



Carmanah®

OWNER'S MANUAL

Solar LED Roadway Light / 24-Hour Hazard Flasher - Model R247



“The world’s most advanced 24-hour solar LED hazard flasher”
No external wiring or bulb replacement.
No maintenance for five years!

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R247 - 37224

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1.0 Introduction

Congratulations on purchasing the Carmanah Model R247 solar-powered LED roadway hazard flasher, "the world's most advanced solar LED hazard flasher." The R247 is intended to increase the visibility of roadway hazards using a completely self-contained unit that is very easy to install on an existing signpost. Using LED illumination, the unit is designed to operate reliably with no scheduled maintenance for up to 5 years except for routine cleaning.

1.1 How it Works

The Carmanah Model R247 does not require an external power supply as it operates using a pair of solar-charged batteries that are maintenance free for up to five years when the product is properly installed. The R247 consists of a single LED array that will cast a highly visible light towards oncoming traffic in all conditions. It can also be adjusted to meet varying brightness requirements.

Activation of the R247 is performed at the time of installation, and from then on, the R247 will flash 24 hours a day, 7 days a week with no down-time required for charging. The output brightness will automatically change at dusk and dawn to provide optimum visibility, day and night.

The light is completely power-autonomous therefore no wiring to an external power supply is required. Trenching of wire to a power source, pavement cutting and traffic disruption are not a concern with the R247 as everything is contained within the unit itself. It can be mounted wherever there is sunlight.

2.0 Product Assembly / Installation

2.1 Tools Required

- Socket Set
- Power Drill
- 3/16" drill bit
- Multi-bit screwdriver
- 1/8" hex driver
- Ladder or lift device
- Lithium grease
- Knowledge of local latitude
- Compass

Installation time can be budgeted at approximately ten minutes in the shop plus one hour in the field per R247 system. This time budget is assuming that a pole is already in place in the field to mount the unit on. No trenching, external cabling, traffic disruption or site remediation is required.

2.2 Attaching the Mounting Post

Place the Head and Light Mounting bracket onto the post – the cavity in the mounting post must face traffic. There are five holes in the L-shaped section of the mounting bracket, and corresponding holes must be drilled into the wood post to a depth of at least 2 inches using a 3/16" drill bit. Ensure the mounting bracket remains in the desired position on the post while drilling – you may want to temporarily bind it into place using gaffer's tape or similar material.

Once the holes are drilled, fasten the mounting post to the support structure using the supplied lag bolts and flat washers.

2.3 Mounting the Main Housing Unit

1. Apply some lithium grease to the threads of the Tee pipe.
2. Lift the housing unit above the mounting post and thread the LED harness from the T-pipe down into the top opening of the mounting bracket.
3. Taking care not to pinch the cable, spin the Main Housing Unit onto the post, threading the T-pipe into the post collar until one or two threads remain visible on the Tee pipe (this will allow for final rotational adjustment).

2.4 Mounting the LED Array

1. Hold the support arm and pass the Main Housing Unit LED Harness into the bolt-mount end of the pipe, shown in Figure 1:



Figure 1

2. Place the flange of the top arm pipe into the mounting bracket and ensure that the cabling is not pinched – make sure it does not obscure the mounting hole. See Figure 2.



Figure 2

3. Fasten the top arm pipe to the mounting bracket using the hardware described in **Drawing R247-A01_02** found at the end of these instructions.
4. Remove the large locking nut on the top arm and pass the LED harness into the top hole of the LED array. Replace the locking nut back onto the top pipe from inside the LED array housing. Do not fully tighten, as aiming is required when completed.
5. Fasten the lower arm to the mounting bracket, and to the lower side of the LED array housing.
6. Connect the LED Array harnesses inside the housing.
7. Aim the LED array in the desired direction and then tighten the two locking nuts inside the housing.

2.5 Install and Connect the Batteries

1. Remove the top cover of the main unit. There are two (2) metal battery brackets inside – remove the four (2) nuts and washers holding each bracket and remove the bracket.
2. Remove the cover of the circuit board box (in the center of the main EMS Housing Assembly). Notice that the LED harness is already connected to the card.
3. Each battery has two harnesses, one male and one female. With the connectors of the card facing toward you, join the male connector of the right-side battery to the female connector of the left-side battery. Now insert the remaining male harness connector of the left-side battery into the circuit board using the left-most card connector, denoted as “Battery”. The right-side battery will have a harness that is unused. See Figure 3.

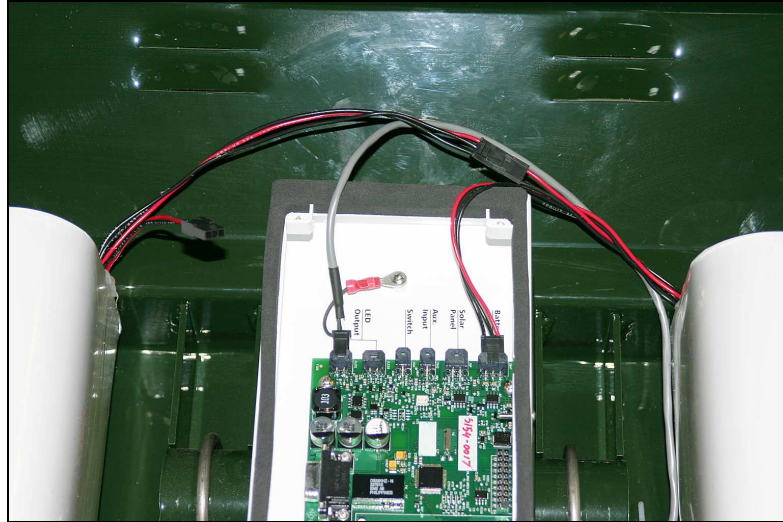


Figure 3

5. Plug the solar panel harness into the solar panel interface harness already present on the card.
6. Place the circuit board lid onto the box (make sure open end is towards the harnesses). Ensure the harnesses exit the box, being pinched only by the foam seal. Fasten the lid with the supplied screws.

The Model R247 Hazard Light is now functional!

Note: If any changes are desired in the function of the light using the DIP switches, the changes must be made while disconnected from the batteries – the unit reads the DIP switch settings upon initial power-up.

2.6 Final Adjustments

As the Carmanah Model R247 is a solar-powered device, it is critical to position the unit in relation to the optimum angle of the sun in order to achieve maximum solar power generation.

Note: To do this, angle the top of the main housing unit towards the equator (south if installed in the northern hemisphere, and north if installed in the southern hemisphere) and tip it upwards at an angle equal to your latitude plus 5 degrees.

Once you have determined the final position of the R247, tighten the set-screw in the mount collar.

2.7 Install Bird Deterrents on the Module Housing

The small wire bird deterrents discourage birds from perching on the R247. Attach the bird deterrents to the top panel using the holes and sheet metal screws provided.

3.0 Configuration / Operating Instructions

3.1 How to use the R247

3.1.1 Activation

Connecting the batteries to the main circuit board activates the R247. The light will immediately begin flashing and will continue to do so until the unit is no longer required at the location. Unplug the battery cable from the circuit board to turn the unit off.

3.1.2 Configuration Options

The R247 offers four (4) customer-configurable options using a set of switches located on the circuit board:

Daytime Brightness Levels: 124, 250 or 400 candela for MUTCD setting.

Nighttime brightness: 10 or 35 candela for MUTCD setting.

Automatic Light Control (ALC): ALC is a patented algorithm built into the system to ensure that the unit performs at its maximum efficiency by determining the brightness that can be continuously sustained at a particular state of charge. It will protect the batteries if the voltage drops too low due to insufficient sunlight. ALC can be turned "on" or "off."

Flash Pattern: See the table in Section 3.2.1 for the 8 options available to choose from.

3.2 Product Configuration

To configure the above settings, the top of the unit upon which the solar panels are mounted must be removed to access the circuit board inside. To do this, remove the four (4) screws attaching the top solar panel lid to the main housing. Remove the lid and locate the main circuit board enclosure in the center of the main housing. Remove the four (4) screws and enclosure lid.

On the circuit board there is a plastic block with eight small switches on it (see Figure 4).

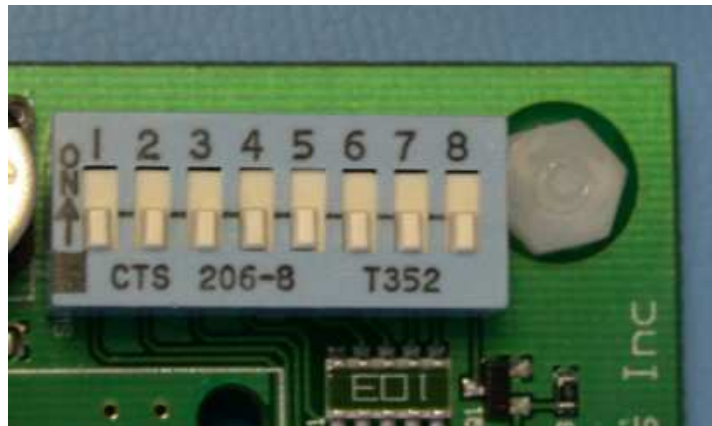


Figure 4

3.2.1 Switch Function and Options

The R247 has several user-configurable options that are accessed by DIP switches mounted on the circuit board. These options are read by the R247 only on power-up, so the power must be disconnected and reconnected after any change is made.

Switch 1: Night Intensity (for MUTCD setting)

- OFF – 35 candela
- ON – 10 candela

Switch 2 and 3: Day Intensity

- 2 OFF, 3 OFF - 124 candela
- 2 ON, 3 OFF - 250 candela
- 2 OFF, 3 ON - 400 candela
- 2 ON, 3 ON - 400 candela

Switch 4: ALC Disable

- OFF – ALC Enabled
- ON – ALC Disabled

Switch 5: ALC Disable

Not Used

Switch 6, 7 and 8: Flash Pattern

Switch Settings			Flash times, in seconds								Approx. Brightness (Cd)	Description
6	7	8	On	Off	On	Off	On	Off	On	Off		
Off	Off	Off	0.5	0.5							250	MUTCD standard
Off	Off	On	0.3	0.7							417	Brighter than MUTCD
Off	On	Off	0.1	0.05	0.1	0.05	0.1	0.5			375	Three quick flashes
Off	On	On	0.15	0.1	0.15	0.1	0.15	0.5			319	Three slower flashes
On	Off	Off	0.1	0.2							375	Fast flashing
On	Off	On	0.5	1							375	Slow flashing
On	On	Off	0.1	0.1	0.1	0.1	0.1	0.5			417	Three flashes
On	On	On	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	375	Four Flashes

3.3 Factory Default Settings

The factory default configuration is all switches set to the OFF position – this sets 124 candela daytime intensity and 35 candela nighttime intensity, with ALC enabled and MUTCD standard flash pattern.

4.0 Maintenance and Product Care

Although the system is designed to be maintenance free, optimum performance can be achieved by cleaning solar panels and lenses as required. Clean on a regular basis, or whenever the panels are visibly dirty. Use water and a soft sponge or cloth for cleaning and a mild, non-abrasive cleaning agent for more stubborn residue. Rinse well.

Note: Pressure washers should **not** be used (water forced up into the louvers may soak internal components).

Following the check list below will assist in ensuring that the R247 is will perform optimally

1. Clean the solar panels more frequently during drier months, as they may become soiled more quickly.
2. Check all electrical and mechanical connectors yearly to ensure they are clean, secure and undamaged.
3. The main battery housing has several vents and drain holes. Ensure that they are free of debris.
4. Visual inspection – check over exterior assembly for cracks, missing or broken hardware or other potential problems.

A Note on Batteries

Be cautious when handling the battery packs. They are capable of generating enormous short-circuit currents. Remove all jewelry (bracelets, metal-strap watches, rings) before attempting to handle or disassemble the battery packs.

The batteries are comprised of four sealed, lead-acid cells each. Consult your local municipal by-laws for information on recycling the cells.

Do not discard these cells in the garbage – please recycle!

5.0 Troubleshooting

The Light is not Flashing

There are two faults that may occur with the R247 that will prevent the light from flashing:

1. Check the battery connection and the LED array connection to ensure that the connectors are fully inserted. As the light is designed to function as soon as the battery is plugged in, this should be fairly simple to diagnose.



2. IF SO EQUIPPED: Certain units have batteries that utilize inline fuses. In the case of system malfunction, open the inline fuse holder (pictured left), and check the state of the fuse. If the interior filament is intact, the fuse itself is functional, otherwise replace fuse with **Cooper-Bussman** model **ABC-4** (4-amp fuse).

The Light is Exhibiting Irregular Flash Patterns

Your R247 flasher may exhibit irregular flasher patterns under certain conditions. If you notice that your R247 is flashing irregularly it may be a result of one of the following conditions:

1. Low battery condition: Under a low battery condition the R247 will exhibit the following flash pattern: on 0.1 second, off 10 seconds, repeat. If your light is exhibiting this flash code you will need to charge the unit's batteries. This can be done in several ways. If there is sufficient insolation, disconnect the LEDs and allow the unit to charge for three to five days. Batteries can also be charged by placing the unit under high-powered halogen flood lights for three days. Also, ensure your unit's dip switch is set to the lowest candela setting, as it is likely that the unit is drawing more energy than the solar input.
2. The flasher has not been exposed to sunlight in 24 hours: Under this condition the light will display the following flash pattern: on 0.1 second, off 0.5 seconds, on 0.1 seconds, off 0.5 seconds, on 0.1 seconds, off 5 seconds, repeat. In this situation it is best to expose the unit to sunlight or high-powered halogen flood lamps. This measure should stimulate the unit to begin producing its specified flash code.

If your R247 flasher still refuses to operate correctly, contact Carmanah Technologies Corp. at 877-722-8877 or contact your distributor.

6.0 Service and Additional Products

6.1 Customer Service

Before contacting Carmanah's customer service department, please have the serial number of the Model R247 available, a brief description of the problem, as well as all details of the installation.

Carmanah products are covered by a standard 3-year pro-rated warranty. A warranty card is supplied with each unit. The warranty can also be viewed online at:

<http://www.carmanah.com/content/products/warranty/>

To contact Carmanah's Customer Service Department:

Mail: Carmanah Technologies Corp.
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Victoria, BC Canada V9A 3S2

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1 (877) 722-8877 (Toll Free in Canada & U.S.)

Fax: + (250) 380-0062

Email: customerservice@carmanah.com

Website: www.carmanah.com

6.2 Additional Products

Carmanah offers a variety of solar-powered and energy efficient LED lighting products. For roadway applications, Carmanah also manufactures solar LED pedestrian crosswalk flashing beacon and school zone flashers, as well as LED internally illuminated street-name signs and traffic signs. For more information, please visit our website at: www.roadlights.com.

7.0 Specifications

Light Output

Peak Intensity.....35-400 candela (user-adjustable)
Divergence (vertical/horizontal).....20 deg / 30 deg

Operation

Required Solar Isolation for
Daily Operational Profile2 hours
Continuous Operation Without Sun.....40 days
Lifespan of LEDSUp to 100,000 hours
Color OutputYellow or Red
Dominant Wave Length (Yellow).....590nm
Flash Pattern/On Time/Off Time0.55s / 0.55s (MUTCD Compliant)
Battery Capacity200-Watt Hour

Lens

ColorsYellow or Red (matched to LEDs)
Material.....Polycarbonate, hard-coated for
abrasion resistance

Operating Temperatures

Optimal Ambient Range-4°F to 77°F (-20°C to +25°C)
Maximum Ambient Temperature Range-40°F to 176°F (-40°C to +80°C)
Storage Temperature20° C +/- 5° C (68° F +/- 5° F)

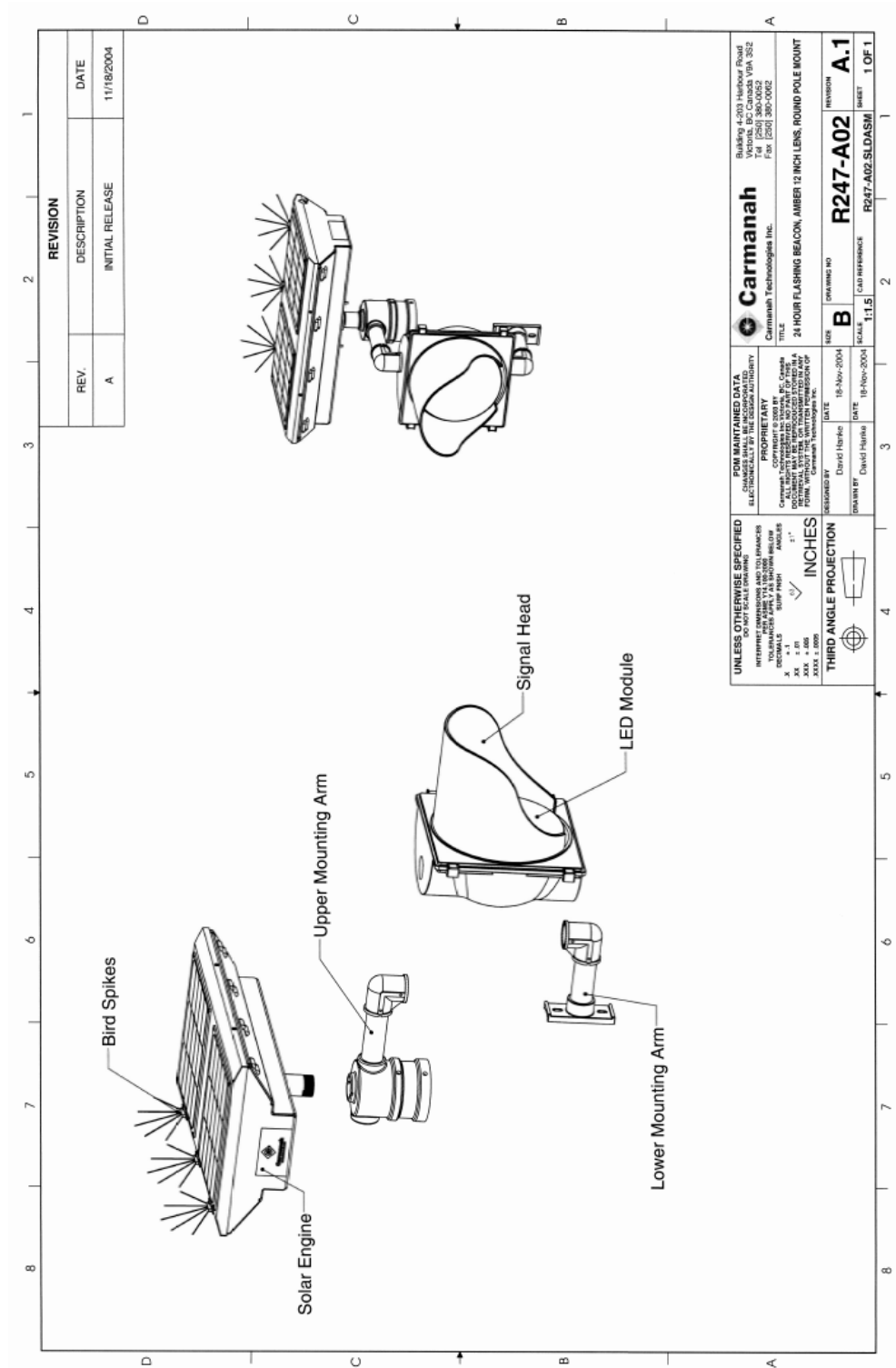
Housing

Head and Support StructurePowder coated aluminum
Signal HousingInjection molded UV stabilized polycarbonate

Patents

Trademark and Patents.....Patents Pending

9.0 Appendix B: R247 Round Pole Mounting Option



REVISION		DATE
REV.	DESCRIPTION	
A	INITIAL RELEASE	11/18/2004

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DIMENSIONS
INTERPRET DIMENSIONS TO NEAREST DECIMALS
DIMENSIONS SHALL BE IN UNITS OF INCHES
XXX.X .000

THIRD ANGLE PROJECTION

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PROPRIETARY
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DESIGNED BY: David Hehke DATE: 18-Nov-2004
DRAWN BY: David Hehke DATE: 18-Nov-2004

Carmanah
Carmanah Technologies Inc.

24 HOUR FLASHING BEACON, AMBER 12 INCH LENS, ROUND POLE MOUNT

SIZE: DRAWING NO: **R247-A02** REVISION: **A.1**
SCALE: 1:1.5
CAB REFERENCE: R247-A02.SLDASM SHEET 1 OF 1