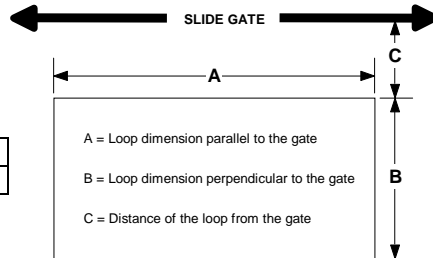


## Loop Installation

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, the distance C will need to increase.

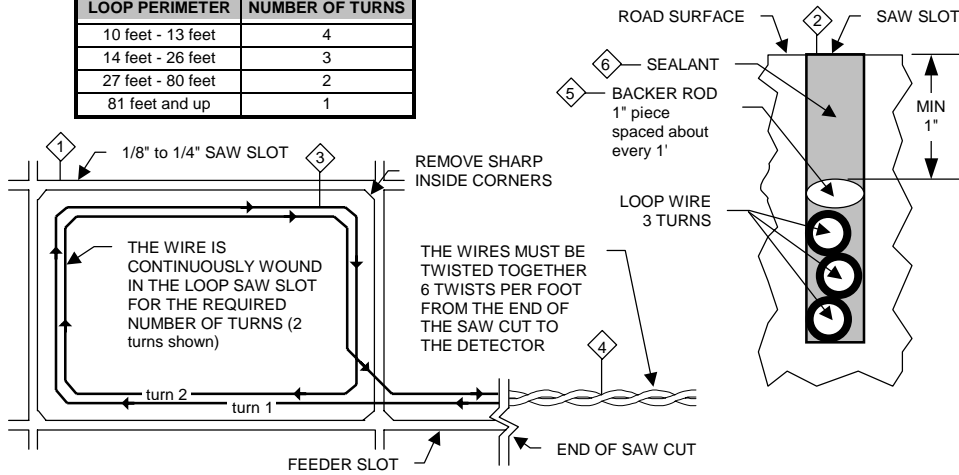
A =	6 ft	9 ft	12 ft	15 ft	18 ft	21 ft
C =	3 ft	4 ft	4.5 ft	5 ft	5.5 ft	6 ft

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

Reno A&E  
 4655 Aircenter Circle  
 Reno, Nevada 89502  
 U.S.A.



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## OPERATING INSTRUCTIONS FOR

# Model AX Series

## SINGLE CHANNEL LOOP DETECTORS

### I General

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

Model	AX-3	AX-7	AX-8	AX-23	AX-24
Voltage	120VAC	24VAC	240VAC	12VDC	24VDC

Each detector is factory configured for either Fail-Safe or Fail-Secure operation (see rear of unit).

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

### II Indicators and Controls

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. AX models operate with supply voltage as low as 70% of nominal supply voltage.*

### Front Panel DIP Switches

Switch	ON	OFF	Factory Default
1			OFF
2	See Table under Frequency Section		OFF
3	Pulse Mode	Presence Mode	OFF
4	Sensitivity Boost	No Boost	OFF
5	See Table under Sensitivity Section		ON
6			OFF

### Frequency (DIP switches 1 and 2)

Switch	Low (0)	Med Low (1)	Med Hi (2)	High (3)
1	ON	OFF	ON	OFF
2	ON	ON	OFF	OFF

Loop frequency is controlled by DIP switches 1 and 2 on the front panel. The values 1 and 2 that appear to the left of the DIP switches are assigned to a DIP switch when it is turned ON. When a DIP switch is turned OFF, its value is 0. By adding the values of each DIP switch that is turned ON, effective values of 0 to 3 can be achieved indicating which of the four frequencies is selected. 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.

### Presence/Pulse (DIP Switch 3)

Relay A has 2 modes of operation: Presence and Pulse. When in Pulse mode (DIP switch 3 set to ON), the 250 ms pulse can be set for entry pulse or exit pulse via the Internal DIP switch 1. When in Presence mode, the presence hold time can be selected for Infinite Presence or Limited Presence via the Internal DIP switch 1.

### 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.

### Sensitivity (DIP switches 5 and 6)

The detector has four sensitivity levels. The two DIP switches marked 5 and 6 select the sensitivity level. The values 1 and 2 that appear to the left of the DIP switches are assigned to a DIP switch when it is turned ON. When a DIP switch is turned OFF, its value is 0. By adding the values of each DIP switch that is turned ON, effective values of 0 to 3 can be achieved indicating which of the four sensitivity levels is selected. Choose the lowest sensitivity level that consistently detects the smallest vehicle necessary. Do not use a sensitivity level higher than necessary. The following table shows the actual sensitivity for each Sensitivity Level.

Sensitivity	-ΔL/L	Switch 5	Switch 6
0 (Low)	0.32%	OFF	OFF
1 (Med/Low)	0.16%	ON	OFF
2 (Med/High)	0.08%	OFF	ON
3 (High)	0.02%	ON	ON

### Internal DIP Switches (Labeled SW2 on Circuit Board)

Switch	ON	OFF	Factory Default
1	Exit Pulse or Limited Presence	Entry Pulse or Infinite Presence	OFF
2	2 Second Delay	No Delay	OFF

### Infinite/Normal Presence or Pulse on Entry/Exit (Internal DIP switch 1)

**Presence Mode (with front panel DIP Switch 3 set to OFF):** one of two presence hold times: Infinite Presence (OFF) or Normal Presence (ON). Both of these modes output a “Call”, i.e. vehicle detected, for as long as a vehicle is present in the loop detection area. Normal Presence will typically hold the Call output for about one to three hours. However, Infinite Presence will hold the Call for as long as the vehicle is present and power is not removed or reset applied. The Infinite Presence time applies only for normal size automobiles and trucks and for normal size loops (approx. 12 ft<sup>2</sup> – 120 ft<sup>2</sup>).

**Pulse Mode (with front panel DIP switch 3 set to ON):** The Internal DIP Switch 1 selects the 250-millisecond pulse output for only upon vehicle ENTRY (OFF) over the loop or only upon vehicle EXIT (ON) from the loop.

### Output Delay (Internal DIP Switch 2)

A two second delay of output A can be activated by setting internal DIP switch 2 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 relay 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.

### III Reset

Pressing the RESET button or 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 the loop fault memory).

### IV Call Memory

When power is removed for 2 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 (Power loss or dips of 2 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 out of tolerance, the LED indicates whether the loop is shorted (1 Hz flash) or open (steady ON). If and when the loop returns to within tolerance, the FAIL LED will flash 3 flashes once per second to indicate 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 the detector loses power.

### VI Pin Connections

Pin	Color	AX-3, AX-7, AX-8, AX-23, AX-24
1	BLACK	Power (Line)
2	WHITE	Power (Neutral)
3	ORANGE	No Connection
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	No Connection
10	WHITE / BLACK	Relay A, Normally Closed (N.C.)
11	WHITE / RED	No Connection

*Note: Color of wire only applies for Reno A&E Model 802-4 harness.*

*Note: The relay contacts shown are with power applied, loops connected, and no vehicle present.*

### VII Fuse (Automatic Recovery – AX-7 only)

If 120VAC power is applied to the Model AX-7 (24VAC), the automatic fuse will open. The fuse will automatically reset when power is removed for 3 seconds. Check source voltage before reinstalling.

### VIII 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.