

**INSTALLATION AND OPERATING  
INSTRUCTIONS FOR THE**

**mini  
rad-v™**

**VEHICLE-MOUNTED RADIATION DETECTION SYSTEM**



**D-tect Systems  
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## 1 Introduction

The mini rad-V is a personal radiation detection device outfitted for use aboard a vehicle. It quietly scans the environment around the vehicle to find any sources of gamma radiation. If gamma rays are detected, the mini rad-V gives clear audio and visual alarms proportional to the presence of radiological materials nearby. The mini rad-V features a very simple layout and automatically calibrates itself to natural background radiation.

## 2 System Overview

### 2.1 Modules

The mini rad-V consists of two modules: the In-Cab Display (Figure 1) and the External Detector (Figure 2). The In-Cab Display receives power via a cable connected to the back of the unit. The unit can be powered by any of the following sources: a car adapter, two lead lines attached to the fuse box, or an AC power converter for standard 110VAC outlets. The In-Cab Display is connected to the External Detector via a communications cable.

#### Dimensions

- In-Cab Display – 2.8” × 1.82” × 1” Weight: 0.4 lbs
- Exterior Detector – 4.7” × 3.14” × 1.7” Weight: 1.2 lbs



**Figure 1: In-Cab Display**



**Figure 2: Exterior Detector**

### 2.2 Detector

The Exterior Detector houses a 0.5” diam x 1.5” Cesium Iodide Scintillation crystal with a high-sensitivity photo-multiplier tube. It detects gamma radiation in the energy range of 30 keV to 3 MeV. Readings are taken in less than one second.

### 2.3 Maintenance

The Exterior Detector is designed to MIL-STD-810 environmental standards for rain, shock, and vibration. The unit is sealed to reduce intrusion from dust, humidity, and salt fog. This unit may be cleaned safely with mild soap and water using a warm, wet cloth.

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### 3 Installation Suggestions

Note: The installer should refer to the vehicle manufacturer's manual for installation guidance for the routing of communication and power cables and connection to vehicle power for all third party devices. The installation suggestions are for the installer and are to be used at the sole discretion and judgment of the user. D-tect Systems assumes no responsibility for damages to any vehicle, other electronic devices, or this product incurred during installation.

#### 3.1 In-Cab Display Installation

The In-Cab Display is placed within easy reach of the operator and should be attached securely to a solid surface. The module is attached to a support that accommodates three 1/4" screws spaced 1 1/4" apart. Make sure that the module does not block the view of the driver or interfere with vehicle controls or other equipment. Contact your local Department of Transportation for information regarding regulations on dashboard-mounted displays, as these may vary from state to state. The In-Cab Display must be connected to the External Detector via the communication cable. Depending on the vehicle model and configuration, this cable can usually run under the dashboard and through the engine compartment.

#### 3.2 External Detector Installation

The External Detector houses the radiation detection components and is designed for placement on the exterior of the vehicle. It is attached to the vehicle with four 1/8" screws (spaced 2" apart on both ends of the module). The sensitivity of the device decreases with the amount of material between the detector and any potential radiation sources, so it is best to mount the device in a secure location with good exposure, such as behind the front grill or on the front bumper. Make sure that neither the mounting equipment nor the position of the module affects the operation of the vehicle in any way. Take special care if mounting under the hood to avoid placement near the engine block, exhaust lines, compressor, or other hot/cold areas, as exposure to extreme temperatures may damage the device. Also, make sure to avoid engine belts and electrical wires, and confirm that the power or communications cables of the modules are secured and isolated from moving parts and hot surfaces.

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### 3.3 Specifications

<b>mini rad-V™</b>	
<b>Mission</b>	Vehicle-mounted radiation detector
<b>Detector</b>	0.5" diam x 1.5" Cesium Iodide scintillation detector with high-sensitivity photo-multiplier tube
<b>Energy Range</b>	30 keV – 3 MeV
<b>Power</b>	12V DC
<b>Response Time</b>	Less than 1 second
<b>Calibration</b>	Automatic
<b>Dimensions</b>	Exterior Detector: 4.7" x 3.1" x 1.7" In-Cab Display: 2.8" x 1.82" x 1"
<b>Weight</b>	Exterior Detector: 1.2 lbs In-Cab Display: 0.4 lbs
<b>Environment</b>	Exterior Detector: Driving rain, -10° F to 122° F In-Cab Display: Controlled environment Operates in high RF environments
<b>Warranty</b>	2 years parts and labor

## 4 System Operation

### 4.1 Start up

To operate the mini rad-V you first need to connect the cables. Both the communication and power cables connect to the back of the In-Cab Display. To connect the cables, line up the white dots located on the plug and outlet and gently press the plug on. To release the cable, squeeze lightly on the tabs of the plug and the cable will release. When power is applied to the In-Cab Display, the blue LED labeled 'Power' will light up and the unit will begin a power-up and calibration sequence, indicated by a beep and flashing red LED. During the 30 second calibration interval, the unit will measure naturally occurring background radiation and calculate a threshold. (This threshold will be the baseline from which a radiological alert will be indicated to the operator.) The red LED will blink once more to let you know the background calibration has finished. If the mini rad-V stops detecting normal background radiation levels for a period of time (such as if it is taken into a parking garage), the mini rad-V will recalibrate itself. The device will beep and the red LED will flash to indicate the 30 second calibration phase. When calibration is complete, the mini rad-V will beep once more and go into detection mode. This keeps the mini rad-V at maximum sensitivity levels in all environments.



## 4.2 Power

The unit can be powered by any of the following sources: a car adapter plugged into a cigarette lighter or auxiliary power source, two leaded lines attached to the fuse box, or an AC power converter for standard outlets. After plugging in the unit, check to make sure the blue LED on the front face of the In-Cab Display is on.

## 4.3 Alarm

The In-Cab Display will alarm (audibly and with a blinking red LED on the front face of the display) when the presence of gamma radiation exceeds threshold background levels. The frequency of the audio and visual alarms will increase proportionately as the level of gamma radiation increases. The audio alarm can be silenced by pressing the 'mute' button on the front face of the In-Cab Display. The red LED will continue to flash until the detector no longer detects radiation above background levels.

## 5 Customer Service

The D-tect Systems team strives to provide the most reliable and technologically advanced detection and identification products available at affordable prices. All D-tect Systems products are designed, engineered, and manufactured in the USA. In an effort to ensure that the user receives the utmost in value and productivity in the use of D-tect Systems products, we have established a knowledgeable, trained distributor network with a specific background in these types of products. Please contact your distributor if you require additional information about the products (please reference model, serial number, and date of purchase) or if you require immediate warranty assistance. We also provide direct technical support resources at [www.dtectsystems.com](http://www.dtectsystems.com).

## 6 Limited Warranty for D-tect Systems Products

### 1. What this Warranty Covers and for How Long

D-tect Systems ("D-tect Systems") warrants this device (the "Product") against defects in materials and workmanship under normal use for a period of two years from the date of purchase. This warranty extends to the first end-user purchaser only, and is not transferable. This warranty does not extend to other ancillary and/or consumable products including but not limited to batteries, calibration sources, straps, and shipping cases. D-tect Systems, at its option, will at no charge either repair, replace or refund the purchase price of any Products that do not conform with this warranty. Repair may include the replacement of parts with functionally equivalent reconditioned or new parts. Replacement may include providing a functionally equivalent Certified Reconditioned/Pre-owned or a new Product. Products that have been repaired or replaced are warranted for the balance of the original warranty period or for 90 days from the date that the repaired or replaced Product is received by you, whichever is longer. All Products for which replacements have been provided will become D-tect Systems property.

### 2. Other Warranty Conditions

This warranty is D-tect Systems' complete warranty for the Product. D-tect Systems assumes no obligation or liability for changes to this warranty unless made in writing and signed by an officer of D-tect Systems.

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If D-tect Systems agrees to perform services requested and approved by the customer that are not included in either the Limited or Extended Warranty, these services will be billed to the customer at D-tect Systems' standard prices and terms.

D-tect Systems does not warrant any installation, maintenance, or service that it did not perform. SERVICE WORK PERFORMED BY SERVICE CENTERS NOT AUTHORIZED BY D-TECT SYSTEMS TO PERFORM SUCH WORK WILL VOID THIS WARRANTY.

### 3. What This Warranty Does Not Cover

- a. Defects or damage resulting from: collision of the Product with hard surfaces, contact with water, rain or extreme humidity, contact with sand, dirt or the like, contact with extreme heat or cold, spills of food or liquid, improper testing, operation, maintenance, installation, adjustment; or any alteration or modification of any kind.
- b. Normal "wear and tear" of the Product such as scratches, scuffs, and marks on the LCD, case and other external features.
- c. Cracked or broken displays, buttons, or damage to other externally exposed parts caused by abnormal use and/or abuse of the Product.
- d. Products disassembled or repaired in such a manner as to adversely affect performance or prevent adequate inspection and testing to verify any warranty claim.
- e. Products on which serial numbers or date tags have been removed, altered or obliterated.

### 4. How to Get Warranty Service

To get warranty service, please contact your distributor or D-tect Systems at [www.dtectsystems.com](http://www.dtectsystems.com).

You will receive directions on how to mail the Product to D-tect Systems. All Products shipped to D-tect Systems must be shipped with freight and insurance prepaid. Along with the Product you must include a receipt, bill of sale, or some other comparable proof of purchase, a written description of the problem and, most importantly, your address and telephone number. If additional information is needed, please contact D-tect Systems at the web address indicated above.

### 5. General Provisions

THIS IS THE COMPLETE WARRANTY FOR THIS PRODUCT BY D-TECT SYSTEMS AND SETS FORTH YOUR EXCLUSIVE REMEDIES. THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER EXPRESS WARRANTIES. IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE GIVEN ONLY IF SPECIFICALLY REQUIRED BY APPLICABLE LAW. OTHERWISE, THEY ARE SPECIFICALLY EXCLUDED. IN NO EVENT SHALL D-TECT

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#### **6. Patent and Software Provisions**

D-tect Systems will defend at its own expense, any suit brought against you to the extent that it is based on a claim that the Products infringe a United States patent. D-tect Systems will pay those costs and damages finally awarded against you in any such suit which is attributable to any such claim. The defense and payments by D-tect Systems are conditioned on the following: (a) that you will notify D-tect Systems promptly in writing any notice of the claim; and (b) that D-tect Systems will have sole control of the defense of the suit and all negotiations for its settlement or compromise; and (c) should the Products become, or in D-tect System's opinion be likely to become, the subject of a claim of infringement of a United States patent, that you will permit D-tect Systems, at its option and expense, either: to procure for you the right to continue using the Products or parts; to replace or modify them so that they become non-infringing; or to grant you a credit for such Products or parts as depreciated and accept their return. The depreciation will be an equal amount per year over the lifetime of the Products, accessories, battery or parts as established by D-tect Systems.

D-tect Systems will have no liability to you with respect to any claim of patent infringement which is based upon the combination of the Products or parts furnished under this limited warranty with software, apparatus or devices not furnished by D-tect Systems. D-tect Systems will have no liability for the use of ancillary or peripheral equipment or software not furnished by D-tect Systems which is attached to or used in connection with the Products. The foregoing states the entire liability of D-tect Systems with respect to infringement of patents by the Products, accessories, batteries or any parts of them.

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