode of Relay B if DIP switch 8 is set to the ***OFF*** position (Presence Mode Relay B). For additional details, refer to the Relay B Output Mode section on page 3.

Presence Hold Time (DIP Switch 7)

Output A always functions as a presence output. DIP switch 7 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 7 is ***OFF***. If DIP switch 7 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. True Presence™ time applies only for normal size automobiles and trucks and for normal size loops (approximately 12 ft^2 to 120 ft^2). The factory default setting is ***OFF*** (True Presence™ Mode).

Relay B Output Mode (DIP Switch 8)

Relay B has two modes of operation; Pulse or Presence. Its output mode is controlled by DIP switch 8. When set to operate in Pulse Mode (DIP switch 8 ***ON***), Relay B outputs a 250 millisecond pulse when a vehicle enters the loop detection zone or when a vehicle leaves the loop detection zone. (See the Relay B Pulse Mode section on page 2 for details.) When set to operate in Presence Mode (DIP switch 8 ***OFF***), the output of Relay B is the same as that of Relay A. (See the Presence Hold Time section above for details.) The factory default setting is ***ON*** (Pulse Mode Relay B) unless dual presence (DP) operation is specified, in which case the factory default setting is ***OFF*** (Presence Mode Relay B).

III. 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).

IV. Failed Loop Diagnostics

The **FAIL** LED provides an indication of 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 turn off to indicate that the loop fault condition has been corrected and that the loop is once again within tolerance.

The Model B detector automatically stores the last loop failure type in non-volatile memory. To determine the type of loop failure that has last occurred, press and hold the **FREQ** pushbutton for at least three seconds. When the **FAIL** LED begins flashing at one Hz rate with a 5% duty cycle, release the **FREQ** pushbutton. The detector will then display the last loop failure type detected (if any). This indication will be displayed **one time** for about fifteen seconds unless terminated by pressing the **RESET** or **FREQ** pushbutton. The non-volatile memory used to store the last loop failure type is automatically cleared each time it is interrogated.

V. Pin Connections

Models B-3, B-4, and B-8 (Reno A&E Wiring Harness Model 802-4)

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

Models B-1, B-5, and B-35 (Reno A&E Wiring Harness Model 801-4)

Pin	Wire Color	Function
A	White	AC Neutral / DC Common
B	Brown	Relay A, Normally Open (N.O.)
C	Black	AC Line / DC +
D	Red	Loop
E	Orange	Loop
F	Yellow	Relay A, Common
G	Blue	Relay A, Normally Closed (N.C.)
H	Green	Chassis Ground
I	Violet	Relay B, Common
J	Gray	Relay B, Normally Open (N.O.)

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.

VIII. Loop Installation

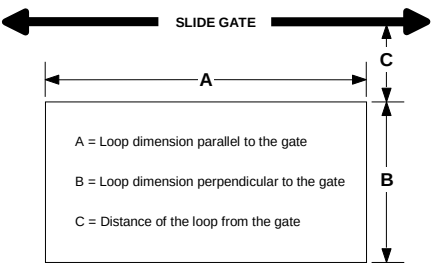
The vehicle detection characteristics of an inductive loop detector are greatly influenced by the loop size and proximity to moving metal objects such as gates. Vehicles such as small motorcycles and high bed trucks can be reliably detected if the proper size loop is selected. If the loop is placed too 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

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 = 2/3 x 6 feet = 4 feet.

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

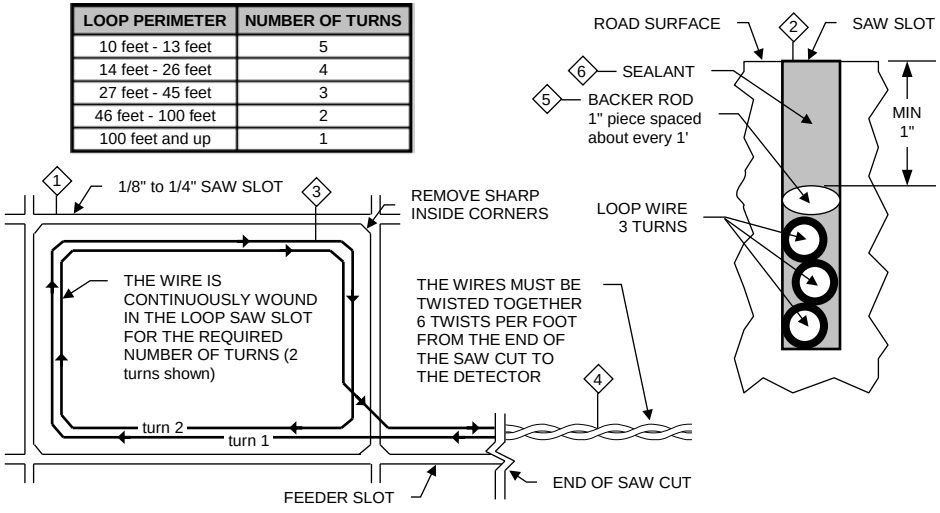
2. As the length of leg A is increased, distance C must also increase.
3. For reliable detection of small motorcycles, legs A and B should not exceed 6 feet.



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 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.
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 - 100 feet	2
100 feet and up	1



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