

# LOD-1

## LIGHT OUT DETECTOR

### USER MANUAL

## MICRO-AIDE

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### HIGHWAY PRODUCTS

LOW POWER MODEMS

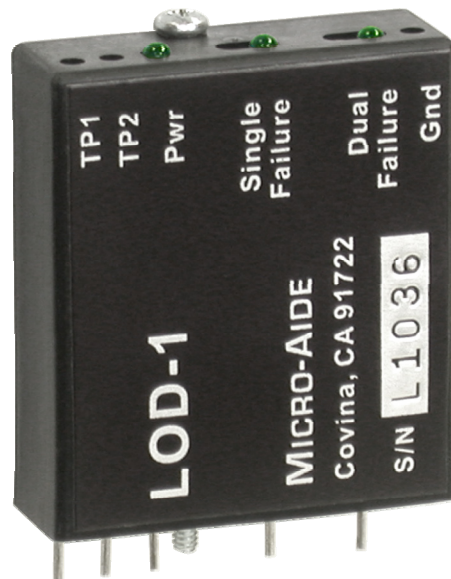
LIMITED DISTANCE MODEMS

**LIGHT OUT DETECTORS**

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# LOD-1 LIGHT OUT DETECTOR USER MANUAL

*Burned-out bulbs, wiring faults and relay problems often cause failures in LCS head assemblies. The LOD-1 can be used to passively monitor actual current flow to an indicator lamp.*

## Description

This document is intended to provide a detailed description of the use and operation of the MICRO-AIDE LOD-1 Light Out Detector.

The LOD-1 is designed to provide its user with an accurate and stable method of sensing current flow to a Lane Control Signal (LCS) head. The LOD-1 can be used to automatically indicate a two-bulb failure in an LCS lamp circuit. Each LOD-1 is equipped with current sensing circuitry to monitor a single LCS indication. An open collector output transistor and LED are used to indicate a two-bulb failure. Additionally, a separate LED is used to indicate a single bulb failure. The operating range of the LOD-1 extends from .2 to 1.5Aac. It cannot be used to sense direct current.

The size and physical configuration of the LOD-1 allows it to be secured to an existing wiring panel inside a roadside cabinet. The LOD-1 can be powered by a nominal 24Vdc ( $\pm 4$ Vdc) source. The limit values for single and dual bulb failures can be set separately and precisely by adjusting a twenty-turn potentiometer. As a convenience to the user, both limit values are pre-set at the factory prior to shipment. If the lamp current drops below the limit value for a two-bulb failure the output transistor will turn off and +24Vdc will be presented at the output pin. Additionally, an LED will indicate the drop in current by turning off. The LOD-1 is designed for fail safe operation. A loss of power to the LOD-1 is indistinguishable from a two-bulb failure.

Figure 1 provides a two-sided view of the LOD-1 and an explanation of its various controls and indicators. The last page of this document lists detailed specifications.

## Installation

The LOD-1 is designed to be mounted in place of existing LCS sensor modules. Its use does not require any modifications to existing wiring or cable plans, including the LCS head assembly. Its installation and operation is completely non-intrusive. It may be oriented in either a horizontal or vertical plane. It is not susceptible to stray magnetic fields.

The LOD-1 must be installed on the primary side of the LCS 120/12V step-down transformer. It is ideally suited for use with 50W lamps at the LCS. The LOD-1 transistor output is typically connected to an input of a MICRO-AIDE LCU.

The LOD-1 is equipped with five male pins. Refer to Figure 1 for a definition of each pin. These pins must be carefully aligned and inserted into the female sockets located on the interconnect panel PCB. Tighten the mounting screw to secure the module in place.

**Note** - The LOD-1 mounting footprint conforms to the Opto-22 G1 standard.

## Setup and Operation

The operation of the LOD-1 is fully automatic once both limit values are properly adjusted. The limit values and sensor circuitry are designed to be stable over a wide range of temperatures and current levels. All of the LOD-1 features are consistent with a desire for “set and forget” operation.

To adjust the limit values refer to Figure 1. Verify that power has been applied to the device. The green power LED should be illuminated. Locate the green test point and the red test point identified as “TP2”. Connect a Digital Volt Meter (DVM) across the two

test points. The positive lead of the DVM must be connected to the red test point. Adjust the appropriate potentiometer until it reads in Volts the desired limit value in Amps. As an example, if .5Aac is desired a reading of .5Vdc is required. Adjust the single failure limit value in the same fashion by connecting the DVM to the red test point identified as "TP1".

**Reminder** - The LOD-1 is pre-adjusted with limit values of .30Aac and .65Aac. These values are optimum for use with 50W bulbs and 120/12V step-down transformers. The limit values should only be adjusted if these conditions are not applicable.

## Maintenance and Trouble-shooting

The LOD-1 is designed to be completely maintenance free. It contains no consumable materials or serviceable components. If it fails to operate the device should be returned to MICRO-AIDE for repair or replacement.

The LOD-1 is protected by a five-year limited warranty. Telephone numbers and a shipping address are listed below.

### **MICRO-AIDE CORPORATION**

685 Arrow Grand Circle

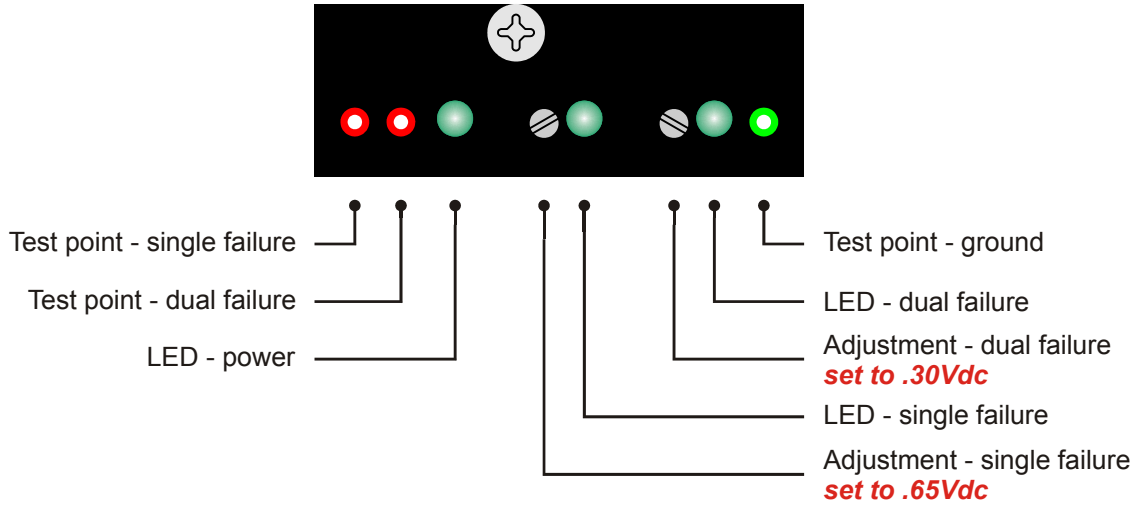
Covina, CA 91722

Tel: 626-915-5502

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# Top View



# Front View

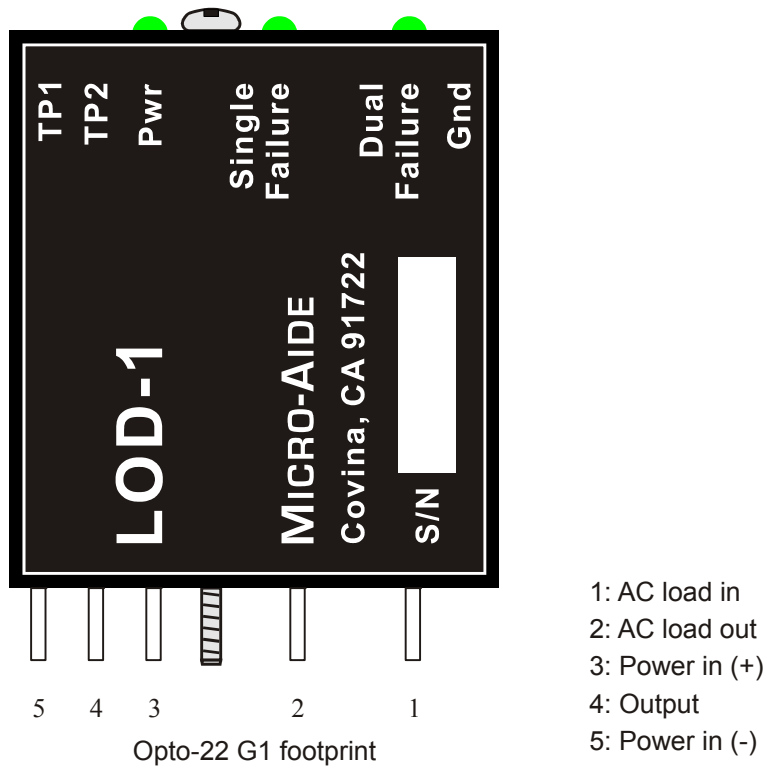


Figure 1 – Top and front views

# LOD-1 LIGHT OUT DETECTOR SPECIFICATIONS

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## Physical

### Size

Height: 2.25"

Width: 1.70"

Thickness: .6"

### Weight

3 oz.

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## Environmental

### Storage

Temperature: -50°C to +85°C

Humidity: 0% to 95%, non-condensing

### Operating

Temperature: -40°C to +72°C

Humidity: 0% to 95%, non-condensing

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## Mounting

4-40 screw into G1 module rack

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## Construction

### Housing

Completely sealed, non-conductive plastic case

Externally accessible adjustments and LEDs

### Electrical

Single printed circuit board inside housing

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## Power

### Voltage

Input: 20 to 28Vdc

### Consumption

Less than 30mA at 24Vdc

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## Protection

### Isolation

Minimum 4000Vdc from current leads to output and power leads

### Input Impedance

Infinite to current conductor (fully isolated)

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## Output

### Operation

Open collector type, pulls low when lamp current exceeds limit value

Non-latching, restores automatically

### Load

Maximum Load: 10mA<sub>dc</sub> sink

Maximum Output Voltage: 36V<sub>dc</sub>

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## Transient Filtering

Each sensor includes hysteresis and a .53 second filter that will ignore momentary current fluctuations

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## LED Indicators

### Lamp Current (2)

Green: indicates lamp current exceeds respective limit value (separate LEDs for dual and single lamp failures)

### Power

Green: indicates that power has been applied to the unit

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## Controls

### Potentiometer (2)

20-turn, used to adjust current limit value

### Test points (3)

Female, used to connect DVM when setting current limit values

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## Connector

Single row, five terminals, male, conforms to Opto-22 G1 std.

Terminals 1 & 2: AC Load, in/load

Terminal 3: Power Input, positive

Terminal 4: Output

Terminal 5: Power Input, negative

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## Range

Current limit value may be adjusted between .2 and 1.5A<sub>ac rms</sub>

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## Accuracy

The greater of ±4% or .03A<sub>ac</sub> as compared to current limit value

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