



C Bicycle Series

TWO CHANNEL BICYCLE LOOP DETECTORS

Allows the traffic engineer to detect and provide safe passage time for bicycles without compromising the intersection's operating efficiency.

FEATURES

- Special Initial Time For Bicycles
- Audible Detect Signal (Buzzer)
- Bicycle Detect Only Mode

HIGHLIGHTS

- Differentiates Bicycles From Other Vehicles
- Model Options For All Cabinet Types
- Operates With Recommended Loop Geometries



Overview: The Model C Bicycle Series detectors are designed to detect all vehicles with the added ability of differentiating bicycles from all other vehicles. The unique capability to identify bicycles from other vehicles allows the user to program initial time and extension time for bicycles only, thus providing a safe passage time through the intersection.

Function: When a bicycle is detected passing through the bicycle loop, the channel's output is latched in the call state. The call output can only be latched during the absence of phase green. The latched call is held until the detector's phase green input becomes active. At the time the phase green input becomes active, the latch is reset, the call is held, and the initial time, which has been programmed in the detector, begins counting down to zero. If the loop is vacant when the initial time reaches zero, the call is dropped. If additional bicycles are detected before the initial time reaches zero, each subsequent bicycle extends the call by either the remaining amount of initial time or the extension time, whichever is greater. During phase green, after the initial time expires, all bicycle calls are extended by the amount of the programmed extension time. The detector's latched call, initial time, and extension time respond only to bicycles. For all other vehicles, the detector functions as a standard presence detector without timing. The detector can also be set for Bicycle Detect Only Mode so that the detector does not output call signals for other vehicles passing over the bicycle detection loop.

Loop Frequency: Each channel has eight (8) selectable loop frequency settings, which are normally in the range of 20 to 100 kilohertz. The actual loop operating frequency is a function of the loop/lead-in network and the detector's loop oscillator circuit components

Sensitivity: A unique bar graph display on the LCD enables the user to select the optimum sensitivity level for any loop/lead-in network. There are nine (9) selectable sensitivity levels per channel, plus settings for continuous call and channel off.

- Continuous Call: When set to the continuous call state the channel output is held in the call state regardless of



the presence or absence of vehicles over the loop. The loop oscillator is disabled in the continuous call state.

- **Channel Off:** When set to the channel off state the channel output is held in the no call state regardless of the presence or absence of vehicles over the loop. The loop oscillator is disabled when in the channel off state.

Call Delay: There is no call delay time for bicycles entering the loop! However, when average size vehicles enter the loop detection zone call delay time begins timing. Whenever the phase green input is active the call delay time is forced to zero. Each channel's call delay time is adjust-able from 0 to 255 seconds in 1-second steps.

Call Extension: The call extension time operation depends on the setting of the bicycle initial time. If the bicycle initial time is set to zero all calls are extended by the programmed extension time. If the bicycle initial time is set to a non-zero value only bicycle calls are extended. Bicycles entering the loop zone during the extension time register a bicycle call and reset the extension time. When the loop zone becomes va-cant the call is held and full extension time is provided. Each channel's call extension time is programmable from 0 to 25.5 seconds in 0.1-second steps.

Bicycle Initial Time: Bicycle initial time is adjustable from OFF to 999 seconds in 1 second steps. Each channel is independently programmed. When bicycle initial time is set to zero the detector functions as a conventional detector. When bicycle initial time is set to a non-zero value the symbol "bc" is displayed on the LCD and the detector functions as a bicycle detector.

The following is a description of operation when operating in the bicycle detector mode: When the bicycle initial time is set to a non-zero value and the phase green is in the not-green state any bicycle passing over the bicycle loop latches the call output. When the bicycle departs the loop (vacant loop) the call is held until the associated phase green becomes active. When the phase green becomes active the latch is cleared, the call is held, and the initial time begins counting. If the loop is vacant when the initial time reaches zero the call is dropped. If a bicycle passes over the loop while the initial time is counting the detection is registered, and when the bicycle departs the loop a full extension time starts counting. The call is held until either the initial time reaches zero, or the extension time reaches zero, whichever is greater. If the extension time value is programmed to zero the bicycle detector extends all bicycle calls for the same time value as the initial time

Option 1 - Loop Inductance Display: When option 1 is turned "on" the LCD screen displays the total loop/lead-in inductance in uH (microhenries). Loop inductance values are normally in the range of 20 uH to 2500 uH. Note: Turning this option "on" activates the option for both channels. Option 1 is disabled 15 minutes after the last switch actuation, reset, or power loss.

Option 2 - Loop Inductance Change (-DL/L) Display: When option 2 is turned "on" the LCD screen displays the percentage change of inductance (-DL/L value) during the call state. Note: Turning option 2 "on" activates the option for both channels. Option 2 is disabled 15 minutes after the last switch actuation, reset, or power loss.

Option 11 - Audible Detect Signal: When option 11 is turned "on" an audible signal is activated whenever the detection

zone is occupied. Timing functions have no affect on the audible signal. This option can only be active for one channel at a time. Turning option 11 "on" for a different channel automatically turns it "off" for the other channel. Note: Option 11 is disabled 15 minutes after the last switch actuation, reset, or power loss.

Option 15.0 - Bicycle Detect Only: When Option 15.0 is turned "on", the channel will only detect bicycles. When option 15.0 is turned "on" "bc0" is displayed to indicate the channel is in bicycle detect only mode. In this mode average size vehicles do not activate a call output. When option 15.0 is OFF the channel registers calls for all detected vehicles; however, average size vehicles do not provide either initial time or extension time.

Option 15.1, Phase Green Input Disable: When Option 15.1 is turned "off" phase green input is enabled, and the channel provides bicycle initial time when the phase green input becomes active. When Option 15.1 is turned "on" the phase green input is disabled, and the channel does not provide any initial time; however, full extension time is provided for each bicycle departing the loop. Note: If extension time is programmed to zero extension time will be the same as the programmed initial time

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

Loop Inductance Range: 20 to 2500 microhenries with a Q factor of 5 or greater.

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: The C-1200-B 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 C-1100-B meets CALTRANS Specification 30-microsecond low state 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, then holding the CHAN button for 3 seconds. Also, changing either the sensitivity or loop frequency of a channel will reset that channel.

Phase Green Inputs: Also known as Call Delay Overrides. Meets and/or exceeds all NEMA TS 1 and TS 2 requirements. When used in racks without phase green inputs, the C-1000-B Series has a RJ-11 connector (6 conductors) mounted on the circuit board for the phase green inputs.

Fail-Safe Outputs: Per NEMA TS 2, a conducting state indicates detection output. Outputs default to a Call state for any loop failure condition or loss of power. Channel Status Outputs: Per NEMA TS 2, each channel has an output to communicate the status states of the channel (C-1200-B only).

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

Display: The LCD backlighting illuminates whenever any pushbutton is pressed. The backlighting will extinguish 15 minutes after the last actuation of any push button.

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Detect Indicators: Each channel has a high-intensity, red, light-emitting-diode (LED) to indicate a Call output or failed loop.

Response Time: 133 ± 27 milliseconds for all sensitivity settings.

Self-Tuning: The detector automatically tunes and is operational within 2 seconds after application of power or after being reset. Full sensitivity and hold time require 30 seconds of operation.

Environmental & Tracking: The detector is fully self-compensating for environmental changes and loop drift over the full temperature range and the entire loop inductance range.

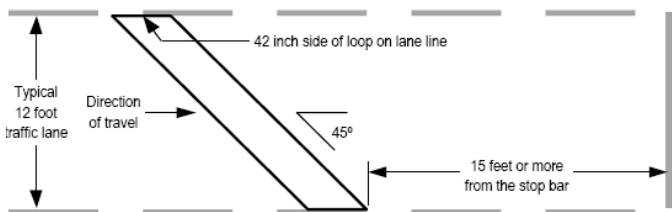
Grounded Loop Operation: The loop isolation transformer allows operation with poor quality loops (which may include one short to ground at a single point).

Loop (Fail) Monitor: If the total inductance of the channel's loop input network goes out of the range specified for the detector, 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. However, if the detector is reset, or power is momentarily lost, the detector will retune if the loop inductance is within the acceptable range. The Fail-Safe mode generates a continuous call in Presence Mode. At the time of a loop failure, the channel's LED will begin repeating a burst of three flashes each one second. The LED will continue these bursts 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 operation in a normal manner; except the LED will continue the bursts thus providing an alert that a Loop Fail condition occurred. Each loop failure for the channel is counted and accumulated into the Loop Fail Memory. The total number of loop failures written into the Loop Fail Memory (since the last power interruption or manual reset) is viewed in Program Mode in the "LOOP FAIL" screen.

Full Restore To Factory: 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 will display all possible symbols and messages on the LCD screen.

Recommended Loop Geometries: The optimum bicycle loop is a 4-turn 42 inch parallelogram across the entire lane shown in Figure 1. The 42 inch sides of the parallelogram loop can be on the lane line.



Factory Default Settings:

Functions	Channel 1 & 2
Frequency (8 steps)	3
Sensitivity (OFF, 1 to 9, CALL)	7
CALL Delay Time (0 - 255 sec)	0
CALL Extension Time (0 - 25.5 sec)	0.0
Bicycle Detect Latch Time (OFF, 1 - 999 sec)	OFF
Option 1 (Loop Inductance, L)	OFF
Option 2 (% Inductance Change, -DL/L)	(all channels)
Option 11 (Audible Detect)	OFF
Option 15.0 (Bicycle Detect Only)	OFF
Option 15.1 (Phase Green Input Disable)	OFF

Pin Assignments:

C-1100-B & C-1101-B

Pin	Function	Pin	Function
A	DC (-) Common	N	No Connection
B	DC (+) Power	P	No Connection
C	Reset Input	R	No Connection
D&4	Ch 1 Loop Input	S	No Connection
E&5	Ch 1 Loop Input	T	No Connection
F	Ch h 1 Output, Collector / N.O.	U	No Connection
H	Ch 1 Output, Emitter / Com.	V	No Connection
J&8	Ch 2 Loop Input	W	No Connection
K&9	Ch 2 Loop Input	X	No Connection
L	Chassis Ground	Y	No Connection
M	No Connection	Z	No Connection

C-1200-B & C-1201-B

Pin	Function	Pin	Function
A	DC (-) Common	1	Ch 1 Phase Green Input
B	DC (+) Power	2	Ch 2 Phase Green Input
C	Reset Input	3	No Connection
D	Ch 1 Loop Input	4	Ch 1 Loop Input
E	Ch 1 Loop Input	5	Ch 1 Loop Input
F	Ch 1 Output, Collector / N.O.	6	No Connection
H	Ch 1 Output, Emitter / Com.	7	Ch 1 TS2 Status Output
J	Ch 2 Loop Input	8	Ch 2 Loop Input
K	Ch 2 Loop Input	9	Ch 2 Loop Input
L	Chassis Ground	10	No Connection
M	No Connection	11	No Connection

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Pin	Function	Pin	Function
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	Ch 2 Output, Collector / N.O.	19	No Connection
X	Ch 2 Output, Emitter / Com.	20	Ch 2 TS2 Status Output
Y	No Connection	21	No Connection
Z	No Connection	22	No Connection

Model Options:

Model	Discipline	Added Feature
C-1100-B	332 / 170	
C-1101-B	332 / 170	TrueCount
C-1200-B	TS1 / TS2 / ITS / ATC	
C-1201-B	TS1 / TS2 / ITS / ATC	TrueCount

RJ-11 JACK located on PCB

Pin	Function	Pin	Function
1	Ch 2 Phase Green Input	4	No Connection
2	Ch 1 Phase Green Input	5	Logic Ground
3	No Connection	6	No Connection

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