RAE®

RENO A & E

MODEL Y-200 SERIES

Firmware Version 2.10

FOUR CHANNEL, TS 2-1998 TYPE B
DIP SWITCH PROGRAMMABLE LOOP DETECTOR

### OPERATING INSTRUCTIONS

I General

The Model Y-200 is a scanning, four channel, card rack mounted loop detector. Once the detector is plugged into an appropriately wired card rack, 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 operation of each channel is independent and is programmed using one of four, front panel mounted, six-position DIP switch modules and a PC board mounted eight-position DIP switch module. Each channel has a single, dual color (green / red) Detect / Fail LED indicator. The LED provides an indication of the channel'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 Y-200 also has a Test mode that verifies proper operation of the outputs, LED indicators, DIP switches, and loop oscillator circuitry.

II Indicators and Controls

i Front Panel Mounted Programming DIP Switches

The four, six-position DIP switch modules located on the front panel that are labeled **1**, **2**, **3**, and **4** affect each channel independently. To turn one of these DIP switches *ON*, move the switch to the left.
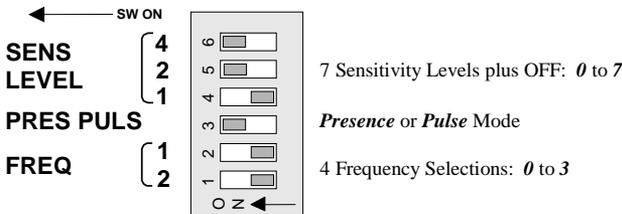
Six-position DIP switch module

Frequency (FREQ) (DIP SWITCHES 1 and 2)

Each channel of the Model Y-200 detector has four (4) frequency selections that allow altering the resonant frequency of the loop circuit. DIP switches 1 and 2 on each of the four, front panel mounted six-position DIP switch modules are used to select the frequency for a given channel. The value (**1** or **2**) to the left of the DIP switch is 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. Use the table on the next page as a reference for the switch settings and associated frequency selections.

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

Frequency	Switch 2	Switch 1	Effective Value
High *	OFF *	OFF *	0 + 0 = **0** *
Medium High	ON	OFF	1 + 0 = **1**
Medium Low	OFF	ON	0 + 2 = **2**
Low	ON	ON	1 + 2 = **3**

* Factory default setting.

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

DIP switch 3 on each of the four, front panel mounted six-position DIP switch modules controls the output mode of each channel.

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.

NOTE: Changing the Presence / Pulse Mode setting will reset the detector channel.

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

There are seven (7) selectable sensitivity levels plus OFF for each channel. The seven sensitivity levels and OFF setting are selected via DIP switches 4, 5, and 6 on each of the four, front panel mounted six-position DIP switch modules. The value (**1**, **2**, or **4**) to the left of the DIP switch is 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. Choose the lowest sensitivity level that will consistently detect the smallest vehicle that must be detected. Do not use a sensitivity level higher than necessary. The factory default setting is Sensitivity Level 6, $-\Delta L/L = 0.02\%$ for detection. The following table is a reference for the switch settings and associated sensitivity level selections.

NOTE: Changing the sensitivity level setting will reset the detector channel.

Sense Level	$-\Delta L/L$	Switch 4	Switch 5	Switch 6	Effective Value
0 (OFF)	N/A	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.

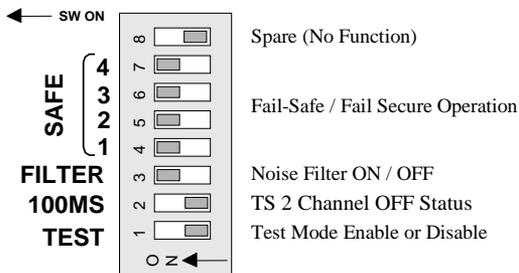**ii   Front Panel Mounted Pushbutton - Audible Detect Buzzer**

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. Only one channel can have this feature active at any given time. To activate this feature, press the pushbutton. The first time the pushbutton is pressed, a short (50 millisecond) audible signal confirms the activation of the feature for Channel 1. The second time the pushbutton is pressed, two short (50 millisecond) audible signals confirm the activation of the feature for Channel 2. The third time the pushbutton is pressed, three short (50 millisecond) audible signals confirm the activation of the feature for Channel 3. The fourth time the pushbutton is pressed, four short (50 millisecond) audible signals confirm the activation of the feature for Channel 4. To deactivate this feature, press and hold the pushbutton for one second. A long (250 millisecond) audible signal confirms the deactivation of the feature.

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

This feature will automatically turn off 15 minutes after activation.

iii PC Board Mounted Programming DIP Switches

The eight-position DIP switch module located near the center of the PC board affects all four channels. To turn one of these DIP switches *ON*, move the switch to the left.

Switch	Function
8	Spare (No Function)
4 3 2 1 (SAFE)	Fail-Safe / Fail Secure Operation
FILTER	Noise Filter ON / OFF
100MS	TS 2 Channel OFF Status
TEST	Test Mode Enable or Disable

Eight-position DIP switch module

Test Mode (TEST) (DIP Switch 1)

When DIP switch 1 (labeled **TEST**) is turned *ON*, Test mode is activated. For more information on Test mode, refer to the Model Y-200 Operation Manual. The factory default setting of this switch is *OFF* (Test Mode OFF).

NOTE: The Test Mode DIP switch must be *OFF* for normal detector operation.

TS 2 Channel Off Status (DIP Switch 2)

When DIP switch 2 (labeled **100MS**) is turned *OFF*, turning a channel *OFF* will cause that channel's TS 2 channel status output to maintain State 1 (Normal Operation / Detector Channel OK). When DIP switch 2 is turned *ON*, turning a channel *OFF* will cause that channel's TS 2 channel status output to enter State 2 (Detector Channel Failure). The factory default setting of this switch is *OFF*.

Noise Filter ON / OFF (FILTER) (DIP Switch 3)

DIP switch 3 (labeled **FILTER**) controls the Noise Filter function. When the DIP switch is set to the *ON* position, the filter function is activated for all channels, and a time filter is added before the output signal is activated when a vehicle is in the loop detection area. It is strongly recommended that the Noise Filter feature be turned *ON* for most traffic control applications. The factory default setting of this feature is *ON* (Noise Filter ON).

Fail-Safe / Fail-Secure (SAFE 1 2 3 4) (DIP Switches 4, 5, 6, and 7)

During a loop failure condition, the state of the channel's output can be selected as Call in the Fail-Safe mode of operation or No Call in the Fail-Secure mode of operation. Fail-Safe operation during a loop failure is the standard mode of operation for intersection control. Fail-Secure operation during a loop failure is typically used for incident detection systems for freeway management.

Fail-Safe or Fail-Secure modes of operation are selectable for each channel using PC Board mounted DIP switches 4, 5, 6, or 7 (labeled **SAFE 1 2 3 4**). DIP switch 4 controls channel 1, DIP switch 5 controls channel 2, DIP switch 6 controls channel 3, and DIP switch 7 controls channel 4. When the DIP switch corresponding to a given channel is in the *OFF* position, that channel will operate in the Fail-Secure mode. When the DIP switch corresponding to a given channel is in the *ON* position, that channel will operate in the Fail-Safe mode. The factory default setting of these four switches is *ON* (Fail-Safe operation).

Spare (DIP Switch 8)

DIP switch 8 has no function.

III   Reset

Changing the position of any of an individual channel's front panel mounted DIP switches (except the Frequency switches) resets the channel. When the detector is installed and operating, the most convenient method for resetting a channel is to momentarily change the position of the Presence / Pulse DIP switch and then return it to its original position. Changing the position of the individual channel's PC board mounted Fail-Safe / Fail-Secure DIP switch also resets the channel.

Changing the position of the PC board mounted Filter or Test DIP switch resets the detector. The detector can also be reset by connecting a logic ground signal to Pin C of the edge card connector or by the reapplication of power after a power loss.

IV   Detect / Fail Indications

The Model Y-200 detector has a single two color (green / red) light emitting diode (LED) per channel to indicate a Call output and/or the status of any current or prior loop failure conditions. A green indication signifies a Call output (detect state). A red indication signifies a loop failure condition. A continuous ON (green) state indicates 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. When operating in Fail-Safe mode, this indication also generates a Call output. When operating in Fail-Secure mode, no Call output is generated. A one Hz (red) flash rate indicates that a current shorted loop failure condition or an inductance change condition of greater than -25% exists. When operating in Fail-Safe mode, this indication also generates a Call output. When operating in Fail-Secure mode, no Call output is generated. 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 any channel has the audible detect feature activated, that channel's 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)
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)