Model T-110 Series

SINGLE CHANNEL
DIP SWITCH PROGRAMMABLE
LOOP DETECTOR
WITH DELAY AND EXTENSION TIMING

V.   Call Delay / Call Extension Control:

The twelve-position DIP switch located on the front panel is used to program Call Delay and/or Call Extension. To turn any of these DIP switches ON, push the switch to the left.

i.   CALL EXTENSION (EXTEND) (DIP switches 1, 2, 3, 4, 5, and 6):

DIP switches 1, 2, 3, 4, 5, and 6 are used to control the amount of time a CALL output is extended. The values ¼, ½, **1**, **2**, **4**, and **8** that appear to the left of the DIP switches are assigned to a DIP switch when it is turned ON. When a DIP switch is turned *OFF*, its value is 0. By adding the values of each DIP switch that is turned *ON*, effective values of 0 to 15.75 can be achieved indicating the amount of Extension time (in seconds) that has been selected. The factory default setting of all of these switches is OFF (no Extension time programmed). The following table contains examples of switch selections and Extension time settings.

SWITCH						SWITCH VALUES (EXTENSION TIME PROGRAMMED)
1 (¼ Sec)	2 (½ Sec)	3 (1 Sec)	4 (2 Sec)	5 (4 Sec)	6 (8 Sec)	
OFF	OFF	OFF	OFF	OFF	OFF	0 + 0 + 0 + 0 + 0 + 0 = **0.00**
ON	OFF	OFF	OFF	OFF	OFF	¼ + 0 + 0 + 0 + 0 + 0 = **0.25**
OFF	ON	OFF	OFF	OFF	OFF	0 + ½ + 0 + 0 + 0 + 0 = **0.50**
OFF	ON	OFF	ON	OFF	OFF	0 + ½ + 0 + 2 + 0 + 0 = **2.50**
OFF	OFF	ON	OFF	ON	OFF	0 + 0 + 1 + 0 + 4 + 0 = **5.00**
ON	OFF	ON	OFF	ON	OFF	¼ + 0 + 1 + 0 + 4 + 0 = **5.25**
OFF	ON	OFF	ON	OFF	ON	0 + ½ + 0 + 2 + 0 + 8 = **10.50**
ON	ON	ON	ON	ON	ON	¼ + ½ + 1 + 2 + 4 + 8 = **15.75**

ii.   CALL DELAY (DELAY) (DIP switches 7, 8, 9, 10, 11, and 12):

DIP switches 7, 8, 9, 10, 11, and 12 are used to control the amount of time a CALL output is delayed. The values **1**, **2**, **4**, **8**, **16**, and **32** that appear to the left of the DIP switches are assigned to a DIP switch when it is turned ON. When a DIP switch is turned *OFF*, its value is 0. By adding the values of each DIP switch that is turned *ON*, effective values of 0 to 63 can be achieved indicating the amount of Delay time (in seconds) that has been selected. The factory default setting of all of these switches is OFF (no Delay time programmed). The following table contains examples of switch selections and Delay time settings.

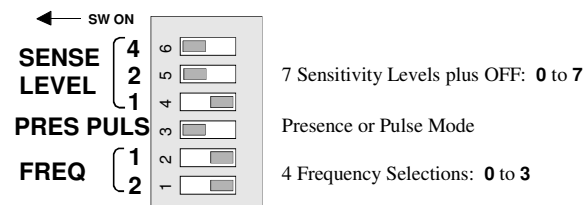| SWITCH						SWITCH VALUES (DELAY TIME PROGRAMMED)
7 (1 Sec)	8 (2 Sec)	9 (4 Sec)	10 (8 Sec)	11 (16 Sec)	12 (32 Sec)	
OFF	OFF	OFF	OFF	OFF	OFF	0 + 0 + 0 + 0 + 0 + 0 = **0**
ON	OFF	OFF	OFF	OFF	OFF	1 + 0 + 0 + 0 + 0 + 0 = **1**
OFF	ON	OFF	OFF	OFF	OFF	0 + 2 + 0 + 0 + 0 + 0 = **2**
OFF	ON	OFF	ON	OFF	OFF	0 + 2 + 0 + 8 + 0 + 0 = **10**
OFF	OFF	ON	OFF	ON	OFF	0 + 0 + 4 + 0 + 16 + 0 = **20**
ON	OFF	ON	OFF	ON	OFF	1 + 0 + 4 + 0 + 16 + 0 = **21**
OFF	ON	OFF	ON	OFF	ON	0 + 2 + 0 + 8 + 0 + 32 = **42**
ON	ON	ON	ON	ON	ON	1 + 2 + 4 + 8 + 16 + 32 = **63**

I.   General:

The Model T-110 is a single channel, shelf mount loop detector with Delay and Extension timing. Once the detector is connected to an appropriately wired harness it will begin to operate. The detector automatically tunes itself and is operational within two seconds after application of power or after being reset. Full sensitivity and hold time require approximately 30 seconds of operation. The detector is fully self-compensating for environmental changes and loop drift over the full temperature range and the entire loop inductance range. The Model T-110 is available with solid state or relay outputs.

The detector is programmed using a front panel mounted, six-position DIP switch. A single, dual color (green / red) Detect / Fail LED indicator provides an indication of the detector's output state and loop failure conditions. OUTPUT STATE conditions are indicated when the Detect / Fail LED is illuminated in a green state. LOOP FAILURE conditions are indicated when the Detect / Fail LED is illuminated in a red state. The Model T-110 also has a TEST mode that verifies proper operation of the output, LED indicator, DIP switches, and loop-oscillator circuitry.

II.   Operating Controls:

i.   Front Panel Mounted Programming DIP Switches:

The six-position DIP switch located on the front panel is used to program the detector. To turn one of these DIP switches ON, push the switch to the left.

SW ON

SENSE LEVEL 4 2 1 — 7 Sensitivity Levels plus OFF: **0** to **7**

PRES PULS — Presence or Pulse Mode

FREQ 1 2 — 4 Frequency Selections: **0** to **3**

Frequency (FREQ) (DIP Switches 1 and 2):

The Model T-110 detector has four (4) frequency selections that allow altering the resonant frequency of the loop circuit. DIP switches 1 and 2 are used to select the frequency. The values (**1** and **2**) to the left of the DIP switches are assigned to the switch when the switch is ON. If the switch is OFF, the switch has a value of zero (0). By adding the switch *ON* and *OFF* values, the two switches will combine for values from 0 to 3 that indicate one of the four Frequency selections. The following table is a reference for the switch settings and associated frequency selections.

RAE
RENO A&E

After changing any frequency switch setting(s), it is necessary to reset the detector by momentarily changing one of the other switch positions.

Frequency	Switch 2	Switch 1	Effective Value
HI *	OFF *	OFF *	0 + 0 = **0** *
MED HI	ON	OFF	1 + 0 = **1**
MED LO	OFF	ON	0 + 2 = **2**
LO	ON	ON	1 + 2 = **3**

* Factory default setting.

Presence / Pulse Mode (PRES PULS) (DIP Switch 3):

DIP switch 3 controls the output mode of the detector.

PRESENCE (**PRES**): When the switch is in the *ON* position, Presence Mode is selected. Presence Mode provides a Call hold time of at least four minutes (regardless of vehicle size) and typically one to three hours for an automobile or truck. This is the factory default setting and the most common setting.

PULSE (**PULS**): When the switch is in the *OFF* position, Pulse Mode is selected. Pulse Mode will generate a single 125 millisecond pulse output for each vehicle entering the loop detection zone. Any vehicle remaining in the loop detection zone longer than two seconds will be tuned out providing full sensitivity for the vacant portion of the loop detection zone. Full sensitivity for the entire loop detection zone is recovered within one second following the departure of any vehicle that has occupied the loop detection zone longer than two seconds.

Sensitivity (SENSE LEVEL) (DIP Switches) (DIP Switches 4, 5, and 6):

There are seven (7) selectable sensitivity levels plus OFF. The seven sensitivity levels and OFF setting are selected via DIP switches 4, 5, and 6 on the front panel mounted six-position DIP switch. The values (**1**, **2**, and **4**) to the left of the DIP switches are assigned to the switch when the switch is ON. If the switch is OFF, the switch has a value of zero (0). By adding the switch *ON* and *OFF* values, the three switches will combine for values from 0 to 7 that indicate OFF or one of the seven Sensitivity Level selections. The following table is a reference for the switch settings and associated sensitivity selections.

NOTE: Changing the sensitivity level setting will RESET the detector.

Sense Level	-ΔL/L	Switch 4	Switch 5	Switch 6	Effective Value
0 (OFF)	OFF	OFF	OFF	OFF	0 + 0 + 0 = **0**
1	0.64%	ON	OFF	OFF	1 + 0 + 0 = **1**
2	0.32%	OFF	ON	OFF	0 + 2 + 0 = **2**
3	0.16%	ON	ON	OFF	1 + 2 + 0 = **3**
4	0.08%	OFF	OFF	ON	0 + 0 + 4 = **4**
5	0.04%	ON	OFF	ON	1 + 0 + 4 = **5**
6 *	0.02% *	OFF *	ON *	ON *	0 + 2 + 4 = **6** *
7	0.01%	ON	ON	ON	1 + 2 + 4 = **7**

* Factory default setting.

ii. Front Panel Mounted Pushbutton - Detector Reset:

A front panel mounted pushbutton labeled **RESET** is used to reset the detector. To reset the detector, press the pushbutton.

iii. Front Panel Mounted Pushbutton - Audible Detect Buzzer:

A front panel mounted pushbutton labeled **BUZZER** is used to enable an audible detect signal that is emitted any time a given channel's detection zone is occupied. To activate this feature, press the pushbutton. A short (50 millisecond) audible signal confirms the activation of the feature. To deactivate this feature, press and hold the pushbutton for one second. A long (250 millisecond) audible signal confirms the deactivation of the feature. This feature will automatically turn off 15 minutes after activation.

NOTE: When operating in Pulse mode, the audible detect signal will cease if a vehicle occupies the detection zone for more than two seconds.

III. Reset:

To reset the detector, press the pushbutton labeled **RESET**. The detector can also be reset by changing the position of any front panel mounted programming DIP switch (except the Frequency switches) or by reapplying power after a power loss. Changes made to any of the Delay and/or Extension Timing DIP switches do not reset the detector.

IV. Detect / Fail Indicators:

The Model T-110 detector has a two color (green / red) light emitting diode (LED) to indicate a CALL output and/or the status of any current or prior loop failure conditions. 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% exists. This indication also generates a CALL output. A one Hz (red) flash rate indicates that a current shorted loop failure condition or an inductance change condition of greater than -25% exists. This indication also generates a CALL output. A flash rate of three 50 millisecond (red) flashes per second indicates a prior loop failure condition. A flash rate of three 50 millisecond (red) flashes per second followed by a single 750 millisecond (green) flash indicates a prior loop failure condition and a current CALL output (detect state).

If Delay and/or Extension Timing has been set, the Detect / Fail LED will display one (or both) of two unique flash sequences [four flashes (green) per second - Delay Timing set; 16 flashes (green) per second - Extension Timing set], thus providing an alert that Delay and/or Extension Timing has been set and the feature is active.

If the audible detect feature is activated, the Detect / Fail LED will be illuminated in an orange state for any CALL output condition.

Detect / Fail LED	Meaning
Off	No Detect (No CALL Output)
Solid ON (Green)	Detect (CALL Output)
Solid ON (Orange)	Audible Detect Signal Activated, Detect (CALL Output)
Four flashes per second (Green)	Vehicle detected, Delay Timing active, No Detect (No CALL Output)
Four flashes per second (Orange)	Audible Detect Signal Activated, Vehicle detected, Delay Timing active, No Detect (No CALL Output)
16 flashes per second (Green)	Detection zone vacant, Extension Timing active, Detect (CALL Output)
Solid ON (Red)	Open Loop Failure or Inductance change condition of greater than +25% exists
One Hz flash rate (Red) (50% Duty Cycle)	Shorted Loop Failure or Inductance change condition of greater than -25% exists
Three 50 ms (Red) flashes per second	Loop Failure condition occurred but no longer exists
Three 50 ms (Red) flashes per second followed by a single 750 ms (Green) flash	Loop Failure condition occurred but no longer exists and Detect (CALL Output)
Three 50 ms (Red) flashes per second followed by a single 750 ms (Orange) flash	Loop Failure condition occurred but no longer exists, Audible Detect Signal Activated and Detect (CALL Output)
Three 50 ms (Red) flashes per second followed by four flashes per second (Green)	Loop Failure condition occurred but no longer exists and Vehicle detected, Delay Timing active, No Detect (No CALL Output)
Three 50 ms (Red) flashes per second followed by four flashes per second (Orange)	Loop Failure condition occurred but no longer exists, Audible Detect Signal Activated and Vehicle detected, Delay Timing active, No Detect (No CALL Output)
Three 50 ms (Red) flashes per second followed by 16 flashes per second (Green)	Loop Failure condition occurred but no longer exists and Detection zone vacant, Extension Timing active, Detect (CALL Output)