

GT SERIES



TWO CHANNEL RACK MOUNT DETECTOR WITH TIMING



- Meets and exceeds NEMA TS 2 specification.
- 63 second Call Delay selectable in 1-second increments.
- 15.75 second Call Extension selectable in 0.25-second increments.
- Eight front panel DIP switches for each channel provide:
 - Eight levels of sensitivity.
 - Presence or Pulse mode.
 - Four loop frequencies.
 - Fail-Safe or Fail-Secure operation.
 - Channel disable.
- Loops are sequentially scanned to eliminate crosstalk.
- Channel status outputs provide individual channel status states per NEMA TS 2.
- Loop Fail "Event" Monitor remembers and indicates intermittent and current loop failures.
- Detector is self tuning and provides complete environmental tracking.
- Red, high intensity, LEDs provide "Detect" and "Loop Fail" indications.
- Complete built-in detector integrity test.

Ordering Information:

Model GT-200-XX ← R = Relay outputs
SS = Solid State outputs

Overview:

The Model GT is designed to meet or exceed NEMA Standards TS 2-1998 for Type C detectors and is downward compatible to NEMA Standards TS 1-1989. The Model GT Detector is a two channel, card rack type loop detector with delay and extension timing. Delay and extension timing condition the channel Call outputs in either Presence or Pulse mode.

Reno A & E

4655 Aircenter Circle • Reno, Nevada • 89502 • USA

Tel: (775) 826-2020 • Fax: (775) 826-9191 • E-mail: sales@renoae.com • Internet: www.renoae.com



GT SERIES SPECIFICATION

This is a Performance Specification. It is not intended to be used as Operating Instructions.

Loop Frequency: Four (4) DIP switch selectable loop frequencies (normally in the range of 20 to 100 kiloHertz) are a function of the actual loop / lead-in network.

Sensitivity: Eight (8) sensitivity levels are available for each channel. The eight settings are selectable using three DIP switches. Each of the eight sensitivity levels are binary encoded from 0 to 7 (lowest to highest sensitivity). The sensitivity level selected determines the percentage of negative inductance change of the loop circuit required for a "CALL" output signal. See "SENSITIVITY, - Δ L/L, & RESPONSE TIME in Fail-Secure mode" table.

Channel Disable: When set to the "Disable" position, the channel output is continuously in the no call state regardless of the presence or absence of vehicles over the loop. The loop oscillator is not activated when the channel is in the "Disabled" (ON) state. Changing this setting will RESET the channel.

Call / Test Switch: Each channel can be independently set to provide a simulated call output. Each detector channel has a front panel mounted, three position toggle switch that can be used to short the detector channel's output terminals in either a continuous (CALL) or momentary (TEST) closed state.

Presence / Pulse Mode: Each channel can be independently set to operate in one of two modes by means of front panel mounted DIP switches.

Presence Mode: Call hold time is a minimum of four minutes regardless of vehicle size, and is typically 1 to 3 hours for an automobile or truck.

Pulse Mode: A pulse of 125 \pm 10 milliseconds duration is generated for each vehicle entering the loop detection zone. Each vehicle detected is instantly tuned out if it remains in the loop detection zone longer than two seconds. This feature allows detection of vehicles subsequently entering the detection zone. After each vehicle leaves the loop detection zone, the channel resumes full detection sensitivity within one second. Changing the Presence / Pulse Mode switch will RESET the channel.

Call Delay: Each channel's Call Delay is adjustable from 0 to 63 seconds in 1-second steps by means of PCB mounted DIP switches. Call Delay time starts counting down when a vehicle first enters the loop detection zone. If the Delay feature is activated, the output will only be turned on after the selected delay time has passed with a vehicle continuously present in the loop detection area. If a vehicle leaves the loop detection area during the delay interval, detection is aborted and the next vehicle to enter the loop detection area will initiate a new full delay interval. Whenever a channel's Phase Green Input (call delay override) signal (pins 1 or 2) is active (low state), the Call Delay function for that channel is aborted and the Call delay time is forced to zero. The detector indicates that a vehicle is being detected but that the outputs are being delayed by flashing the Detect LED at 4 Hz with a 50% duty cycle.

Call Extension: Each channel's Call Extension is adjustable from 0 to 15.75 seconds in 0.25-second steps. Call Extension time starts counting down when the last vehicle leaves the loop detection zone. In the event a vehicle enters the loop detection zone before the extension time expires, the detector will return to the detect state (regardless of the setting of the delay timer) and the extension timer will be reset. When the last vehicle leaves the loop detection zone, full Extension time is reestablished and the detector begins counting down again. The detector will indicate that the extension interval is currently timing by flashing the Detect LED at 16 Hz with a 50% duty cycle.

Detect: Each channel has a super bright, high intensity, red LED which indicates a Call output. The LED is steady On while a vehicle is being detected. A flash rate of 4 Hz with a 50% duty cycle indicates that the delay interval is currently timing. A flash rate of 16 Hz with a 50% duty cycle indicates that the extension interval is currently timing.

Fail Indicator: Each channel has a super bright, high intensity, red LED which indicates the status of any current or prior loop fault condition for that channel. If the LED is Off, the loop is intact and in tolerance. A steady On condition indicates that the loop has failed or an inductance change condition of greater than \pm 25% exists. A series of three rapid flashes every second indicates that a loop failure condition of some sort has occurred, but no longer exists.

Loop Fail (Event) Monitor: If the total inductance of the loop input network goes out of the range specified for the detector, or rapidly changes by more than \pm 25%, the affected channel will immediately enter the programmed Fail-Safe or Fail-Secure mode of operation. Fail-Safe operation generates a continuous "Call" output in the Presence or Pulse mode. Fail-secure operation does not generate a call during a loop failure. In both modes of operation, the FAIL LED will illuminate and remain on for as long as the loop fault exists. If the loop "self-heals", the channel will resume operation in a normal manner, but the FAIL LED of the channel will begin to flash at a rate of three flashes per second as a means of indicating a prior Loop Fail condition. The FAIL LED will continue its indication of a prior loop failure until the detector channel is reset or the detector is manually reset.

Loop Inductance Range: 20 to 2000 microhenries with a Q factor of 5 or greater.

Loop Feeder Length: Up to 5000 feet (1500m) maximum with proper feeder cable and appropriate loops.

Loop Input: Transformer isolated. The minimum capacitance added by the detector is 0.068 microfarad.

Scanning: The loop(s) connected to each detector channel are activated alternately to minimize crosstalk between adjacent loops connected to the same detector.

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 (chassis) ground.

Detector Reset: Changing the position of any channel's DIP Switches (except the Frequency switches) will reset that detector channel. The detector can be reset by connecting a logic ground signal to Pin C (Reset Pin). Reapplication of power after a power loss will also cause the detector to reset. After changing any channel's Frequency selection switches (DIP Switches 2 & 3), the detector will require a reset.

Phase Green Inputs: Meets and / or exceeds all NEMA TS 1 and TS 2 requirements. Application of a Low state voltage (0 to 8 VDC) to pin 1 (Ch. 1) and / or pin 2 (Ch. 2) causes the delay timer for the channel to abort the delay timing function.

Solid State Outputs: Optically coupled transistors. 30 VDC max. collector to emitter. 50 mA max. collector current. 1.2 VDC max. transistor saturation voltage. The output transistors are protected by a 33 volt Zener diode connected between the emitter and collector.

Relay Outputs (Optional): The relay contacts are rated for 6 Amps max., 150 VDC max., and 180 Watts max. switched power.

Response Time: The response time of either channel is affected by the sensitivity level setting and Fail-Safe / Fail-Secure selection of that channel. When set to operate in Fail-Safe mode, response time is 65 ms \pm 25 ms for all sensitivity levels. When set to operate in Fail-Secure mode, response time varies and depends on the sensitivity level selected. See "SENSITIVITY, - Δ L/L, & RESPONSE TIME in Fail-Secure mode" table.

Self Tuning: The detector automatically self tunes and is operational within two seconds after application of power or after being reset. Full sensitivity and hold time requires 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).

Detect Outputs: Per NEMA TS 2, conduction indicates detection output. The output is conductive in a DC power supply failure condition or during a loop failure (i.e. An open loop or shorted loop condition).

NEMA TS 2 Channel Status Outputs: Meets and / or exceeds all NEMA TS 2 status output specifications.

Test Mode: A PCB mounted switch enables Test Mode. Test Mode provides a means of verifying proper operation of all of the detector's input and output circuitry including switches, LEDs, and outputs. Each channel's loop oscillator circuit is also checked to verify the correct frequency in each of the four frequency settings. The frequency portion of testing requires that each channel be connected to a 100 microhenry loop; if other inductance values are used, the frequency test results will be invalid.

Weight: 6.0 oz (170 gm).

Size: 4.50 inches (11.43 cm) .high x 1.12 inches (2.84 cm) wide x 6.875 inches (17.46 cm) deep (including connector, excluding handle). Handle adds 1.00 inch (2.54 cm) to depth measurement.

Operating Temperature: -40°F to +180°F (-40°C to +82°C).

Circuit Board: Printed circuit boards are 0.062 inch thick FR4 material with 2 oz. copper on both sides and plated through holes. Circuit boards and components are conformal coated with polyurethane.

Connector: 2 x 22 contact edge card connector with 0.156 inch (0.396 cm.) contact centers. Key slots located between pins B/2 & C/3, E/5 & F/6, and M/11 & N/12. (See "PIN ASSIGNMENTS" table).

Power: 10.8 to 30 VDC. Solid State output, 100 mA max.; Relay output, 130 mA max.

TABLES

SENSITIVITY, - Δ L/L, & RESPONSE TIME:

Switch Position	0	1	2	3	4*	5	6	7
- Δ L/L	1.28%	0.64%	0.32%	0.16%	0.08%	0.04%	0.02%	0.01%
Response Time (ms)	3.5 \pm 2.5	3.5 \pm 2.5	3.5 \pm 2.5	3.5 \pm 2.5	4.5 \pm 2.5	7 \pm 6	11.5 \pm 10.5	21.5 \pm 20.5

* Denotes factory default.

Notes:

Changing any of a channel's sensitivity switches will RESET that channel.

To achieve the exact response times listed above, the Sensitivity level settings for both channels must be the same and both channels must be set to operate in Fail-Secure mode.

PIN ASSIGNMENTS:

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, Collector / Normally Open	6	No Connection
H	Channel 1 Output, Emitter / Common	7	Channel 1 TS 2 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	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, Collector / Normally Open	19	No Connection
X	Channel 2 Output, Emitter / Common	20	Channel 2 TS 2 Status Output
Y	No Connection	21	No Connection
Z	No Connection	22	No Connection

FACTORY DEFAULT SETTINGS:

Switch	Function	Setting	Factory Default
1	Disable	Off	OFF
2	Frequency	1	ON
3		OFF	
4	Fail-Safe / Fail Secure	Fail-Safe	ON
5	Presence / Pulse	Presence	ON
6	Sensitivity	4	OFF
7			OFF
8			ON