

Fiberoptic Sensor - Reflectance Compensated\*

# Model RC63



For The Measurement of Distance, Displacement and Vibration

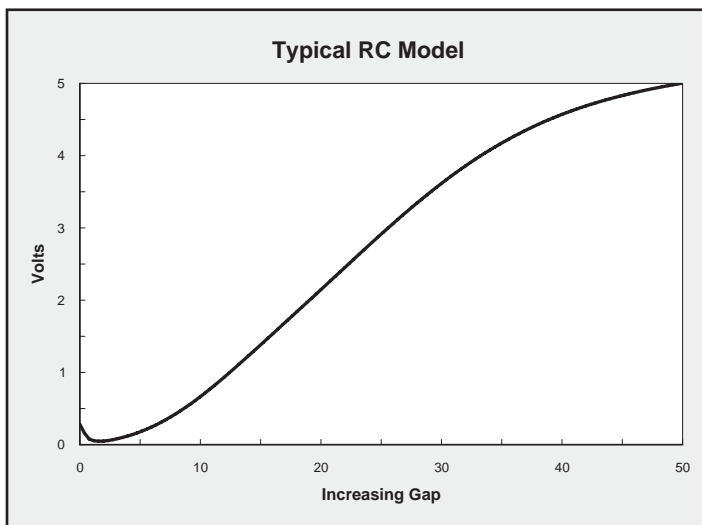
**Features**

- Reflectance Compensated Output
- Rugged Tip Design
- 4 mm Operating Range (0.160 inch)
- 1.6 mv/ $\mu$ m Sensitivity (40 mv/mil)

**Tip & Cable Dimensions**



**Tip Detail**



| FEATURE                 | mm          | inch          |
|-------------------------|-------------|---------------|
| Tip Outer Diameter, Ø B | 7.14        | 0.281         |
| Fiberoptic Area         | 1.58 x 3.18 | 0.063 x 0.125 |
| Tip Length, B           | 38.1        | 1.5           |
| Cable Length, A         | 915         | 36            |
| Cable Diameter, Ø A     | 5.97        | 0.235         |
| Cable Min. Bend Radius  | 22          | 0.875         |

\*These are reflective type transducers based upon detecting the intensity of reflected light. RC Model sensors have a pair of adjacent fiberoptic detectors in the sensor tip. Light reflected off the target follows two separate paths back to the electronics where a ratiometric calculation provides the distance measurement which is independent of varying surface reflectance; i.e., *reflectance compensated*.



## Two Instrument Packages To Choose From

This sensor can be provided as an analog or as a digital instrument. For available options and how to order go to [www.philtec.com](http://www.philtec.com)

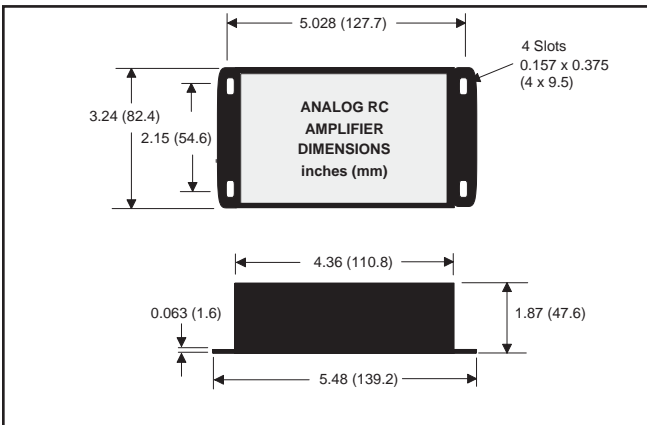


**A**nalog sensors are fast responding units ideal for relative motion measurements in dynamic applications:

- DC-20 KHz is standard
- DC-200 KHz or higher is optional
- DC-100 Hz provides best resolution

Standard analog units include:

- Electronics with 0 to +5 VDC output
- 3 foot long fiberoptic cable



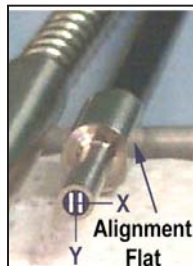
### ANALOG OUTPUT

A calibration chart is provided with each sensor tip giving the voltage output response to distance. There are three ways to derive accurate distance measurements:

- within the bounds of the linear range, multiply sensitivity by the change in voltage output
- create a lookup table using the XY calibration data points
- use a polynomial curve fit to accurately map the sensor's output function

### SENSOR TIP ALIGNMENT

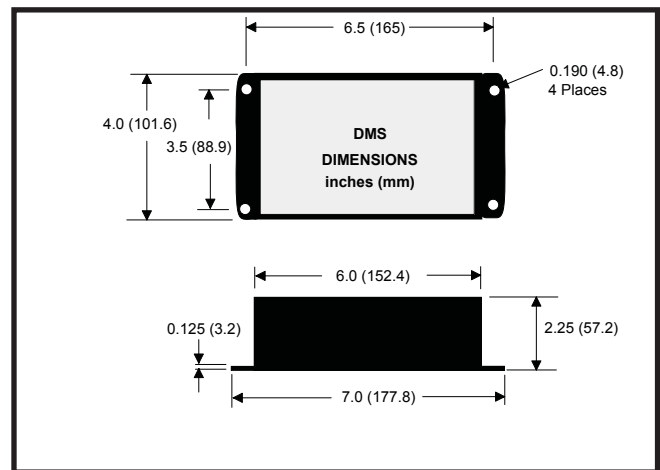
RC sensors have adjacent fiber bundles in the face of the sensor. An alignment flat is provided on the casing to aid with alignment. The flat is ground parallel to the split between the adjacent fiberoptic bundles, and located on the light transmitting side.



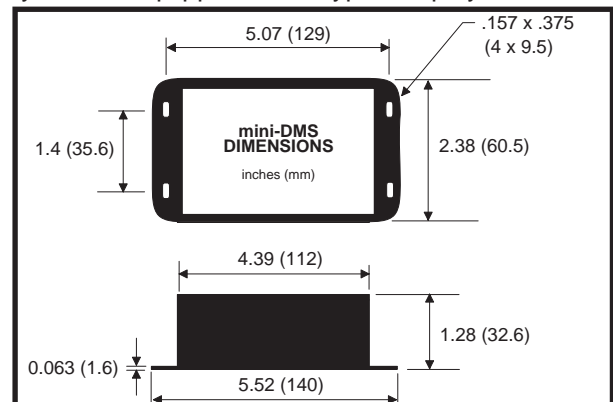
**D**isplacement Measurement Systems (DMS) are the best choice for absolute distance measurements, multiplexing and process control applications, with data rates up to 5,000 readings/second. Two sizes are available:

**Standard DMS** units include:

- Electronics with RS-232 communication
- Keypad/LCD for local operation

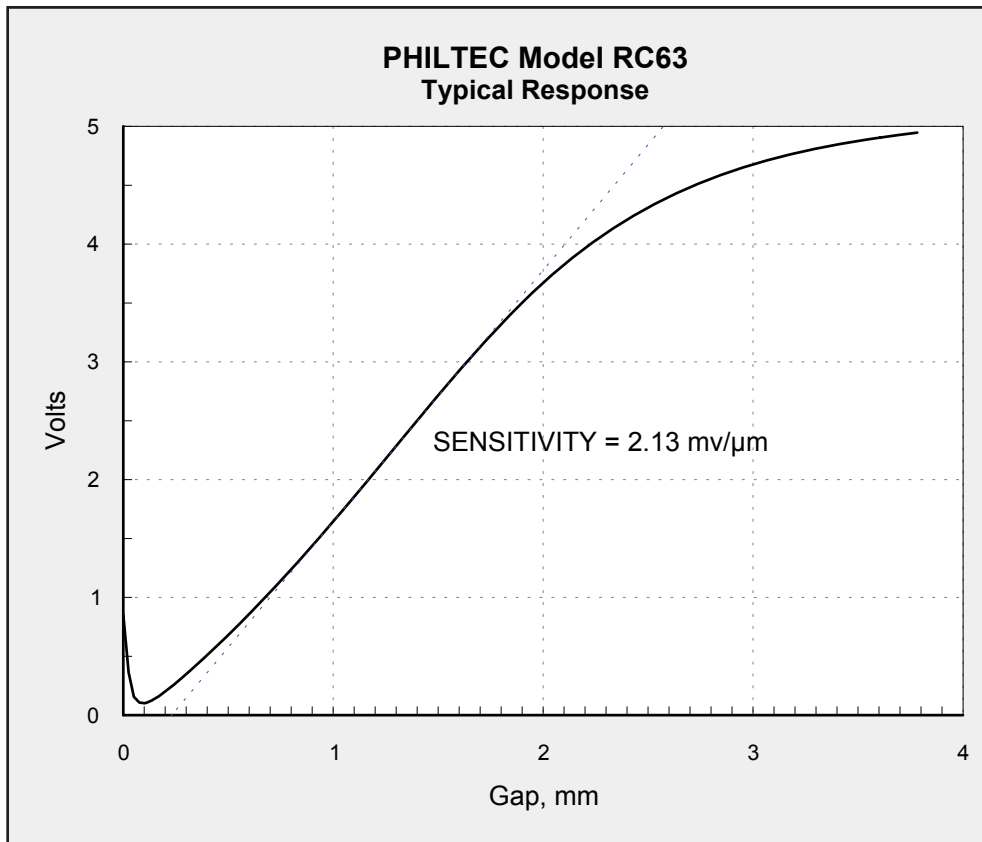


**Mini-DMS** units are full-featured for PC operation only, they are not equipped with keypad/display.



### DIGITAL OUTPUT

DMS units provide distance output via RS232. Gap calibration data is stored on board DMS units. They provide accurate distance measurements over the sensor's entire operating range using a 24 bit internal lookup table. They have storage capacity for many additional calibrations.



Conversions: 1 micron = 39.37 microinch 1 mm = 39.37 mils 1 mil = 0.001 inch = 25.4 microns = 0.0254 mm

### Standard Specifications - RC63

| Electronics       |                        |            | Fiberoptics               |   | Outputs   |                             |                        |   |  |
|-------------------|------------------------|------------|---------------------------|---|---|-----------------------------|------------------------|---|--|
|                   | Analog                 | DMS        | Light Beam spread         | 30°   | Analog Voltage  |                             |                        | DMS RS232   |  |
| Light Source      | LED, 880 nm            |            | Cable Sheathing           | PVC over Steel Monocoil                                     | Total Range   | 0.160 in.                   | 4 mm                   | Total Range   | 4 mm   |
| Input Voltage     | +12 to +24 VDC         | +12 VDC    | Tip Material              | 300 Series SS   | Linear Range  | 63 mils                     | 1.6 mm                 | Distance  | 23 bit resolution  |
| Input Current     | 125 ma max             | 500 ma max | Tip Epoxy Outgas          | 0.3% @ 200°C<br>2.4% @ 300°C                                | Nominal Standoff  | 54 mils.                    | 1.4 mm                 | Reflectance   | 8 bit resolution   |
| Band-width        | DC-20 KHz<br>3 db down | 5 KHz max  | Tip Operating Pressure    | 35 bar  | Nominal Sensitivity   | 40 mv/mil                   | 1.6 mv/μm              | Amplifier Temperature   | 12 bit resolution  |
| Iso-thermal Drift | 0.5%                   | 0.05%      | Tip Operating Temperature | -55 to 175°C continuous;<br>to 350°C intermittent 1-2 hours | <u>Resolution*</u><br>DC - 200KHz<br>DC - 20 KHz<br>DC - 100 Hz | 160 μin<br>80 μin<br>20 μin | 4 μm<br>2 μm<br>0.5 μm | <u>Resolution*</u><br>Pk-Pk Units at Mid Range using 50% Signal Power | ADC AVG = 2 pk-pk = 0.5 μm<br>ADC AVG = 16 pk-pk = 0.25 μm<br>ADC AVG = 256 pk-pk = 0.1 μm<br>ADC AVG = 4096 pk-pk = 0.02 μm |

\*These specifications represent best case performance where: the target is flat, smooth and highly reflective, the sensor is perpendicular to the target, the sensor is gapped to its range of highest sensitivity, fiberoptic cable lengths are standard and the cables are not connectorized.

### Custom Hardware To Customer Specifications



**PHILTEC, INC., ANNAPOLIS, MD USA 410-757-4404**  
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