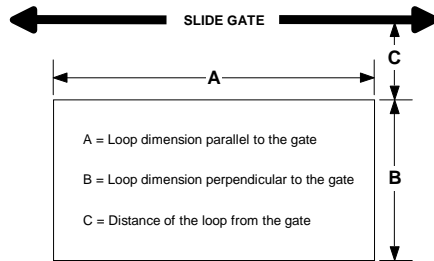


Loop Installation

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.



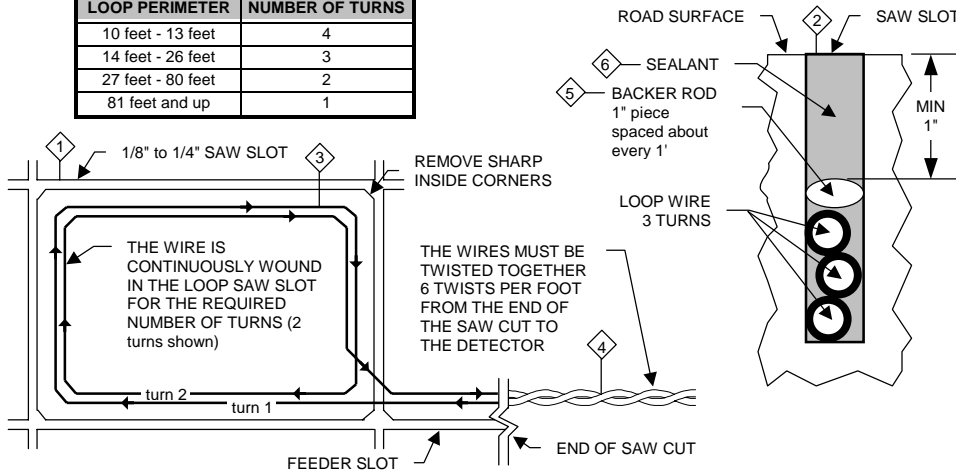
General Rules

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

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 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.
- 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 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 AX2 & AX2DL Series

TWO CHANNEL LOOP DETECTOR

General Description

The Model AX2 Series is a two-channel loop detector that operates two independent inductive loops and provides a separate relay output for each channel. The loops connected to channel 1 & 2 are scanned (alternating on and off cycles), which eliminates crosstalk between loops connected to the Model AX2 detector. The Model AX2DL is factory configured to provide AB and BA directional logic outputs.

Model AX2	-xx-xx-x(xx)	Two-channel loop detector
3 for 120 VAC		Two-channel loop detector with directional logic
7 for 24 VAC		NC for Normally Closed Contacts*
8 for 240 VAC		NO for Normally Open Contacts*
23 for 12 VDC		blank for Fail-Safe
24 for 24 VDC		S for Fail-Secure
		1C for one 11-pin connector
		2C for two 11-pin connectors

Verify that source voltage and the detector's input voltage are the same before applying power.

* Only the 1C (one connector) models have the (NO) Normally Open or (NC) Normally Closed contact designation.

	FAIL SAFE OPERATION		FAIL SECURE OPERATION	
	Power Failure	Loop Failure	Power Failure	Loop Failure
Normally Open Contacts	Closed	Closed	Open	Open
Normally Closed Contacts	Open	Open	Closed	Closed

Indicators

Power LED: When the front panel green LED is ON the input power is normal. When the LED is OFF there is no input power or low power.

CH 1 and CH 2 Detect LEDs: Each channel has a red LED to indicate vehicle detection and loop failures.

STATUS	MEANING
Off	No vehicle present over the loop and the loop is OK
Solid On	Vehicle present over the loop
1 Hz Flashing, 50% duty cycle	Shorted loop
10 Hz Flashing, 50% duty cycle	Open loop
3 Flashes per second	Intermittent loop failure. Loop failed and corrected. NOTE: When a vehicle is present the LED will be Solid On.

IMPORTANT: After installing and applying power to the Model AX2 detector, momentarily push the RESET button to clear the Power Down Memory. This initializes the detector to the loops that are connected and clears the memory of any previous loop information.

Front Panel Switch Functions

Frequency (DIP Switches 1 & 2): Loops connected to channels 1 & 2 of a Model AX2 can **not** crosstalk. When loops are in close proximity to each other and connected to different detector units, it may be necessary to select different frequencies for each loop to avoid loop interference. Four Frequency selections are available:

FREQ	Low	Med/Low	Med/Hi	High
SW 1	ON	OFF	ON	OFF
SW 2	ON	ON	OFF	OFF

NOTE: After changing the frequency, the detector **must** be RESET to obtain reliable operation.

Pres/Pulse (DIP Switch 3): Each channel has two modes of operation: either Presence (OFF) or Pulse (ON).

When in the OFF position (True Presence mode), the detector will hold the Call for as long as the vehicle is present in the loop detection area. This is providing that: power is not removed, reset is not applied, normal size loops are used (approximately 12 ft² to 120 ft²), and a normal size vehicle or larger is being detected.

When DIP switch 3 is turned ON, the detector operates in the PULSE mode and generates a single 250-ms pulse output for each vehicle entering the loop detection area.

Sensitivity Boost (DIP Switch 4): DIP switch 4 can be turned ON to increase sensitivity **only** during the “detect state” without changing the sensitivity during the “no detect state.” When a vehicle enters the loop, the detector automatically boosts the loop sensitivity. The higher sensitivity level remains in effect until the “detect state” reverts back to the “no detect state.” This feature helps prevent dropouts during the passage of high-bed vehicles and is particularly useful in sliding gate situations.

Sensitivity Level: (DIP Switches 5 & 6): Each channel has 4 sensitivity levels. The 2 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 4 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

NOTE: Changing the sensitivity does not reset the detector. A vehicle can be over the loop while the sensitivity is being adjusted.

Reset Switch: The front panel RESET pushbutton resets both channels. **CAUTION:** If vehicles are present in the loops’ detection area, a reset will clear the CALL outputs.

Factory Default Settings for Both Channels

Switch	Factory Default	Setting
6	OFF	Sensitivity Level 1
5	ON	
4	OFF	Sensitivity Boost is Off
3	OFF	Relay in Presence mode of Operation
2	OFF	Frequency is High
1	OFF	

Other Features

Power Down Memory: When power is removed, the detector automatically “remembers” the status of the loop. During the loss of power, vehicles may enter or leave the loop area. When power is restored, the detector will output a Call for a vehicle in the loop or No Call for no vehicle in the loop, even if the vehicles entered or exited the loop while the detector was not powered. (Power loss or dips of any duration will not bring a gate arm down onto cars as they wait at the gate). **IMPORTANT: After installing and applying power to the Model AX2 detector, momentarily push the RESET button to clear the Power Down Memory. This initializes the detector to the loops that are connected and clears the memory of any previous loop information.**

Failed Loop Diagnostics: The Channel DETECT LEDs indicates whether or not the loop is currently within tolerance. If out of tolerance, the LED indicates whether the loop circuit is shorted (1 Hz Flash) or open (10

Hz Flash). If and when the loop returns to within tolerance, the Channel DETECT LED will flash at a distinctive rate (a burst of three flashes once per second) to indicate an intermittent loop fault has occurred and corrected. This flash rate will continue (when no vehicles are present in the loop) until another loop fault occurs or the detector is RESET. While indicating an intermittent loop failure, the Channel DETECT LEDs will be steady on to indicate presence of a vehicle. **Warning: Removal or loss of power will not clear loop fault memory. The detector must be RESET.**

Wiring Instructions

One 11-Pin Connector: Requires one Reno A & E Model 802-4-2TP Harness

PIN	WIRE COLOR	FUNCTION for (NO) Models	FUNCTION for (NC) Models
1	BLACK	POWER, HOT or (+)	POWER, HOT or (+)
2	WHITE	POWER, NEUTRAL or (-)	POWER, NEUTRAL or (-)
3	ORANGE	Ch. 2 Relay Normally Open	Ch. 2 Relay Normally Closed
4	GREEN	No connection	No connection
5	YELLOW	Ch. 1 Relay Common	Ch. 1 Relay Common
6	BLUE	Ch. 1 Relay Normally Open	Ch. 1 Relay Normally Closed
7	GRAY	Ch. 1 Loop	Ch. 1 Loop
8	BROWN	Ch. 1 Loop	Ch. 1 Loop
9	RED	Ch. 2 Relay Common	Ch. 2 Relay Common
10	VIOLET, or WHITE/BLACK	Ch. 2 Loop	Ch. 2 Loop
11	WHITE/GREEN, or WHITE/RED	Ch. 2 Loop	Ch. 2 Loop

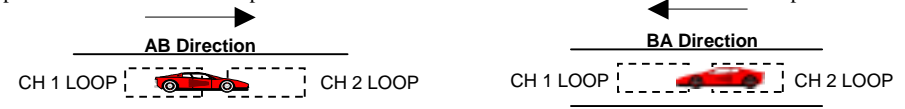
Two 11-Pin Connectors: Requires two Reno A & E Model 802-4 Harnesses

PIN	COLOR	CONNECTOR 1 FUNCTION	CONNECTOR 2 FUNCTION
1	BLACK	POWER, HOT or (+)	No connection
2	WHITE	POWER, NEUTRAL or (-)	No connection
3	ORANGE	No connection	No connection
4	GREEN	No connection	No connection
5	YELLOW	Ch. 1 Relay Common	Ch. 2 Relay Common
6	BLUE	Ch. 1 Relay Normally Open	Ch. 2 Relay Normally Open
7	GRAY	Ch. 1 Loop	Ch. 2 Loop
8	BROWN	Ch. 1 Loop	Ch. 2 Loop
9	RED	No connection	No connection
10	VIOLET, or WHITE/BLACK	Ch. 1 Relay Normally Closed	Ch. 2 Relay Normally Closed
11	WHITE/GREEN, or WHITE/RED	No connection	No connection

NOTE: All contacts above are shown for power applied, loops connected, and no vehicle present.

Model AX2DL Directional Logic: Uses the Ch. 1 and Ch. 2 loops to determine the direction the vehicle is traveling. The loops must be spaced such that a vehicle can span both loops. The expected installation is two loops, one after the other in the same lane, spaced anywhere from overlapping to 6 feet apart. **NOTE: Contact a Field Engineer at Reno A & E regarding loop configurations and spacings for specific applications.**

When a vehicle enters the first loop the CH LED will flash 750 ms ON and 250 ms OFF to indicate the vehicle’s presence. The flash will continue until the vehicle leaves the loop area. When the directional output is set to the pulse mode, the CH LED will flash 250 ms ON and 750 ms OFF to indicate the vehicle’s presence over the second loop. This indication will continue until the vehicle leaves the loop.



When a vehicle travels from CH 1 loop and enters the CH 2 loop, the CH 2 relay and LED activate to indicate the AB direction.

When a vehicle travels from CH 2 loop and enters the CH 1 loop, the CH 1 relay and LED activate to indicate the BA direction.