T-110

SINGLE CHANNEL LOOP DETECTOR FOR NEMA CABINETS

The Model T-110 is a single channel, shelf mount type loop detector with Delay and Extension timing.

FEATURES

- 6 Front Panel DIP Switches
- Dual Color, High Intensity LED
- Audible Detect Signal
- Loop Fail Event Monitor
- Built-in Detector Integrity Test
- Call Delay & Call Extension Timing

HIGHLIGHTS

- Meets and exceeds NEMA TS 1 specification
- Space provided on front panel to label detector
- Detector is self tuning and provides complete environmental tracking

MEETS MUTCD STANDARDS

BUILD AMERICA, BUY AMERICA COMPLIANT

ISO 9001 CERTIFIED

2 YEAR LIMITED WARRANTY

NEMA CABINET COMPATIBLE

Overview: The Model T-110 is designed to meet or exceed NEMA Standards TS 1-1989. Model T-110 detector is a single channel, shelf mount type loop detectors with Delay and Extension timing. Detect and loop fail indications are provided via a dual color, high intensity LED. The Model T-110 offers advanced single channel detection capabilities in a compact package.

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

Sensitivity: Seven (7) sensitivity levels (plus off) are available. The eight settings are selectable using three (3) front panel mounted DIP switches. Each of the seven sensitivity levels are binary encoded from 1 to 7 (lowest to highest sensitivity). A setting of 0 turns the detector off. The sensitivity level selected determines the percentage of negative inductance change of the loop circuit required for a CALL output signal. See SENSITIVITY, -ΔL/L, & RESPONSE TIME table.

Presence / Pulse Mode: The detector can be set to operate in one of two modes by means of a front panel mounted DIP switch.

- Presence Mode: Call hold time is a minimum of four minutes regardless of vehicle size, and is typically one to three hours for an automobile or truck.
- Pulse Mode: A pulse of 125 ±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 detector resumes full detection sensitivity within one second. Changing the setting of the Presence / Pulse Mode switch will RESET the detector.

Call Delay: Call Delay is adjustable from 0 to 63 seconds in one-second steps by means of six (6) front panel 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. The detector indicates that a vehicle is being detected but that the output is being delayed by flashing the Detect / Fail LED (green) at four Hz with a 50% duty cycle.

Call Extension: Call Extension is adjustable from 0 to 15.75 seconds in 0.25-second steps by means of six (6) front panel mounted DIP switches. 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 / Fail LED (green) at 16 Hz with a 50% duty cycle.

Audible Detect Signal: A front panel mounted push button is used to enable an audible detect signal that is emitted any time the detection zone is occupied.

Detect / Fail Indicator: The detector has a super bright, high intensity, dual color (Red / Green) LED that indicates a Call output and/or the status of any current or prior loop fault condition. A continuous ON (green) state indicates a CALL output. A continuous ON (red) state indicates that a current open loop failure condition or an inductance change condition of greater than +25% condition exists. A one Hz (red) flash rate indicates that a current shorted loop failure condition or an inductance change condition of greater than -25% condition exists. A flash rate of three 50 millisecond (red) pulses indicates a prior loop failure condition. A flash rate of three 50 millisecond (red) pulses followed by a 750 millisecond (green) pulse indicates a prior loop failure condition and a current CALL output (detect state). If the audible detect signal is activated, any detect indicationthat would normally be displayed as green will be displayed as orange.

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 ±25%, the detector will immediately enter the Fail-Safe mode of operation. Fail-Safe operation generates a continuous call output in Presence or Pulse mode. The Detect / Fail LED will provide an indication of the type of loop failure (see Detect / Fail Indicator, above) and will continue to do so as long as the loop fault exists. If the loop self-heals, the detector will resume operation in a normal manner, but the Detect / Fail LED will begin to flash at a rate of three flashes per second (red) 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 is reset or power is removed.

Loop Inductance Range: C20 to 2000 microhenries with a Q factor of 5 or greater.

Loop Feeder Length: A 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.

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 DIP switch (except the Frequency switches or Call Delay / Call Extension switches) will reset the detector. Pressing the front panel mounted reset switch will reset the detector. Reapplication of power after a power loss will also cause the detector to reset. After changing a Frequency selection switch (DIP switches 1 & 2), the detector will require a reset.

Phase Green Inputs: Also known as Delay Inhibit inputs. Meets or exceeds NEMA TS 1 requirements. The application of an ON state voltage (75 to 130 VAC) to the Phase Green Input pin (Pin J) will cause the detector's delay timer to abort its delay timing function. Solid State Outputs: Optically isolated. 30 VDC max. collector (drain) to emitter (source). 100 mA max. saturation current. 2 VDC max. transistor saturation voltage. The output is protected with a 33-volt Zener diode connected between the collector (drain) and emitter (source).

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

Response Time: The response time of the detector is 33 ± 12 milliseconds regardless of the sensitivity level setting. See SENSITIVITY, -ΔL/L, & RESPONSE TIME 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: A detection output (CALL) is indicated by a closed relay contact (Relay output) or a conducting state (Solid State output). The detector output defaults to a CALL state for any loop failure condition or upon loss of power.

Test Mode: A PCB mounted jumper enables Test Mode. Test Mode provides a means of verifying proper operation of the detector's controls and indicators (switches and LEDs). The detector'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 the detector be connected to a 100 microhenry loop; if other inductance values are used, the frequency test results will be invalid.

Weight: 19 oz (538.7 gm)

Size: 4.70 inches (11.94 cm) high x 2.25 inches (5.72 cm) wide x 5.30 inches (13.46 cm) deep (excluding connector). Connector adds .675 inches (1.71 cm) to depth measurement.

Operating Temperature: -40ºF to +180ºF (-40ºC to +82ºC)

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: MS 3102A-18-1P 10 pin male. See PIN ASSIGNMENTS table.

Power: 89 to 135 VAC, 50/60 Hz, 6 Watts max.

Sensitivity, -ΔL/L, Response Time: Changing a sensitivity switch will RESET the detector. * Denotes Factory Default

Sensitivity	-ΔL/L	Response Time
0	OFF	N/A
1	0.64%	33 +/- 12 ms
2	0.32%	33 +/- 12 ms
3	0.16%	33 +/- 12 ms
4	0.08%	33 +/- 12 ms
5	0.04%	33 +/- 12 ms
6*	0.02%*	33 +/- 12 ms*
7	0.01%	33 +/- 12 ms

Factory Default Settings:

Switch	Function	Setting	Factory Default
1	Frequency	0	OFF
2	Frequency	0	OFF
3	Presence / Pulse	Presence	ON
4	Sensitivity	6	OFF
5	Sensitivity	6	ON
6	Sensitivity	6	ON

Pin Assignments: Relay contacts shown are with power applied, loop(s) connected, and no vehicle present.

Pin	Function
A	Power, Neutral, 120 VAC
B	Output, Relay Common
C	Power, Line, 120 VAC
D	Loop Input
E	Loop Input
F	Output, Relay Normally Open (N.O.)
G	Output, Relay Normally Closed (N.C.)
H	Chassis Ground
I	No Connection
J	Phase Green Input