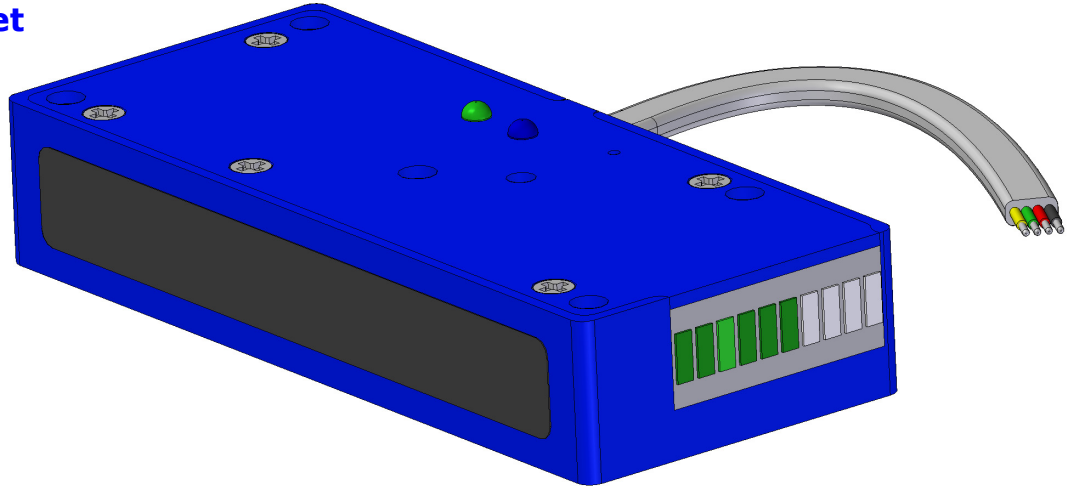


- **Compact Size**
- **LED Bar Indicator**
- **Threshold set**
- **Low cost!**



| Cancellation of visible light and ambient DC, LF light | Flexible mounting (top or bottom surface) | PIN HOLE for Threshold adjustment | Standard 4 wire HOST interface (POWER, REMOTE, OUT) | Dimensions 3.5"x1.5"x0.65" | Uses Class 1 Laser Diode (780nm) | Distance (standoff) of 1.5" (38mm) | Collimated beam for large FOV | Superior sensitivity with wide detection line |

<b>RscanX038 Specifications:</b>	
Detection Method	Laser beam with photodetectors
Light Source	780 nm Class I Laser Diode (0.050mW max. power)
Detecting Distance	1.5" (38mm) or custom (2",3",4')
Response time	ON delay 38µs max.,OFF delay 5ms min (user selectable)
Laser Spot Size	12.7mm x 0.15mm
Angular coverage	+17°,-25° (relative to the sensor front surface)
Detectable wafers	3" to 12", different thickness and coatings (including Nitride wafers)
Supply Voltage	8 to 24 VDC (100mA max.)
Settings	Pin Hole for Threshold adjustment
Interface ( Input and Output )	4 wire cable
Indicators	Green LED = Sensor ON ; Blue LED = Object Present; LED Bar
Output	NPN open collector (internal or external pull-up resistor), 80mA max.
Materials	Aluminum case, glass lenses, RG9 filter
Overall Dimension	88.9mm x 38.1mm x 16.5mm (3.5"x1.5"x0.65")
Weight	92g (3.2oz)

## Introduction

**RscanX038** sensors are specifically designed for detecting presence/absence and improper positioning in slot (e.g. cross-slots) of semiconductor wafers. These sensor are usually mounted on process equipment such as robot's arms and other wafer handling devices (e.g. FOUP door).

**RscanX038** sensors are high performance sensors. They are carefully designed for reliable detecting of all sort of wafer (dark coated, thin wafers,..). These sensors can be used to detect any size of wafer with notch or flat. **RscanX038** allows both scanning methods (at center, off center).

### Features

- detects standard wafers
- detects dark wafers
- detects thin wafers
  
- Side graph displays amount of reflected light
- Easy threshold setting with pushbutton switch
- filters out visible light with optical filter
- filters out all DC and LF light
- mechanically and interface compatible with industry standard sensors
- flexible mounting
- Class 1 laser product
- custom standoff distances available (e.g. 100mm)

## Laser Safety

### Cautions:

**RscanX038** series of sensors uses invisible semiconductor laser. Optical power of laser is internally set, so sensor fits into Class I. Light is emitted from front face of sensor.

**Avoid direct viewing or staring into the laser beam.**

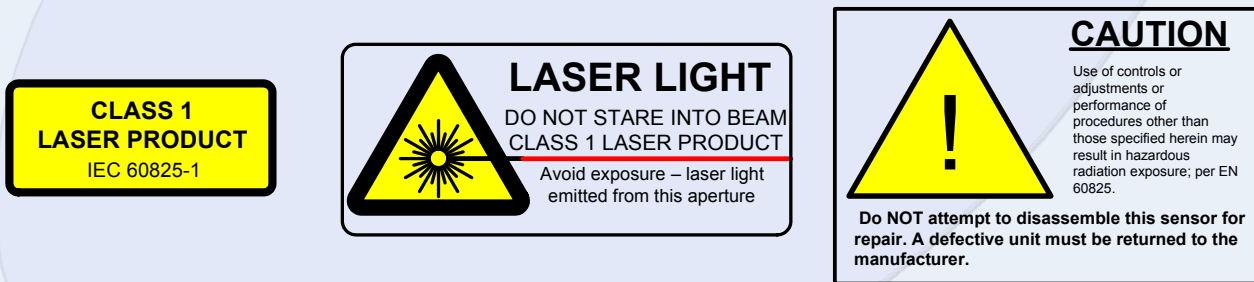


Fig. 1: Laser Safety labels

**RscanX038** sensors conform to IEC 60825-1 (2001-08) – laser safety and to the laser safety requirements of SEMI S2-0200

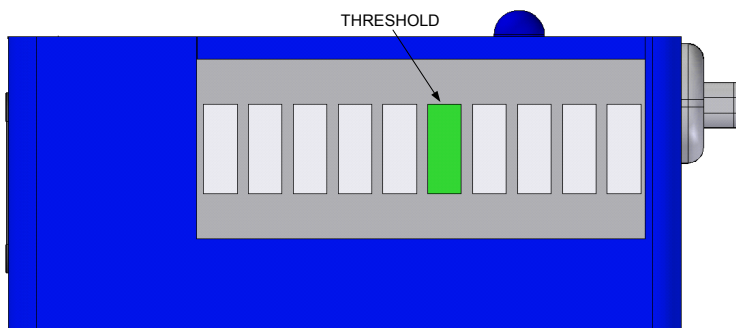
## Functional description

**RscanX038** uses LED bar indicator on side of sensor (see figures bellow). This indicator displays level of reflected light from object (e.g. wafer) in front of sensor. One out of 10 LED is always ON and has higher intensity (see annotation on figures bellow). This indicates Threshold level. When level of reflected light exceed threshold point, output of sensor turns ON (and blue LED too) -

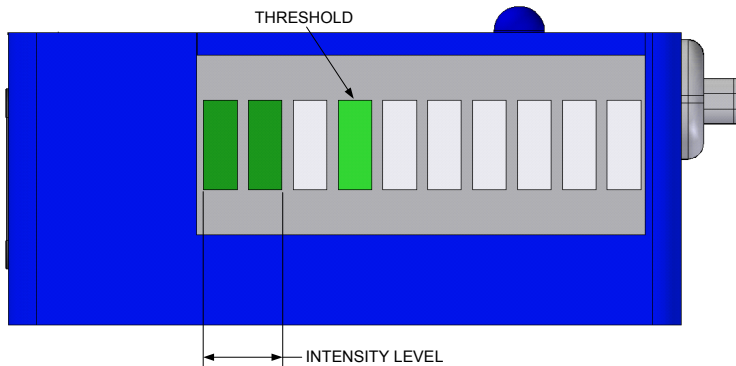
*Figure 2.*

Higher threshold setting is used for high reflectivity surfaces like standard silicon wafer. Lower threshold setting is suitable for dark surfaces (e.g. nitride coating) or thin wafers.

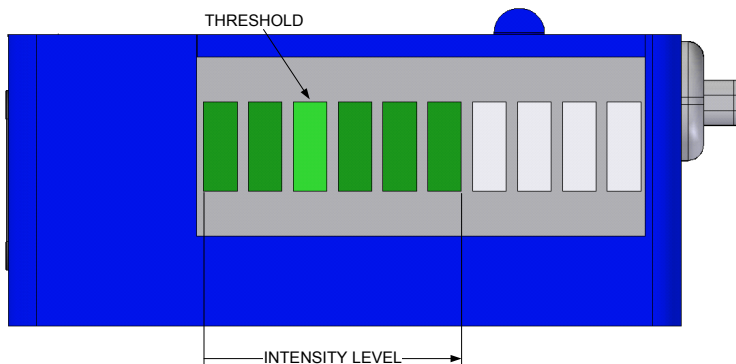
**RscanX038** sensor uses wide detection line so wide working angle are possible (for flatted wafers and to reliable cross lot detection).



**Figure 2:** There is no any reflected light means **NO OBJECT** in detection field of sensor.



**Figure 3:** Reflected light intensity is bellow threshold thus **OUTPUT** and **BLUE LED** are both **OFF**



**Figure 4:** Intensity of reflected light is higher than threshold level thus **OBJECT IS DETECTED**. **Output** and **BLUE LED** are **ON**.

**Please keep clean front optical surface and minimize touching it!**

## Wiring Instructions

**RscanX038** comes with pigtail 4wire cable unless otherwise specified (customer can specify any application specific connector and this can be install in factory). See **Interface, Output** section for appropriate wiring.

## Setting of Threshold

**RscanX038** allows custom setting of threshold level. Before changing threshold the operator should be familiar with reflective wafer mapping. Therefore small pinhole is used as access to pushbutton for adjusting of threshold (see **Indicators and controls** section). Paper clip can be used to press threshold pushbutton. Pushing the button increases threshold (see LED "moving" to right). If last LED is reached threshold goes back on lowest threshold level (most left position on indicator).

## Mounting the Sensor

Use mounting holes (#6-32 and/or #4-40 – see **Indicators and controls** section) to mount sensor on robot arm, load port door, etc. Set proper offset (e.g. 1.5") and alignment. Set sensor angle based on scanning method. For single pass scan best result are obtained on axis (no axis offset). For multiple scans choose appropriate working angle (depends on size of wafers, e.g.  $\pm 2.5^\circ$ ). See **Dimensions, Mounting** section.

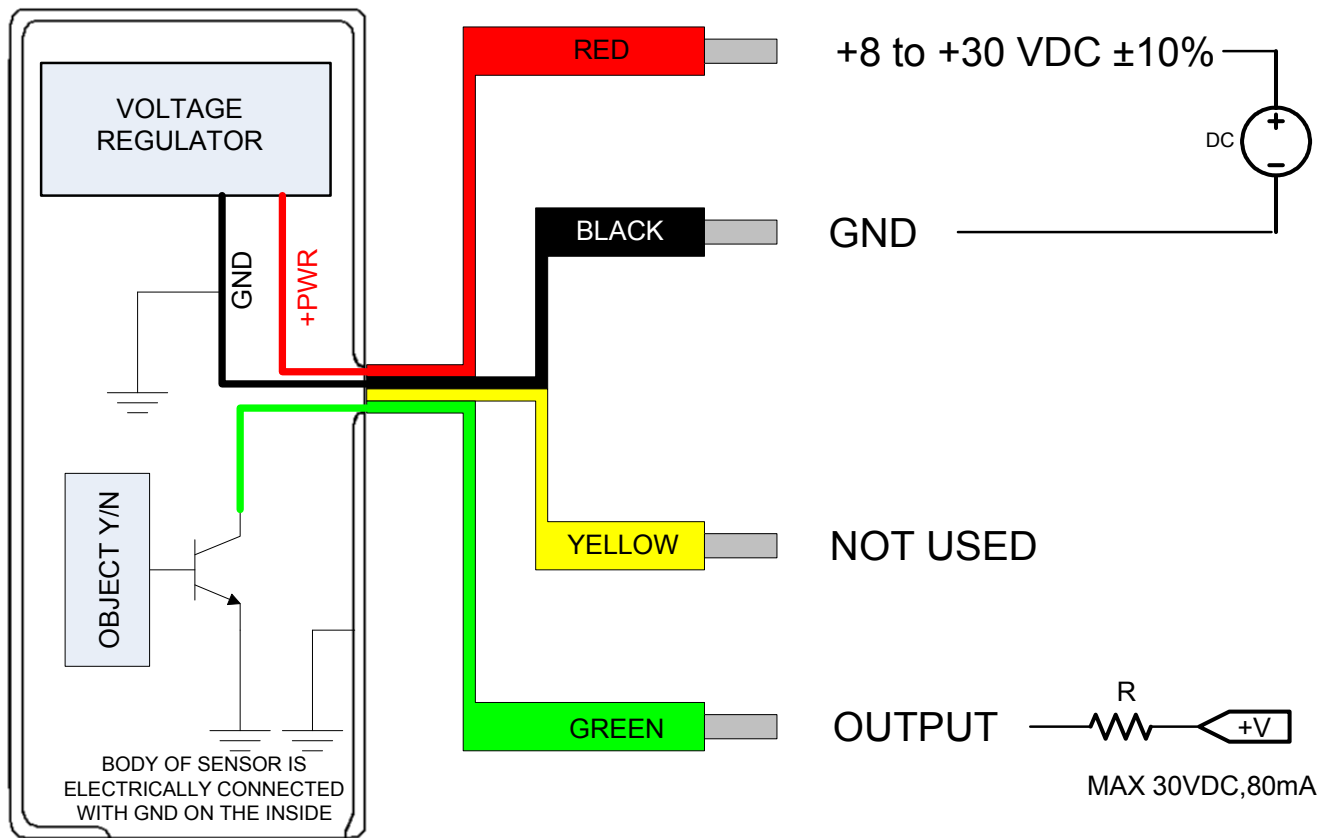
## Quick Functionality Test

Power ON the unit. Green LED has to turn ON. Threshold LED on LED graph has to get ON too.

Teach the robot positions for wafer sensing. When sensor is unmounted (replaced) the robot should be re-taught again.

Wave hand back and forth before face of sensor. See reflected light level on indicator. When level of reflected light exceed threshold points blue led has to turn ON.

## Interface, Output



AS AN OPTION PULL-UP RESISTOR R CAN BE WIRED INSIDE OF THE SENSOR, CONNECTED EITHER ON +PWR OR +5V(TTL/CMOS OUTPUT)

Fig. 5: Connection Schematic

**RscanX038** sensor is internally connected to GND (black) wire, to shield internal circuits from EMI. Insulate the sensor in case when equipment produce large current surges in the case of ground connection.

**RscanX038** uses OPEN COLLECTOR circuit as output. The collector must be connected via a pull-up resistor (see figure) to a source of positive voltage (+5V to +24V). This pull-up resistor has to limit current thru output transistor (max. 80mA). Usually 10kOhm resistor is used. This resistor can be installed inside of the sensor and can be connected on +5V (TTL) or +PWR. Output signal uses negative logic (when object detected - 0V is on OUT, when no object +V is on OUT).

The response time **tRESP** is the time delay between placing an object in the detection field and generating the output signal (max. 200µs). Objects "smaller" than 5ms(i.e. actual time of object in sensor detection field), will generate 5ms output pulse. "Large" objects (i.e. actual time of object in sensor detection field longer then 5ms) generates a pulse width equal to object "size" . Therefore the width of the output pulse is always 5ms or longer (this constant can be changed upon customer request). See Figure 6.

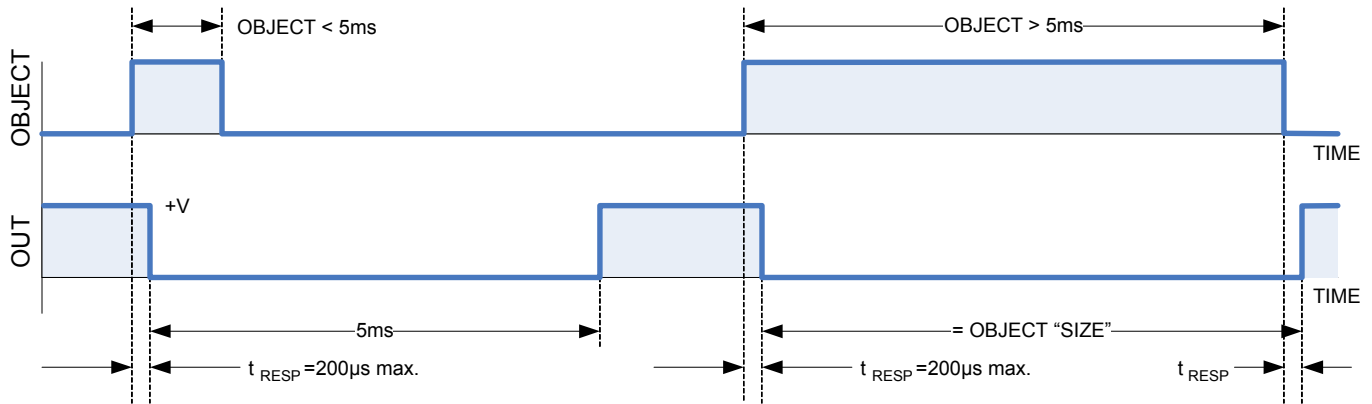


Figure 6: Output signal waveform

## Ambient light

### Optical filter

RscanX038 sensors accommodate optical filter, which block-out all visible light

### Electronic filter

RscanX038 accommodates bandpass filter circuitry. The high pass suppresses ambient light and low frequency alternating light and low pass reduces high frequency noise.

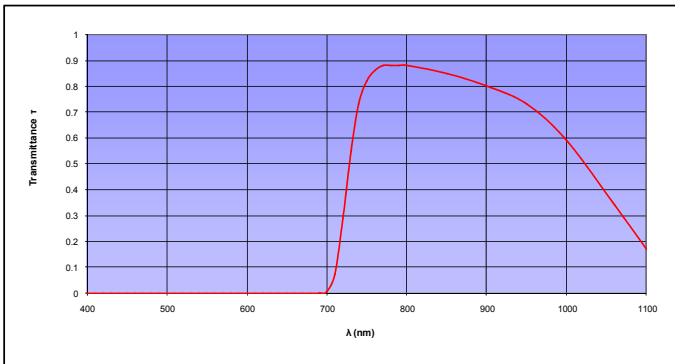


Figure 7: Transmittance

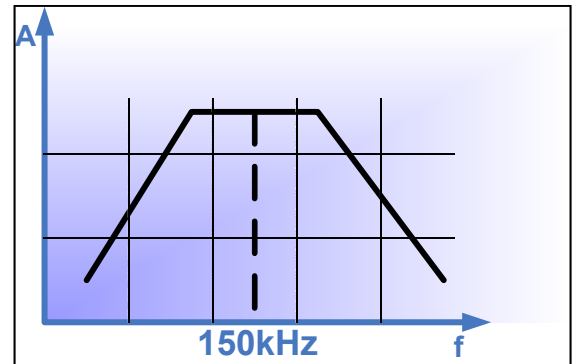


Figure 8: Frequency response

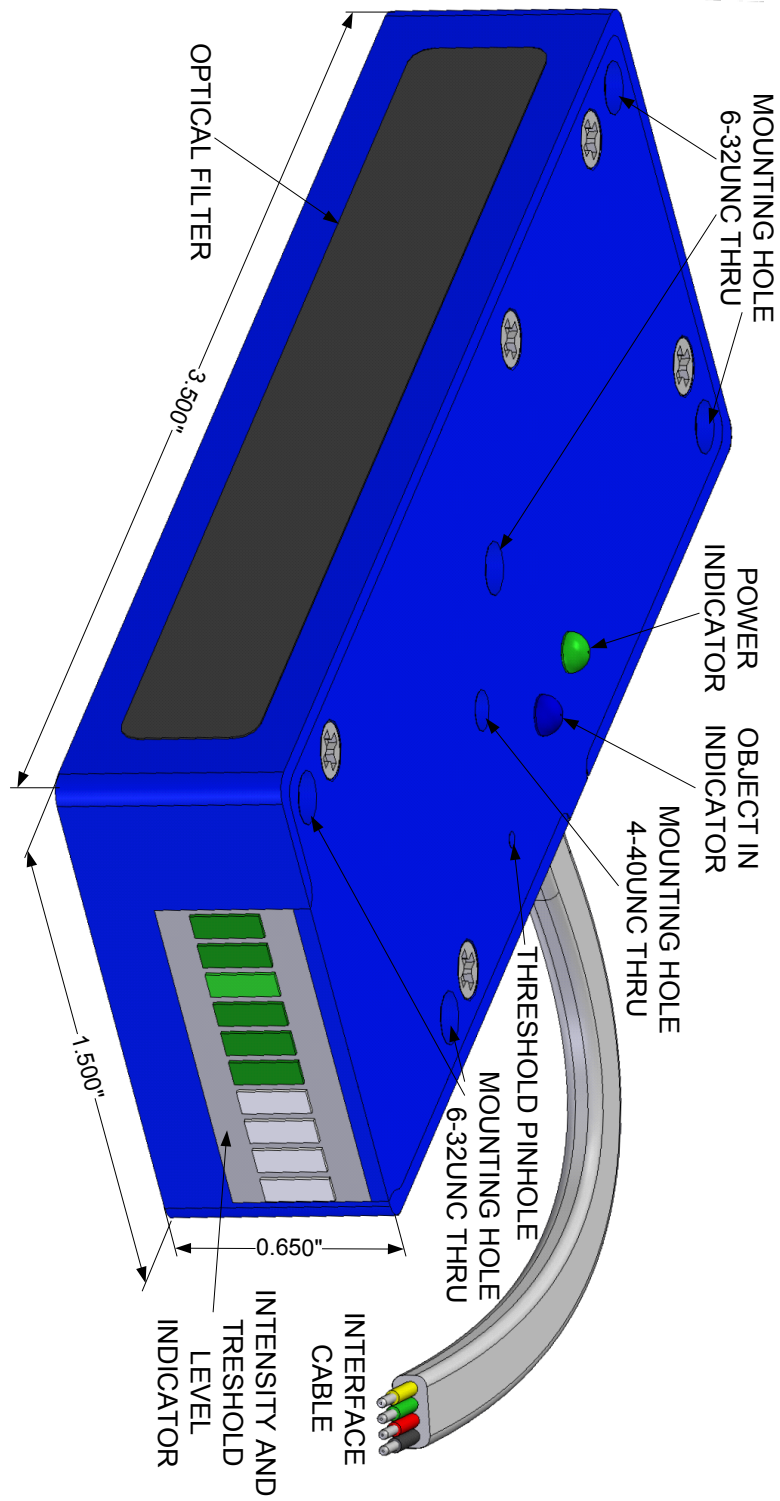
## Warranty

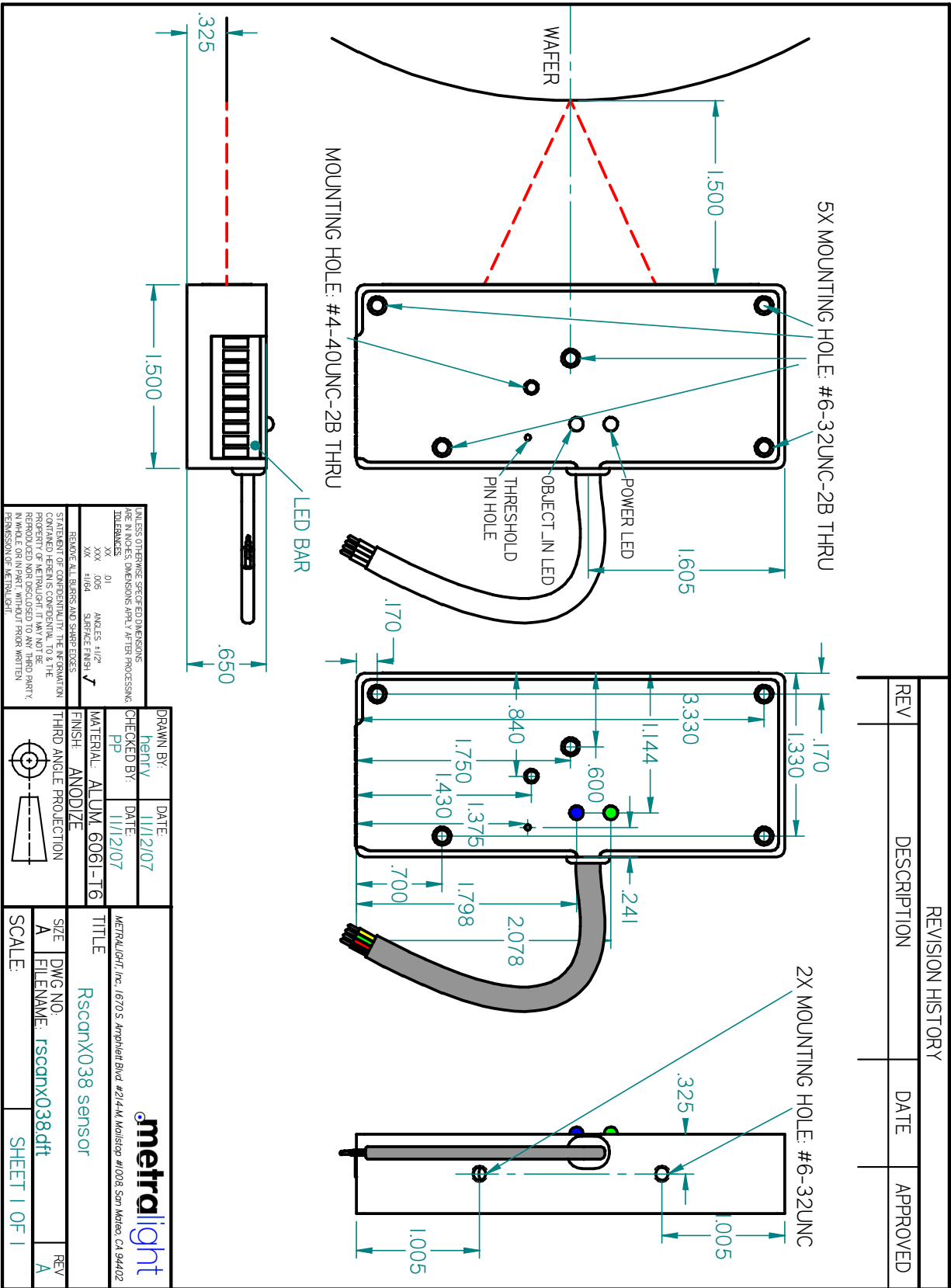
**METRALIGHT** provides a **ONE YEAR** manufacturer's limited warranty against defective materials and workmanship. Please do not attempt to open the unit, as this will void all warranties.

## Contacts

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 web site: <http://www.metralight.com>





REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED

<small>ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. DIMENSIONS PART, OR FINISH PROCESSING TOLERANCES:</small> XX .01 ANGLES: 1/12° XXX .005 SURFACE FINISH: ✓ XX .0104		DRAWN BY: henry CHECKED BY: PP DATE: 11/12/07 DATE: 11/12/07	DATE: 11/12/07 DATE: 11/12/07
<small>REMOVE ALL BURRS AND SHARP EDGES</small> FINISH: ANODIZE THIRD ANGLE PROJECTION		MATERIAL: ALUM 6061-T6 FINISH: ANODIZE	TITLE: RscannX038 sensor SIZE: A DWG NO.: RscannX038.dft FILENAME: RscannX038.dft SCALE:
<small>STATEMENT OF CONFIDENTIALITY: THE INFORMATION CONTAINED HEREIN IS CONFIDENTIAL TO &amp; THE PROPERTY OF METRALIGHT. IT IS NOT TO BE REPRODUCED, COPIED, OR DISCLOSED TO ANY OTHER PARTY WITHOUT PRIOR WRITTEN PERMISSION OF METRALIGHT.</small>		METRALIGHT, Inc. 16770 S. Amphlett Blvd #214-M, Malissip #1008 San Mateo, CA 94402 <b>metralight</b> RscannX038 sensor SHEET 1 OF 1	