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MODEL BT-AVI

SINGLE CHANNEL LOOP DETECTOR AND AUTOMATIC VEHICLE IDENTIFICATION (AVI) RECEIVER

INSTALLATION AND OPERATING INSTRUCTIONS

I General

Verify source voltage before applying power. The model number indicates the input power required and factory preprogrammed code as follows:

Model BT-AVI-x-n ← n = Code (e.g. 5240)

1 = 120 VAC
5 = 12 VDC / 24 VDC / 24 VAC

The Model BT-AVI is a dual function unit combining the features of an inductive loop detector with an Automatic Vehicle Identification (AVI) Receiver. Two LEDs on the front panel of the unit indicate vehicle presence and/or the presence of a valid-coded transmitter. The loop detector provides an output relay contact closure for vehicle presence. The AVI receiver provides an output relay contact for recognition of a matching coded signal from an AVI transmitter. The unit connects to a standard vehicle loop installed in the pavement. The AVI function is factory programmed to identify a single specific transmitter code and does not require any adjustments or setup. The unit is fully operational within two (2) seconds after application of power.

II Indicators

i Power/ Detect / AVI Code / Loop Fail LEDs

The unit has one green and three red LED indicators. The LEDs indicate the detector's power status, vehicle detect output state, AVI code output state, and/or loop failure conditions.

LED State	POWER LED (Green)	DETECT LED (Red)	AVI CODE LED (Red)	LOOP FAIL LED (Red)
OFF	No power or low power	No vehicle present	No valid coded transmitter present	Loop OK
ON	Normal power to unit	Vehicle present	Valid coded transmitter present	Loop Failure (Open or Shorted Loop)
Flash	N/A	2.5 Hz (50% duty cycle) Delay timing 10 Hz (50% duty cycle) Extension timing	N/A	3 Flashes per second Indicates Prior Loop Failure (Loop has failed, but the problem does not currently exist.)
NOTE: The Model BT-AVI continues to operate during power loss of up to two (2) seconds.				

ii. Front Panel Rotary Switch (Sensitivity):

The eight-position rotary switch selects one of eight sensitivity levels. 0 is lowest and 7 is highest, with normal (default) being 3.

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

iii Front Panel DIP Switches (Vehicle Detector Settings)

Switch	ON	OFF	Factory Default
1	Fail-Secure (Loop Failure)	Fail-Safe (Loop Failure)	OFF
2	Sensitivity Boost	No Boost	OFF
3	Output Delay Time		OFF
4			OFF
5	Output Extension Time		OFF
6			OFF
7	Loop Frequency		OFF
8			OFF

Detect Output State - Loop Failure (DIP Switch 1)

DIP Switch 1 configures the unit to operate in either Fail-Safe or Fail-Secure mode during loop failure or loss of power.

Fail-Safe		Fail-Secure	
Power Failure	**Loop Failure**	**Power Failure**	**Loop Failure**
Detect Output	Detect Output	No Detect Output	No Detect Output
NOTE: See Pin Connections section.			

Sensitivity Boost (DIP Switch 2)

DIP switch 2 can be turned ***ON*** to increase sensitivity by two levels during the detect state without changing the sensitivity during the no detect state. This feature is useful in preventing dropouts during the passage of high bed vehicles. The sensitivity level never exceeds a setting of 7.

Output Delay Time (DIP Switches 3 and 4)

Output delay time is defined as: the time following the detection of a vehicle before the output relay changes to the "detect state". Output delay times of zero, two, five, and ten seconds can be programmed. Output delay time begins once a vehicle has entered the loop detection zone and continues for the amount of time programmed. If the vehicle leaves the loop detection zone during the delay time period, the delay timer is reset to zero and a new delay time period begins when the next vehicle is detected. The front panel **DETECT** LED flashes at a 2.5 Hz rate (50% duty cycle) during the delay time period.

Switch		Output Delay Time
3	4	
OFF	OFF	0 Seconds (Default)
ON	OFF	2 Seconds
OFF	ON	5 Seconds
ON	ON	10 Seconds

Output Extension Time (DIP Switches 5 and 6)

Output extension time is defined as: the time following the loss of detection before the output relay changes to the "no-detect state". Output extension times of zero, two, five, and ten seconds can be programmed. If a new vehicle enters the loop detection zone during the extension time period, the extension timer is reset to zero and a new extension time period begins once the last vehicle leaves the loop detection zone. The front panel **DETECT** LED flashes at a 10 Hz rate (50% duty cycle) during the extension time period.

Switch		Output Extension Time
3	4	
OFF	OFF	0 Seconds (Default)
ON	OFF	2 Seconds
OFF	ON	5 Seconds
ON	ON	10 Seconds

Loop Frequency (DIP Switches 7 and 8)

When loops are located in close proximity it may be necessary to select different loop frequencies to avoid loop interference, commonly known as crosstalk.

NOTE: After changing any frequency switch setting(s) the unit must be reset by changing one of the other DIP switch positions or by changing the sensitivity level setting.

Switch	Loop Frequency			
	Low (0)	Normal (1)	Medium (2)	High (3) (Default)
7	ON	OFF	ON	OFF
8	ON	ON	OFF	OFF

III AVI Operation

Response Time

Once a transmitter with the same code as the receiver has been detected the AVI output will activate for a minimum of two (2) seconds.

Presence Time

Once a transmitter with the same code as the receiver has been detected the AVI output will remain activated as long as the transmitter is detected and for two (2) seconds after the transmitter departs the loop.

Reception Range

The transmitter must pass over the loop, or close to the edge of the loop.

IV Reset

The detector is reset when the sensitivity level or any DIP switch (except 7 or 8) is changed. After changing any frequency switch the unit must be reset.

V Pin Connections

(Reno A&E Wiring Harnesses Model 801-4, 801-6, and 801-8)

Pin	Wire Color	Function	Fail-Safe	Fail-Secure
A	White	AC Neutral / DC Common		
B	Brown	Vehicle Detect Output Relay - Common AVI Code Output Relay - Common		
C	Black	AC Line / DC +		
D	Red	Loop		
E	Orange	Loop		
F	Yellow	Vehicle Detect Output Relay	Normally Open (N.O.)	Normally Closed (N.C.)
G	Blue	Vehicle Detect Output Relay	Normally Closed (N.C.)	Normally Open (N.O.)
H	Green	Chassis Ground		
I	Violet	AVI Code Output Relay - Normally Open (N.O.)		
J	Gray	No Connection		

VI Loop Installation

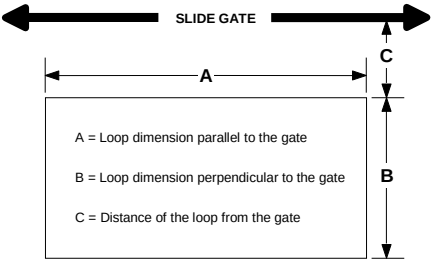
The vehicle detection characteristics of an inductive loop detector are influenced by the loop size and proximity to moving metal objects such as gates. If the loop is placed too close to a moving metal gate, the detector may detect the gate. The diagram below is intended as a reference for the dimensions that will influence the detection characteristics.

General Rules

1. The useful detection height of a loop is approximately 2/3 the shortest leg (A or B) of the loop. Example: Short leg = 6 feet, Detection Height = 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

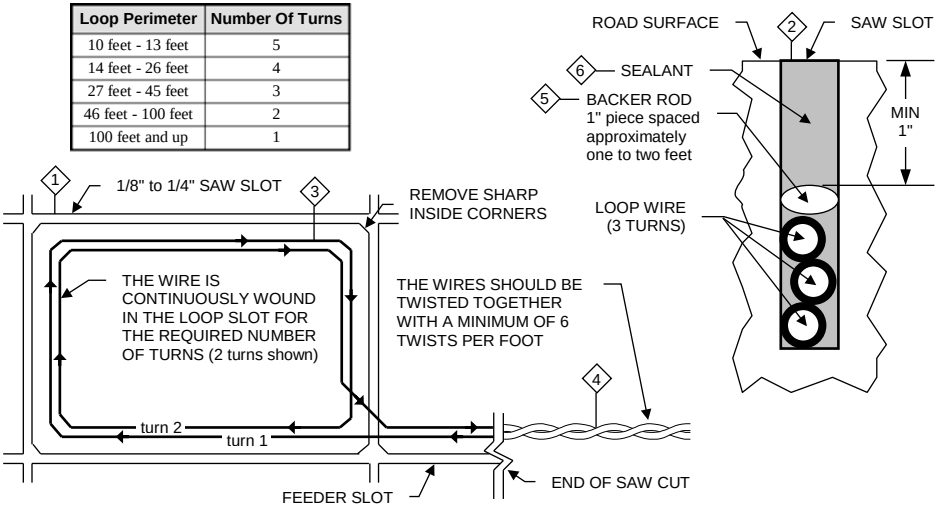
2. As the length of leg A is increased the distance C must also increase.



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 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. A continuous length of wire should be used to form the loop and feeder wires. Loop wire is typically 14, 16, 18, or 20 AWG with cross-linked polyethylene insulation. Use a wood stick or roller to press 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.
4. The wire should be twisted together a minimum of 6 twists per foot from the end of the saw slot to the detector.
5. The wire should be held firmly in the slot with 1" pieces of backer rod every 1 to 2 feet. The backer rod prevents the wire from floating when the loop sealant is applied.
6. Apply the sealant. The sealant should have good adhesion properties and be compatible with 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