

OPERATING INSTRUCTIONS FOR Model RAD3 PLUG-IN LOOP DETECTOR

Three Channel – Four Solid State Outputs

I. General / Overview:

The EDI Model RAD3 operates on 12 VDC and 24 VDC and is designed for low power requirements. The detector is designed to handle gate, parking, drive-through, and all access control applications where *solid-state* outputs are required for both the “detect and “fail” outputs. With RAD3 you only need one detector in your operator to take care of vehicle detection. It will automatically minimize crosstalk between loops by scanning between three channels. From a diagnostic standpoint, RAD automatically and continuously senses three types of possible loop fault conditions: Open Loop, Shorted Loop, sudden changes in inductance exceeding 25% of the nominal inductance.

II. Oscillator Dip Switch Functions for Each Channel (12 switches along one side of PCB):

Dip Switch 1 & 2 – Sensitivity: The sensitivity of each channel is controlled by the first 2 switches marked 1 and 2 for the channel. For typical vehicles (mid-size vehicle / small pickup) utilizing properly installed roadway loops, a value of Medium is usually an optimum sensitivity setting. For high profile vehicles (commercial trucks, 4x4’s, etc...), a value of High may be optimum. After a sensitivity setting change, the detector will automatically reset the channel. When both switches are OFF, the channel is turned off.

OSC SWITCH	Chan Off	Sens Low	Sens Medium	Sens High	Factory Default
1	OFF	OFF	ON	ON	ON
2	OFF	ON	OFF	ON	OFF

Dip Switch 3 & 4 – Frequency: The operating frequency of the channel is controlled by the setting of switches 3 & 4 of the 4 position DIP Switch for the channel. Occasionally when loops are in close proximity to each other, it may be necessary to select different frequencies for each loop detector to avoid loop interference (crosstalk). The actual loop frequency is a function of the size of the loop, number of turns of loop wire in the loop, length of the lead-in cable, and the setting of the frequency switches. The detector frequency should be adjusted so that there is a minimum of 5 kilohertz of separation between all adjacent loops. After a frequency setting change, the detector will automatically reset the channel.

III. ‘Options’ Dip Switch Functions (Next to POWER LED):

Dip Switch 1 – Low Power: The default position is set to OFF. When internal switch 1 is in the ON position, the detector will save around 30% of power consumption. The response time will be slower.

Dip Switch 2 – Boost: The default (factory) position is set to OFF. When internal switch 2 is in the ON position, the sensitivity is increased during the detect period without changing the sensitivity during the no detect period. The boost feature has the effect of temporarily increasing the sensitivity setting by up to two levels (except on Sensitivity Hi). When a vehicle enters the loop detection zone, the detector automatically boosts the sensitivity level. As soon as no vehicle is detected, the detector immediately returns to the original sensitivity level. This feature is particularly useful in preventing dropouts during the passage of high bed vehicles. The factory default setting is OFF (no Sensitivity Boost).

Dip Switch 3 – Limited Presence: The default (factory) position is Infinite Presence (internal switch 3 = OFF). In the Infinite Presence mode, a presence output will always be maintained as long as a vehicle is over the loop. In the Limited Presence mode (internal switch 3 = ON), the output hold time is between 5 minutes minimum and 3 hours maximum. Hold time depends on loop geometry; number of wire turns in the loop, vehicle size, and position of the vehicle relative to the loop.

Dip Switch 4 – Fail-Safe / Fail-Secure Operation: Either Fail-Safe or Fail-Secure Operation is controlled by the setting of internal switch 4. The default (factory) position is Fail-Safe (switch 4 in the OFF position). If a loop fault occurs while in the Fail-Safe mode, Output A activates. If a loop fault occurs in the Fail-Secure mode (switch 4 is in the ON position) Output A will not activate. If there is a power failure, all outputs will deactivate regardless of the position of this switch.

IV. Detector Indicators and Diagnostics:

The Green Power LED is continuously ‘ON’ on startup. After 2 minutes, it will flash once every 5 seconds.

The detector continuously checks the integrity of the loop. The system detects open or shorted loops, or sudden changes in inductance exceeding 25% of the nominal inductance. If a fault is detected, the Red FAULT LED will turn on, and the Green Channel DETECT LED will continuously emit a sequence of flashes. Each type of fault is identified by a different flash sequence:

Flash Sequence	Fault Condition
1 flash	Open Circuit Loop
2 flashes	Shorted Circuit Loop
3 flashes	25% excessive change in inductance

If the Open or Shorted fault condition self-heals, the Green Channel DETECT LED will return to normal operation. In the case of the excessive inductance change fault, the unit will re-tune to the new inductance value after a reset or the error self-heals and continues operation. The Red FAULT LED will only turn off if there is no error on any of the channels.



Figure 1 RAD3 Detector

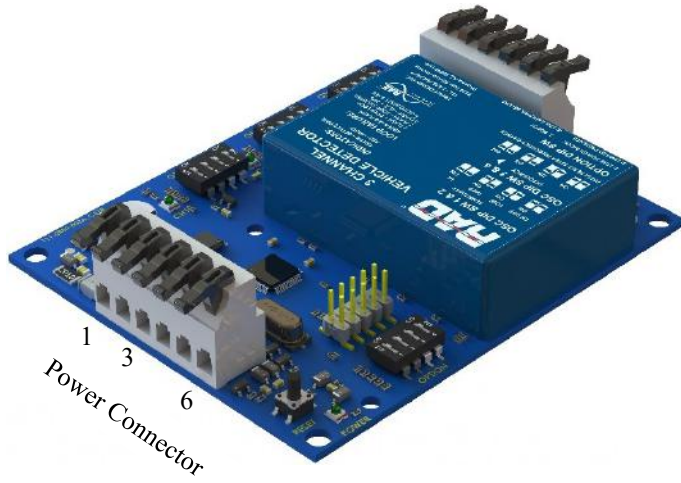


Figure 2 RAD3 Detector Top View

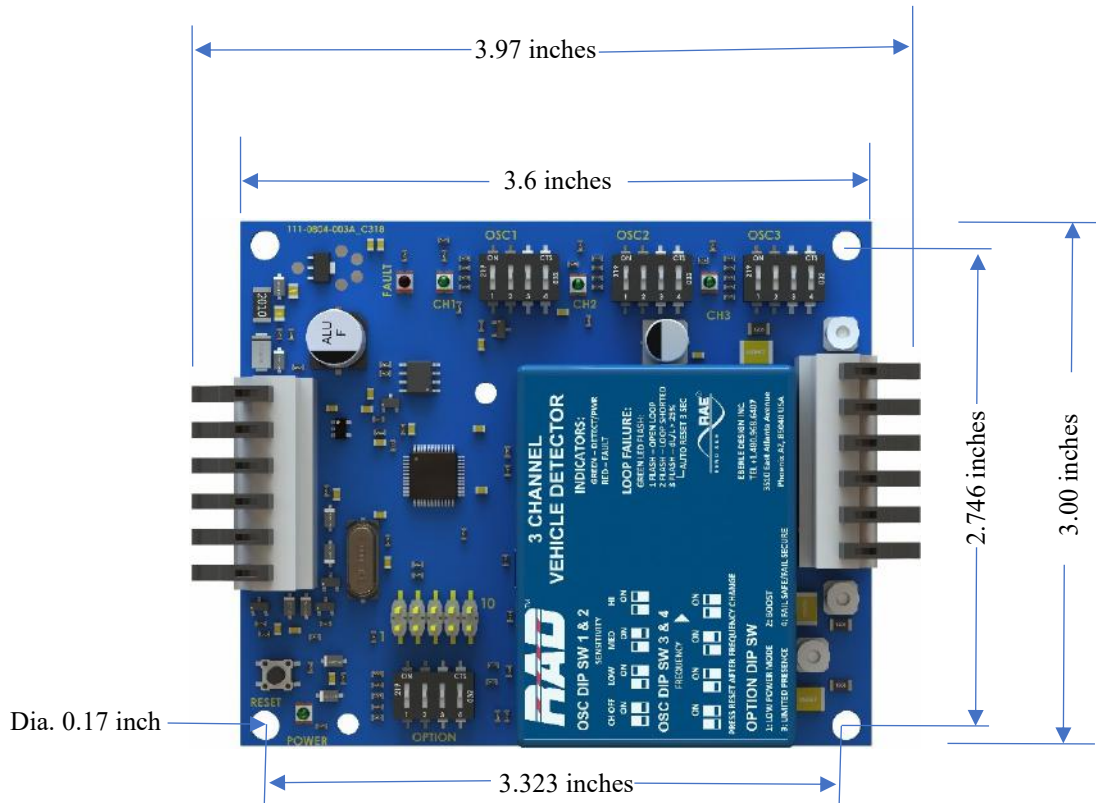
IV. Pin Assignments:

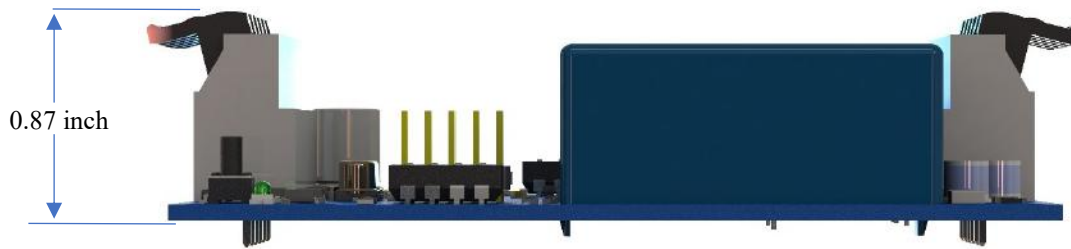
Power Connector	Function
1	Power (12-24VDC, 24VAC)
2	Common
3	Output Open Detect (CH. 1)
4	Output Center Detect (CH. 2)
5	Output Re-Open Detect (CH. 3)
6	Output Fault

Loop Connector	Function
1	Loop Open A (Osc. 1, CH. 1)
2	Loop Open B
3	Loop Center A (Osc. 2, CH. 2)
4	Loop Center B
5	Loop Re-Open A (Osc. 3, CH. 3)
6	Loop Re-Open B



IV. Mechanical Dimensions





V. Electrical Specifications

Loop Inductance (Tuning) Range: 20 to 2500 micro-Henry with a Q factor greater than 5.

Loop Input (Lightning Protection): The loop input incorporates lightning and transient protection devices and the loop oscillator circuitry is transformer-isolated. The lightning protection will withstand the discharge of a 10 uF capacitor charged to 2,000V across the loop inputs or between either loop input and earth ground. The transformer isolation allows operation with a loop which is grounded at a single point.

Environmental Tracking: The Detector automatically and continuously compensates for component drift and environmental effects throughout the tuning range and across the entire temperature range.

Grounded Loop Operation: The Detector will operate when connected to poor quality loops including those that have a short to ground at a single point.

Internal Circuitry Isolation: All internal electronic circuitry is isolated from the loop by means of the loop isolation transformer.

Lead-in Length: The Detector will operate with lead-in (feeder) lengths up to 5,000 feet with appropriate loops and proper lead-in cable.

Output Rating(s): Open Collector Transistor referenced to DC Common. Max current rating 100 mAmps. Max voltage 30 VDC.

Construction: Printed circuit boards are double sided 2oz. copper with plated through holes. Circuit boards are FR4 conformally coated for environmental protection.

Environmental:

- Operating Temperature Range: -34oC to +74oC (-30oF to 165°F)
- Humidity Range: 0 to 95% relative.