BICYCLE Detector

RENO

Model C-1101-B & Model C-1201-B

C-1101-B   C-1201-B

➢ **Requires parallelogram loop geometry.**

➢ **Differentiates bicycles from other vehicles.**

➢ **Special initial time and extension time for bicycles enables the intersection controller to operate at maximum efficiency.**

The Model C-1101-B and C-1201-B bicycle detectors are designed to **detect ALL vehicles** with the added ability of differentiating bicycles from motorized vehicles, including motorcycles. Separating bicycles from motorized vehicles allows programming **independent initial and extension times for bicycles**. This allows the traffic engineer to detect **and** provide safe passage time for bicycles without compromising the intersection's efficiency. The associated phase green logic may be connected to the phase green input on the Model C-1101-B and Model C-1201-B bicycle detectors. (Note: The Model C-1101-B receives the phase green logic from the Reno A&E Model PGI - Phase Green Interface Module.)

When the bicycle initial timer is set to zero (0) and a bicycle is detected passing through the parallelogram loop, the channel will output a 100 millisecond pulse. The pulse width can be increased with the extension timer.

When the bicycle initial timer is not zero (0) and a bicycle is detected passing through the parallelogram loop while the associated phase is **not green**, the detector output is latched in the "**CALL**" state. The latched "**CALL**" insures the controller will provide a green signal for bicycles. When a bicycle is detected passing through the parallelogram loop while the associated phase is green the "CALL" is extended by the programmed bicycle extension time. This method of operation insures that regardless of where the bicycle stops, the bicycle receives a green signal with the proper initial timing. When the phase green becomes active the "bicycle initial time" begins timing. When the "bicycle initial time" reaches zero the latched "**CALL**" is cleared. This method of clearing the latched "**CALL**" insures that bicycles always receive a full "bicycle initial time". (e.g. if a pre-emption occurs that terminates the green prior to a "full bicycle initial time", the bicycle receives a full "bicycle initial time" on the following controller cycle).

The Model C-1101-B and the Model C-1201-B bicycle detectors provide two outputs per channel. The primary output provides "**CALL**" outputs for all vehicles, including motorcycles and bicycles. The primary output can be programmed for Lane Line "LL" mode, which only outputs for bicycles. When turned ON the secondary output always provides a single pulse for each bicycle. The detector's latched call, bicycle in time, and extension time respond only to bicycles.

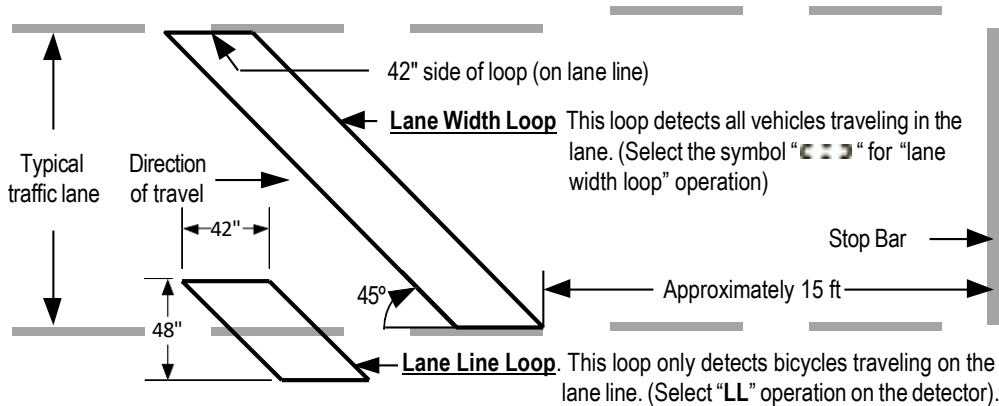US Patents # 8,842,023 and # 8,779,942

Model C-1101-B, C-1201-B Additional Information

REQUIRED BICYCLE LOOP:

Warning: The Models C-1101-B & C-1201-B Bicycle Detectors require the parallelogram loop geometry.

The recommended parallelogram loop is a Reno A&E performed loop (PLB or PLH). The preformed loop is installed across the entire lane width as shown in Figure 1. The 42 inch sides of the parallelogram loop should be on the lane lines

42" side of loop (on lane line)

Lane Width Loop This loop detects all vehicles traveling in the lane. (Select the symbol "⊏ ⊐" for "lane width loop" operation)

Typical traffic lane

Direction of travel

42"

48"

45°

Figure 1

Stop Bar

Approximately 15 ft

Lane Line Loop. This loop only detects bicycles traveling on the lane line. (Select "**LL**" operation on the detector).

GENERAL CHARACTERISTICS:

The Model C-1101-B and the Model C-1201-B bicycle detectors are fully self tuning and do not require any sensitivity adjustment. The only adjustments are:
1.) Bicycle initial time
2.) Bicycle extension time
3.) Loop Frequency

Adjustments are made using the push button switches and LCD display. When the

loop is vacant the LCD display indicates "**- - -**".

Normal size motorized vehicles are indicated by "**CALL**" and an illuminated LED for the channel.

A motorcycle that has passed through the loop latches the "**CALL**", and is indicated by a flashing "**CALL**" and an illuminated LED. The latched motorcycle "**CALL**" is cleared immediately when either a normal size vehicle enters the loop, or the phase green becomes active. This ensures that motorcycles will be served even though the loop may be vacant at the time the phase is to be served.

OPERATING INSTRUCTIONS:

Lane Width **Lane Line**

Menu Operation: Select the channel by pressing the "CHAN" switch. The loop symbols ⊡ and ⊡ identify the selected channel.
Select the function by pressing the "FUNC" switch.
Press the ▲ or ▼ switch to make adjustments.

Step #1 **Channel Off / Lane Width Mode / Lane Line Mode:**
When the channel is set to the "**OFF**" state the channel is disabled.
When the Channel is set to " ⊏ ⊐ " the detector outputs a call for all vehicles. Motorized vehicles are indicated by "**CALL**". Bicycles are indicated by "**bc**".
When the channel is set to "**LL**" the detector outputs calls for bicycles only. Bicycle calls are indicated by "**bc**".

Loop Symbols 1 and 2 indicate selected channel

Loop Symbols 3 and 4 indicate presence of phase green on channels 1 and 2 respectively

Step #2 **Bicycle Initial Time:**
Bicycle initial time is indicated on the display by "**PRESENCE**". Bicycle initial time is selected in one second steps.
When set to 0, a 100 msec pulse will occur for each bicycle detected. Pulse can be extended with the extension time (Default value = 0 seconds)

Step #3 **Bicycle Extension Time:**
Bicycle extension time is indicated on the display by "**EXTENSION**". Bicycle extension time is selected in 0.1 second steps. The minimum value is zero. (Default value = 0 seconds)

Step #4 **Secondary Pulse Outputs:**
When turned "**ON**" the secondary output always provides a single pulse for each bicycle. The secondary outputs are on channels 3 and 4 of a four channel detector. Using the secondary pulse outputs will require two slots in the detector rack.

Step #5 **Bicycle Counts:**
The alternating message "bc" (0.2 seconds) and the three digit number "nnn" (2.0 seconds) indicate the number of accumulated bicycle counts since the last reset. Each bicycle passing over the parallelogram loop increments the number by one count. The number can be reset by pressing either the ▲ or ▼ switch, or resetting the detector.

Step #6 **Option 1 (Buzzer):**
This controls the "buzzer" feature. When turned "ON" the feature is active for both channels. Channel "1" is identified by a single beep. Channel 2 is identified by a double beep. Short beep(s) indicate motorized vehicles. Long beep(s) indicate bicycles.

Step #7 **Option 2 (Output Test):**
When turned "ON" for a channel a "CALL" state is activated on the channel output and repeated pulses are activated on the bicycle pulse output. The front panel LEDs indicate the output states.
Note: Options 1 and 2 are automatically disabled 15 minutes after the last actuation of any push button switch.
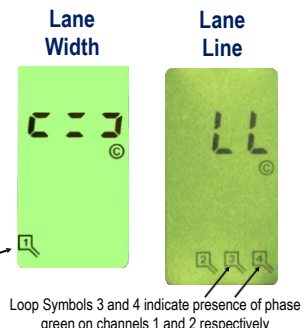
OPERATING INSTRUCTIONS (CONT'D):

Step #8   **Loop Inductance:**
The display indicates the loop inductance value in Microhenries.

Step #9   **Loop Frequency:**
The loop frequency is displayed in Kilohertz. (Normally in the range of 20-50 KHz).
Pressing either the ▲ or ▼ switch selects 1 of 8 loop operating frequencies.

Step #10   **Loop Fail:**
The three digit number indicates the total number of loop failures that have occurred since the last reset or loss of power. A high number indicates a possible loose loop connection. (Loose terminal screw, etc.)

Step #11   **Firmware Version:**
This is the firmware version in the microprocessor. (e.g. **Cbc 3.0**)

SPECIFICATIONS (ELECTRICAL):

Power: 10.8 to 30 VDC, 120 mA maximum, 1.8 Watts maximum.

Loop Inductance Range: 20 to 2500 microhenries .

Loop Inputs: Transformer isolated.

Lightning Protection: The detector can tolerate, without damage, a 10 microfarad capacitor charged to 2,000 volts being discharged directly into the loop input terminals, or a 10 microfarad capacitor charged to 2,000 volts being discharged between either loop terminal and earth ground.

Reset: Meets and/or exceeds NEMA TS 1 and TS 2 detector specifications. Application of a 30-millisecond low state (0 to 8 VDC) to pin C resets all channels. The detector can also be reset by removing and reapplying power. **Each detector channel can be independently reset** by pressing the CHAN button until the desired channel is selected. When the desired channel has been selected hold the CHAN button for 3 seconds. Changing loop frequency resets the channel.

Phase Green Inputs: Meets and/or exceeds all NEMA TS 1 and TS 2 requirements. When used in racks without phase green logic the RJ-11 connector (mounted on the detector circuit board) provides connections for the phase green inputs. Phase Green ≤ 1.0 VDC. When chan- nel 1 phase green is active the ⬚ symbol is displayed. When channel 2 phase green is active the ⬚ symbol is displayed.

Fail-Safe Outputs: Output defaults to a Call state for any loop failure condition or loss of power.

Channel Status Outputs: Model C-1201-B NEMA TS 2. Each channel has a TS 2 status output to communicate the status of the channel.

Solid State Output Ratings: 30 VDC max drain to source. 50 mA max current. 1.2 VDC max transistor saturation voltage.

Relay Ratings: 2 Amps max., 150 VDC max.

SPECIFICATIONS (OPERATIONAL):

Display: The LCD backlighting illuminates whenever any push button is pressed. The backlighting extinguishes 15 minutes after the last actua-

tion of any push button switch.

Detect Indicators: Each channel has two high-intensity red light-emitting-diodes (LEDs). The first LED indicates a "**CALL**" output or failed loop.

The second LED indicates bicycle pulses.

Self-Tuning: The detector automatically tunes and is operational within 2 seconds after application of power or after being reset.

Environmental Tracking: The detector is fully self-compensating for environmental changes.

Grounded Loop Operation: The loop isolation transformer allows operation with poor quality loops, which may include a single point short to ground.

Loop (Fail) Monitor: If the total inductance of the channel's loop input network exceeds the specified inductance range, or rapidly changes by more than ±25%, the channel will immediately enter the Fail-Safe mode and display "**LOOP FAIL**" on the LCD screen. The type of loop failure will also be displayed as "**L lo**" (for -25% change or shorted loop conditions) or "**L hi**" (for +25% change or open loop conditions). This will continue as long as the loop fault exists. If the detector is reset, or power is momentarily lost, the detector will retune if the loop inductance is within the specified range. The Fail-Safe mode generates a continuous call. At the time of a loop failure, the channel's LED begins pulsing a series of three flashes per second. The LED continues pulsing until the channel is manually reset or power is removed. If the loop "self heals", the "**LOOP FAIL**" message on the LCD will extinguish and the channel will resume normal operation; except the LED will continue pulsing providing an alert that a Loop Fail condition occurred. Each loop failure for the channel is counted and accumulated in the Loop Fail Memory. The total number of loop failures written in the Loop Fail Memory (since the last power interruption or manual reset) is viewed in Program Mode in the "**LOOP FAIL**" screen.

Default Settings: Pressing all four front panel switches simultaneously for 5 seconds resets the detector and restores the factory default settings. See "FACTORY DEFAULT SETTINGS" table.

Display Test: Pressing any two of the front panel switches simultaneously displays all possible symbols and messages on the LCD screen.

FACTORY DEFAULT SETTINGS

Functions	Channel 1	Channel 2
Loop Configuration (**OFF**, ⊏ ⊐ or **LL**)*	⊏ ⊐	⊏ ⊐
Bicycle Initial Time (2 - 999 seconds)	0	0
Bicycle Extension Time (0 - 25.5 seconds)	0	0
Secondary Pulse Output	OFF	OFF
Option 1 (Audible Detect)	OFF	
Option 2 (Output Test)	OFF	OFF
Secondary Pulse Output	OFF	OFF
Loop Frequency (8 steps)	3	7

*Lane width loop " ⊏ ⊐ " provides a "**CALL**" output for all vehicles.

MODEL C-1101-B

Pin	Function	Pin	Function
A	DC (-) Common	1	No Connection
B	DC (+) Power	2	No Connection
C	Reset Input	3	No Connection
D	Channel 1 Loop Input	4	Channel 1 Loop Input
E	Channel 1 Loop Input	5	Channel 1 Loop Input
F	Channel 1 Output, Drain / N.O.	6	No Connection
H	Channel 1 Output, Source / Com	7	No Connection
J	Channel 2 Loop Input	8	Channel 2 Loop Input
K	Channel 2 Loop Input	9	Channel 2 Loop Input
L	Chassis Ground	10	No Connection
M	No Connection	11	No Connection
N	No Connection	12	No Connection
P	No Connection	13	No Connection
R	No Connection	14	No Connection
S	No Connection	15	No Connection
T	No Connection	16	No Connection
U	No Connection	17	No Connection
V	No Connection	18	No Connection
W	Channel 2 Output, Drain / N.O.	19	No Connection
X	Channel 2 Output, Source / Com	20	No Connection
Y	No Connection	21	No Connection
Z	No Connection	22	No Connection

MODEL C-1201-B

Pin	Function	Pin	Function
A	DC (-) Common	1	Channel 1 Phase Green Input
B	DC (+) Power	2	Channel 2 Phase Green Input
C	Reset Input	3	No Connection
D	Channel 1 Loop Input	4	Channel 1 Loop Input
E	Channel 1 Loop Input	5	Channel 1 Loop Input
F	Channel 1 Output, Drain / N.O.	6	No Connection
H	Channel 1 Output, Source / Com	7	Channel 1 TS2 Status Output
J	Channel 2 Loop Input	8	Channel 2 Loop Input
K	Channel 2 Loop Input	9	Channel 2 Loop Input
L	Chassis Ground	10	No Connection
M	No Connection	11	No Connection
N	No Connection	12	No Connection
P	No Connection	13	No Connection
R	No Connection	14	No Connection
S	***Channel 1 Bicycle Pulse Output	15	No Connection
T	No Connection	16	**Logic Ground
U	No Connection	17	No Connection
V	No Connection	18	No Connection
W	Channel 2 Output, Drain / N.O.	19	No Connection
X	Channel 2 Output, Source / Com	20	Channel 2 TS2 Status Output
Y	***Channel 2 Bicycle Pulse Output	21	No Connection
Z	No Connection	22	**Logic Ground

Key slots located between contacts B/2 & C/3, E/5 & F/6, and M/11 & N/12.

 ** Pins 16 and 22 are tied to logic ground to simulate normal operation on channel 3 and 4 (TS 2 status outputs). This allows the Bicycle Pulse Output to occur on channels 3 and 4 outputs.

RJ-11 Jack located on detector PCB

Pin	Function
1	Channel 2 Phase Green Input
2	Channel 1 Phase Green Input
3	***Channel 2 Bicycle Pulse Output
4	No Connection
5	Logic Ground
6	***Channel 1 Bicycle Pulse Output

*** Drain or N.O. contact. Source or relay common are connected to logic ground.

Reno A&E MODEL PGI

Phase Green Interface

Detector Ordering Information:

Model C-xxxx-B-___   **SS** = Solid State Outputs

R = Relay Outputs

1101 = 170/332 Configuration

1201 = NEMA TS 2 Configuration

Note: The phase green signals must be available to the detector to control the bicycle initial time. The Reno A &E Model PGI Phase Green Interface Module accepts up to four 120 VAC (green) signals. The 120 VAC signals are