

## FIRMWARE VERSION

The firmware version and revision for the detector is displayed. This is a view only parameter. The display alternates between the model letter and firmware version (example **L34**) and the firmware revision number (example **.00**).

### III. How to Reset the Detector:

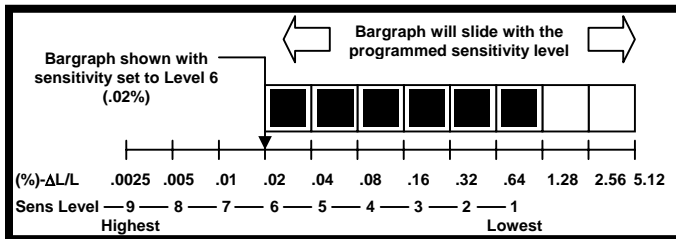
- Press and hold the FUNC pushbutton continuously for three (3) seconds. After three seconds the detector is reset maintaining all previous settings.
- Changing the frequency or sensitivity setting will enter the new setting and reset the detector. Changing any of the other parameters will take effect 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 four pushbuttons **simultaneously** and continuously for five (5) seconds resets the detector and also restores the default settings.
- Changing the setting of Option 4 (Noise Filter Disable) will reset the detector.
- The detector can be reset by removing and reapplying power.
- **Loop Fail History** is cleared by all reset procedures described above except changing the setting of Option 4 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.

### IV. Sensitivity Setting:

Sensitivity is controlled by selecting a Sensitivity Level for the detector. The sensitivity settings of 1 through 9 represent 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 is a representation of the relative change of inductance as seen by the detector. This automatically takes into account loop size, loop inductance, number of loops, number of turns, loop geometry, lead-in length, etc. The bargraph is a sliding scale that is relative 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 will indicate more segments. Each additional segment indicates that the next sensitivity level has also been met or exceeded. Therefore the bargraph indicates if the sensitivity is set too high or too low, easily facilitating the ideal setting of the sensitivity level.

The diagram below shows the bargraph with the detector set to Sensitivity Level 6: 0.02% - $\Delta$ L/L. The bargraph indicates that the vehicle in the loop zone has exceeded the minimum sensitivity level by an additional five Sensitivity Levels or 0.64% - $\Delta$ L/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 zone ensures that the sensitivity has been set to detect a small motorcycle in the same loop zone. If the left most segments of the bargraph are flickering when vehicles pass in the adjacent lane, the Phase Green Compensation can be turned on to minimize the effects of adjacent lane detection (see Option 5). The second method of reducing adjacent lane 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.



**Reno A & E**  
4655 Aircenter Circle  
Reno, NV 89502-5948 USA  
Telephone: (775) 826-2020  
Fax: (775) 826-9191  
Website: www.renoae.com  
E-mail: contact@renoae.com



## OPERATING INSTRUCTIONS FOR

# Model L-1200 Series

Firmware Version 34

## SINGLE CHANNEL LOOP DETECTORS

### I. Factory Default Settings:

Function	Default Setting	Notes
Frequency (8 steps)	2	
Sensitivity (OFF, 1 to 9, CALL)	6	
Presence / Pulse	Presence	
CALL Delay Time (0 - 255 seconds)	0	
CALL Extension Time (0 - 25.5 seconds)	0.0	
Max Presence Time (OFF, 1 - 999 seconds)	OFF	
End Of Green	OFF	
Option 1 (Loop Inductance, L) *	OFF	
Option 2 (% Inductance Change, - $\Delta$ L/L) *	OFF	
Option 3 (CALL Extension Time Control)	OFF	
Option 4 (Noise Filter Disable) *	OFF	
Option 5 (Phase Green Loop Compensation)	OFF	
Option 6.0 (Display Vehicle Count)	OFF	Model 1201 Only
Option 6.1 (Reset Vehicle Count)	OFF	Model 1201 Only
Option 7 (Number of Loops)	04	Model 1201 Only
Option 11 (Audible Detect)	OFF	
Option 12 (Detector Disconnect)	OFF	

### II. How to View and Program Detector Functions:

- 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 mode, press and hold the FUNC pushbutton continuously for one second.

#### LOOP FREQUENCY

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 will display 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. **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

Press the ▲ (UP) or ▼ (DOWN) pushbutton to change the programmed sensitivity. 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 after Sensitivity Level 9). The detector can be disabled by selecting **OFF** (one setting before Sensitivity Level 1). If CALL or OFF is selected, the LCD flashes the message **CALL** or **OFF** during NORMAL DISPLAY mode. See *Section IV Sensitivity Setting* for instructions on how to use the bargraph to determine the proper sensitivity setting for the loop / lead-in network connected to the detector. **NOTE:** Changing the sensitivity will reset the detector. Care should be taken to ensure that the detector is not reset while the detection zone is occupied.

## **PRESENCE / PULSE**

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles between PRESENCE and PULSE modes. PRESENCE mode outputs a call as long as the detection zone is occupied. CALL EXTENSION, CALL DELAY, and MAX PRESENCE can all modify the operation of the PRESENCE mode. PULSE mode generates a 125 millisecond pulse when a vehicle is first detected. Only CALL EXTENSION and CALL DELAY modify PULSE mode operation.

## **CALL DELAY TIME**

Call Delay Time can be adjusted from 0 to 255 seconds by pressing the ▲ (UP) or ▼ (DOWN) pushbutton. When the Call Delay Time is 0, pressing the DOWN pushbutton steps the value to 255 seconds. When the Call Delay Time is 255 seconds, pressing the UP pushbutton steps the value to 0. During the DELAY PERIOD, the DETECT LED flashes at a four Hz rate with a 50% duty cycle and the LCD shows a countdown of the Call Delay Time.

## **CALL EXTENSION TIME**

Call Extension Time can be set from 0.0 to 25.5 seconds by pressing the ▲ (UP) or ▼ (DOWN) pushbutton. When the Call Extension Time is 0.0, pressing the DOWN pushbutton steps the value to 25.5 seconds. When the Call Extension Time is 25.5 seconds, pressing the UP pushbutton steps the value to 0.0. During the EXTENSION PERIOD, the DETECT LED flashes at a 16 Hz rate with a 50% duty cycle and the LCD shows a countdown of the Call Extension Time.

## **MAX PRESENCE TIME**

Max Presence Time can be adjusted from OFF to 999 seconds by pressing the ▲ (UP) or ▼ (DOWN) pushbutton. When the time is set to **OFF**, pressing the DOWN pushbutton steps the value to 999 seconds. If Max Presence Time is set to anything other than **OFF**, an EOG selection appears on the LCD after the Max Presence selection.

A call output occurs when either a vehicle is detected (Delay Time = 0) or after the delay timer has counted down to zero following the arrival of a vehicle. The Max Presence timer starts timing when a call output occurs. 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 Max Presence timer counts towards zero as long as the call output exists. If EOG (End of Green) control is **OFF**, the detector resets at the time the Max Presence timer reaches zero. If EOG is **ON**, the detector goes into a wait state when the Max Presence timer reaches zero. The detector remains in the wait state until either the call drops, or the green input signal to the detector transitions from the **ON** condition to the **OFF** condition. If the call drops, no reset action occurs. If the Max Presence timer is in the wait state when the green input signal transitions from the **ON** condition to the **OFF** condition, the detector is reset with the vehicle over the loop. When the Max Presence timer is in the wait state, the **MAX PRESENCE - EOG** message flashes on the LCD. **NOTE:** If the Max Presence timer does reset the detector, no CALL EXTENSION time will occur.

## **EOG (END OF GREEN) NOTE: Only appears if MAX PRESENCE TIME is not set to OFF.**

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles between **ON** and **OFF**. See MAX PRESENCE TIME above for the effects of turning this feature on.

## **OPTION 1: LOOP INDUCTANCE**

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles between **ON** and **OFF**. When Option 1 is **OFF** the LCD indicates three dashed lines (- - -) during the No Call state. When Option 1 is **ON** the LCD continuously indicates the Loop Inductance value in microhenries while in the NORMAL DISPLAY mode. After 15 minutes, Option 1 turns **OFF**. The display shows three digits if the inductance is between 15 and 999  $\mu$ H. If the inductance is greater than 999  $\mu$ H, the display alternately flashes between **1** or **2** and the lower three digits. The four digits represent inductance values from 1000 to 2500  $\mu$ H. When a vehicle is detected the Detect LED and bargraph display indicate the call. The count down of the Delay, Extension, and Max Presence timers is **not** displayed when Option 1 is **ON**.

## **OPTION 2: INDUCTANCE CHANGE - $\Delta$ L/L**

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles between **ON** and **OFF**. When Option 2 is **OFF**, the LCD indicates a steady Call when a vehicle is detected. When Option 2 is **ON**, the LCD indicates the - $\Delta$ L/L value when a vehicle is detected. The maximum - $\Delta$ L/L that occurred is displayed for two seconds unless a greater change occurs.

## **OPTION 3: CALL EXTENSION TIME CONTROL**

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles between **ON** and **OFF**. When Option 3 is **OFF**, the detector extends all calls for the programmed extension time. When Option 3 is **ON**, the detector extends calls for the programmed extension time **only** when the Phase Green Input (Delay Override) signal is active.

## **OPTION 4: NOISE FILTER DISABLE**

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles between **ON** and **OFF**. When Option 4 is **OFF**, internal noise filtering is utilized. When Option 4 is **ON**, internal noise filtering is disabled thus providing a faster response time. Changing the setting of this option will reset the detector. *It is recommended that this option only be turned ON when the detector is used for speed and/or occupancy measurement applications.*

## **OPTION 5: PHASE GREEN LOOP COMPENSATION**

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles between **ON** and **OFF**. When Option 5 is **OFF**, normal loop compensation is used. No compensation occurs during the first four minutes following the detection of a vehicle to preserve small motorcycle detection for a full four minutes. When Option 5 is **ON**, loop compensation begins when the Phase Green (Delay Override) input becomes true and the detector is outputting a Call. The detector will then begin to tune out small changes, such as adjacent lane pick up and/or loop drift. The presence time for average size vehicles is not affected (note that a small motorcycle will also be tuned out in a short period of time following the start of Phase Green). This option is useful in minimizing false detection resulting from adjacent lane pickup effect.

## **OPTION 6: DISPLAY / RESET VEHICLE COUNT**

This option has two parameters. Option 6.0 is used to turn the display of vehicle counts **ON** and **OFF**. Option 6.1 is used to reset the vehicle count to zero. Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles between **ON** and **OFF** for either parameter. When Option 6.0 is **ON**, the NORMAL DISPLAY will show the accumulated vehicle count since last vehicle count 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 6.1 to **ON** resets the accumulated vehicle count. The setting automatically returns to the **OFF** state when the parameter is exited.

## **OPTION 7: LOOP CONFIGURATION FOR COUNTING**

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton scrolls through the available loop configurations for counting. The currently available options are 7.01 through 7.05 where the last two digits specify how many loops there are in the detection zone. The detection zone must be confined to a single lane of traffic.

## **OPTION 11: AUDIBLE DETECT SIGNAL**

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles between **ON** and **OFF**. When Option 11 is **ON**, an audible signal is emitted any time the detection zone is occupied. Delay and Extension time have no effect on the audible signal. Option 11 will automatically turn off after 15 minutes.

## **OPTION 12: DETECTOR DISCONNECT**

Pressing either the ▲ (UP) or ▼ (DOWN) pushbutton toggles Option 12.0 between **ON** and **OFF**. When Option 12.0 is turned **ON**, detector disconnect is enabled and Option 12.1 is now accessible. If Option 12.1 is **OFF**, the extension timer also serves as the disconnect timer. If Option 12.1 is **ON**, the extension timer is inoperative and its programmed value is used as the disconnect timer (gap timer). When Detector Disconnect is enabled (Option 12.0 is **ON**), the detector operates normally during times when the phase green input is **OFF**. When the phase green input is **ON**, the detector will use the value programmed as extension time to determine when to disconnect the output for the detector. Therefore, if the detection zone is empty for the amount of time specified in the extension timer, the output for the detector will be disconnected. If a call does not exist when the phase green input transitions to **ON**, the output is immediately disconnected. The output is re-enabled when the phase green input transitions to **OFF**.

## **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 setting of Option 4 (Noise Filter Disable) is changed or when the detector's sensitivity 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  $\pm 25\%$ , 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.