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ISO 9001 REGISTERED
Since 2000

MODEL L-ATG SERIES

Firmware Version 1.01

ANTI-TAILGATING LOOP DETECTORS

OPERATING INSTRUCTIONS

I General

Please verify source voltage before applying power. The model designation indicates the input power required for the detector as follows.

Model L-ATG-xx

- **1** = 120 VAC
- **5** = 12 VDC / 24 VDC / 24 VAC
- **35** = 240 VAC

The Model L-ATG is designed to accurately count passenger vehicles and identify tailgating passenger vehicles passing over small inductive loops. Typical loop size is 2.5 feet x 6 feet. The loop size can vary from 2 feet to 3 feet in the direction of travel and 5 feet to 7 feet across the lane. The loop should have three (3), four (4), or five (5) turns of wire. The detector will operate most effectively when connected to a single loop. ***Connection to multiple loops is not recommended.*** Please note that the Model L-ATG has been specifically designed and tested to count and/or identify ***passenger vehicles***, not commercial vehicles or vehicles towing trailers.

The Model L-ATG accumulates vehicle counts and can be configured to display the accumulated count on a front panel Liquid Crystal Display (LCD). The Model L-ATG features two (2) relay outputs. Relay A, the presence output, is used for vehicle presence detection. Relay B, the secondary output, can be used to provide a vehicle count indication to an external device or provide an indication that a tailgating incident or vehicle entry has occurred.

Prior to initial operation, the Model L-ATG detector must be calibrated. Connect the detector to an appropriately wired harness and apply power. Follow the instructions outlined under **Option 4 - Training Mode** on page 3 to calibrate the detector.

II Factory Default Settings

Function	Default Setting
Loop Frequency (8 steps)	2
Sensitivity Level (OFF, 1 to 9, CALL)	5
Call Delay Time (0 to 255 seconds)	0
Call Extension Time (0 to 25.5 seconds)	0.0
Max Presence Time (OFF, 1 to 999 seconds)	OFF
Option 1 - Display Loop Inductance (L) and % Loop Inductance Change (-ΔL/L)	OFF
Option 2.0 - Display Vehicle Count	OFF
Option 2.1 - Reset Vehicle Count	OFF
Option 3 - Relay B Buzzer	OFF
Option 4 - Training Mode	OFF
Option 5 - Relay B Output Mode	5.0
Option 6 - Control Input Active High / Low	OFF

III Viewing and Programming Detector Functions

i Entering and Exiting Program Mode

- Enter the PROGRAM mode by momentarily pressing the **FUNC** pushbutton. Use the **FUNC** pushbutton to step through the functions described below.
- To change a function's setting or to toggle a function ***ON*** or ***OFF***, press the ▲ (UP) or ▼ (DOWN) pushbutton.
- To exit the PROGRAM mode and return to the NORMAL display mode, press and hold the **FUNC** pushbutton continuously for one second.

ii Program Mode Functions

Loop Frequency

Loop Frequency can be adjusted from 1 to 8. Press the ▲ (UP) or ▼ (DOWN) pushbutton to change the programmed Loop Frequency. The filled segment on the bargraph indicates the setting. The left-most segment represents setting 1 and the right-most segment represents setting 8. The LCD displays the actual operating frequency of the loop circuit. A separation of at least 5 KHz for adjacent loops, not connected to the same detector, is recommended. The factory default setting is Loop Frequency 2. ***NOTE: Changing the frequency will reset the detector. Care should be taken to ensure that the detector is not reset while the detection zone is occupied.***

Sensitivity Level

The Sensitivity Level can be adjusted from 1 to 9 or set to ***CALL*** or ***OFF***. Press the ▲ (UP) or ▼ (DOWN) pushbutton to change the programmed Sensitivity Level. The lowest Sensitivity Level is 1 and the highest Sensitivity Level is 9. The detector can be configured to place a permanent call by selecting ***CALL*** (one setting above Sensitivity Level 9). The detector can be disabled by selecting ***OFF*** (one setting below Sensitivity Level 1). If ***CALL*** or ***OFF*** is selected, the LCD flashes the message ***CALL*** or ***OFF*** during NORMAL display mode. Refer to **Section V Sensitivity Setting** for instructions on how to use the bargraph to determine the proper Sensitivity Level setting for the loop / lead-in network connected to the detector. The factory default setting is Sensitivity Level 5. ***NOTE: Changing the Sensitivity Level setting will reset the detector. Care should be taken to ensure that the detector is not reset while the detection zone is occupied.***

Call Delay Time

Call Delay Time applies to Relay A only and can be adjusted from 0 to 255 seconds by pressing the ▲ (UP) or ▼ (DOWN) pushbutton. When the Call Delay Time is set to 0, pressing the DOWN pushbutton steps the value up to 255 seconds. When the Call Delay Time is set to 255 seconds, pressing the UP pushbutton steps the value down to 0 seconds. During the Call Delay period, the **DETECT** LED flashes at a four Hz rate with a 50% duty cycle and the LCD displays a countdown of the Call Delay Time. The factory default setting of Call Delay Time is 0 seconds.

Call Extension Time

Call Extension Time applies to Relay A only and can be adjusted from 0.0 to 25.5 seconds by pressing the ▲ (UP) or ▼ (DOWN) pushbutton. When the Call Extension Time is set to 0.0, pressing the DOWN pushbutton steps the value up to 25.5 seconds. When the Call Extension Time is set to 25.5 seconds, pressing the UP pushbutton steps the value down to 0.0. During the Call Extension period, the **DETECT** LED flashes at a 16 Hz rate with a 50% duty cycle and the LCD displays a countdown of the Call Extension Time. The factory default setting of Call Extension Time is 0.0 seconds.

Max Presence Time

Max Presence Time applies to Relay A only and can be adjusted from 1 to 999 seconds or set to ***OFF*** by pressing the ▲ (UP) or ▼ (DOWN) pushbutton. When Max Presence Time is set to ***OFF***, True Presence™ mode is selected and the detector will provide a Call output as long as a vehicle is present in the loop detection zone. TruePresence™ time applies only for normal size passenger vehicles and for normal size loops (approximately 10 ft^2 to 120 ft^2). When Max Presence Time is set to 1 to 999 seconds, a Call output occurs when a vehicle is detected. The Max Presence timer starts timing when the Call output begins. The Call output continues until the Max Presence timer has counted down to zero or until the vehicle leaves the loop detection zone. Any time a Call output drops while the Max Presence timer is timing, the Max Presence timer is reset to the Max Presence time setting. The factory default setting of Max Presence Time is ***OFF*** (True Presence™ Mode).

Option 1 - Display Loop Inductance (L) and % Loop Inductance Change (-ΔL/L)

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles Option 1 between ***ON*** and ***OFF***. When Option 1 is ***OFF***, the LCD displays three dashed lines (- - -) during a No Call state or ***CALL*** and the Call strength (via the LCD bargraph display) during a Call state. When Option 1 is ***ON*** and the detector is operating in NORMAL display mode, the LCD continuously displays the Loop Inductance value (L) in microhenries (µH) between 15 and 2500 µH. The display shows three digits if the inductance is between 15 and 999 µH. If the inductance is greater than 999 µH, the display alternately flashes between ***1*** or ***2*** and the lower three digits. The combination of the one and three digit displays represent inductance values from 1000 to 2500 µH. When a vehicle is detected, the Call is indicated by means of the **DETECT** LED and the LCD bargraph display. While in the Call state, the LCD also displays the -ΔL/L value while a vehicle is detected. The maximum -ΔL/L that has occurred is displayed for two seconds unless a greater change occurs. The count down of the Delay, Extension, and/or Max Presence timers is ***not*** displayed when Option 1 is ***ON***. Once set to ***ON***, Option 1 will turn ***OFF*** after 15 minutes have elapsed. The factory default setting of Option 1 is ***OFF***.

Option 2 - Display Vehicle Count

This option has two parameters. Option 2.0 is used to turn the display of vehicle counts on the front panel mounted LCD ***ON*** and ***OFF***. Option 2.1 is used to reset the vehicle count to zero. Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles either parameter between ***ON*** and ***OFF***.

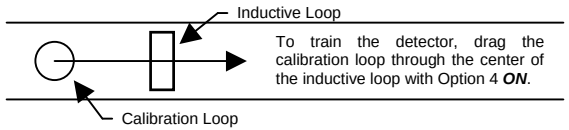
The detector is capable of accumulating 99,999 vehicle counts before rolling over to zero. When Option 2.0 is ***ON***, the NORMAL display will show the accumulated vehicle count since the vehicle count was last reset. The display will show the hundreds, tens, and ones digits until the accumulated count exceeds 999. At this point the display will alternate between the ten thousands and thousands digits and the remaining three digits for hundreds, tens, and ones. Setting Option 2.1 to ***ON*** resets the accumulated vehicle count. The setting of Option 2.1 automatically reverts to the ***OFF*** state when the parameter is exited. The factory default setting of Options 2.0 and 2.1 is ***OFF***. ***NOTE: Loss of power or resetting the detector will not reset the vehicle count.***

Option 3 - Relay B Buzzer

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles Option 3 between ***ON*** and ***OFF***. When Option 3 is ***ON***, an audible signal is emitted any time Relay B outputs a count, tailgating, or entry signal. Option 3 will automatically return to the ***OFF*** state 15 minutes after being set to ***ON***. The factory default setting of Option 3 is ***OFF***.

Option 4 - Training Mode

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles Option 4 between ***ON*** and ***OFF***. When Option 4 is ***ON***, the detector is placed in the training mode. To train the detector, turn Option 4 ***ON***. The LCD will display ***CAL***. Place the Reno A&E Calibration Loop (not included with the detector) on the ground at least two feet away from the inductive loop and slowly drag the calibration loop through the center of the lane making sure that the loop passes over the center of inductive loop. The training process takes approximately five (5) seconds. Once the training process has successfully been completed, the display will revert from ***CAL*** to Option 4 ***OFF***. Please note that once the training process has been initiated, the only way to abort the process is to cycle power to the detector. The factory default setting of Option 4 is ***OFF***. ***NOTE: Proper training is essential for accurate detection of tailgating vehicles. It is critical that cars or other vehicles do not pass over the inductive loop while training is in progress.***



Option 5 - Relay B Output Mode

Option 5 is used to control the output mode of Relay B. Option 5 has seven (7) settings, 5.0 through 5.6. A setting of 5.0 is generally used in applications where the primary concern accurate counting of passenger vehicle entries. Option 5 settings 5.1 through 5.6 are used in applications where the primary concern is detection of events that are considered to be exceptions to normal entrance occurrences (i.e. tailgating or multiple passenger vehicle entry occurrences).

When Option 5 is set to 5.0, the detector's count total is incremented by one and Relay B provides a 0.25 second pulse count output for each passenger vehicle that passes over the loop.

Option 5 settings 5.1 through 5.3 are used in applications where the primary concern is detection of tailgating events. A tailgating incident occurs when two passenger vehicles are over the loop at the same time. When Option 5 is set to 5.1, 5.2, or 5.3 the detector's count total is incremented by one and Relay B provides a pulse output ***only*** when a tailgating incident has been detected. The duration of the pulse output varies depending on the setting of the option. When set to 5.1, the pulse duration is 0.25 second. When set to 5.2, the pulse duration is one second. When set to 5.3, the pulse duration is five seconds.

Option 5 settings 5.4 through 5.6 are used in applications where the primary concern is detection of multiple passenger vehicle entry events. Option 5 settings 5.4, 5.5, and 5.6 function in conjunction with Option 6 (see **Option 6 - Control Input Active High / Low** below). In a normal entrance scenario, one passenger vehicle enters the controlled area for each cycle of the control input. (In general, the control input is active when the gate is open and inactive when the gate is closed.) There are two different output schemes that can occur. The first occurs when Option 5 is set to 5.4, 5.5, or 5.6 and the state of the control input is active (i.e. the gate is open). The detector's count total is incremented by one and Relay B provides a pulse output for each passenger vehicle that crosses the loop ***after*** the first passenger vehicle has crossed the loop. Vehicle counts continue to be accumulated until the state of the control input changes (i.e. the gate closes). If the state of the control input is not active (i.e. the gate is closed), Option 5 settings 5.4, 5.5, and 5.6 result in a slightly different output scheme. The detector's count total is incremented by one and Relay B provides a pulse output for ***every*** passenger vehicle that crosses the loop. When set to Option 5.4 ON, the pulse duration is 0.25 second. When set to Option 5.5 ON, the pulse duration is one second. When set to Option 5.6 ON, the pulse duration is five seconds.

The factory default setting of Option 5 is 5.0.

Option 6 - Control Input Active High / Low

When Option 6 is ***OFF***, the control input is active when it is in a high state. When Option 6 is ***ON***, the control input is active when it is not in a high state. The factory default setting of Option 6 is ***OFF***. ***NOTE: Proper detector operation requires that the control input is active when the gate or barrier is open.***

Loop Fail

The number of loop failures logged in the loop fail register is displayed. Any time the detector enters the Fail Safe Mode due to a recognized loop failure, the loop fail register is incremented by one count. Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton will clear the loop fail register. The number of loop fail counts is also reset to zero by any power down, when the harness is disconnected from the detector, or when the detector is reset. The loop fail register is not reset when the detector's sensitivity level or frequency is changed.

After the detector is initialized and operating in a normal manner, the loop is continuously monitored for faulty conditions (e.g. broken wires, poor splices, bad solder connections, etc.). If the measured loop inductance value rapidly changes by more than ±25%, the loop is considered to have failed. The detector then enters the Fail Safe Mode, which generates a constant Call output. When the detector is in Fail Safe Mode, the Loop Fail symbol located at the bottom of the LCD will be illuminated and the LCD will display ***L lo*** for low loop inductance and shorted loop situations or ***L hi*** for high loop inductance and open loop situations. In addition, the **DETECT** LED will begin to emit a flashing pattern (three flashes per second). If the loop self-heals, the detector and LCD will resume normal operation. The LED will continue to flash as a means of indicating a prior loop fail condition and will continue to do so until the loop fail register is cleared.

Firmware Version

The version and revision level of the firmware programmed into the detector are displayed. This is a view only parameter. The display alternates between the model letter and firmware version (e.g. ***LA1***) and the firmware revision level (e.g. ***.01***).

IV Reset Procedures

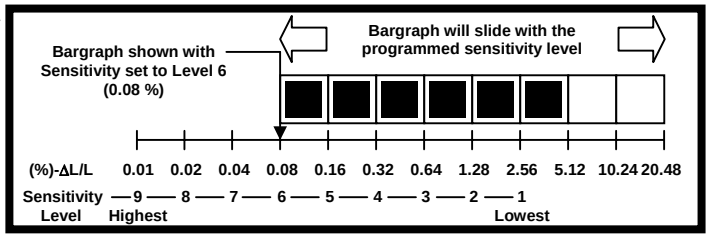
- Press and hold the **FUNC** pushbutton continuously for three (3) seconds. After three seconds the detector is reset maintaining all previous settings.
- Changing the frequency or sensitivity setting will enter the new setting and reset the detector. Changing any of the other parameters will take effect immediately or on the next detection, but will not reset the detector. Simply entering the program mode without changing any parameter will not reset the detector.
- Pressing and holding all three front panel pushbuttons simultaneously and continuously for five (5) seconds resets the detector and also restores all factory default settings. ***NOTE: Following a factory default reset, the detector must be recalibrated. Refer to*** **Option 4 - Training Mode** ***for details.***
- The detector can be reset by removing and reapplying power.
- The Loop Fail History is cleared by all reset procedures described above except changing or changing frequency or sensitivity. Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton while viewing the Loop Fail History will also clear the Loop Fail History.
- The vehicle count can only be reset by setting Option 2.1 to ***ON***. A detector reset, factory default reset, or loss of power will not reset the vehicle count.

V Sensitivity Setting

Sensitivity is controlled by selecting a Sensitivity Level for the detector. The sensitivity settings of 1 through 9 represent detection thresholds from the least sensitive to the most sensitive. Setting the proper sensitivity level for the loop circuit provides stability to the system. If set too high, the detector may detect adjacent traffic. If set too low, the detector may not detect small vehicles or high bed vehicles.

The LCD includes an eight (8) segment bargraph that represents of the relative change of inductance seen by the detector. This automatically takes into account loop size, loop inductance, number of turns, loop geometry, lead-in length, etc. The bargraph is a sliding scale that is related to the programmed Sensitivity Level. The first (left-most) bargraph segment represents the minimum inductance change necessary for the detector to output a Call at the currently selected sensitivity level. Larger inductance changes are indicated by more segments. Each additional segment indicates that the next sensitivity level has also been met or exceeded. When used in this manner, the bargraph can be used to determine if the sensitivity is set too high or too low, facilitating the optimal setting of the sensitivity level.

The diagram below shows the bargraph with the detector set to Sensitivity Level 6 (0.08% -ΔL/L). The bargraph indicates that the vehicle in the loop zone has exceeded the minimum sensitivity level by an additional five Sensitivity Levels or 2.56% -ΔL/L. ***The typical vehicle to be detected should cause five or six segments of the bargraph to become filled.***



If the typical vehicle to be detected is not creating a five to six segment display on the bargraph, count how many segments are being displayed and subtract six. If the number is positive, lower the sensitivity that many levels. If the number is negative, raise the sensitivity that many levels. Example: The detector sensitivity is currently programmed at three (3). The bargraph shows four (4) segments during a typical vehicle detection. Take four (4) (the number of segments displayed) and subtract six (6) to get minus two (-2). Since the answer is negative, raise the sensitivity level, currently at three (3), by two (2) to arrive at the desired sensitivity level of five (5).

The bargraph can also be used to take advantage of a direct relationship between the percent change of inductance caused by a single standard automobile and a small motorcycle in the same loop / lead-in configuration. Adjusting the sensitivity level until seven (7) segments of the bargraph are shaded when a standard automobile is present in the loop detection zone ensures that the sensitivity has been set high enough to detect a small motorcycle in the same loop detection zone. The best method to reduce adjacent loop detection is to reduce the sensitivity level by the number of segments that are flickering, however this will also eliminate the ability to reliably detect small motorcycles.

VI Pin Connections

(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	Control Input
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 connected, and no vehicle detected.