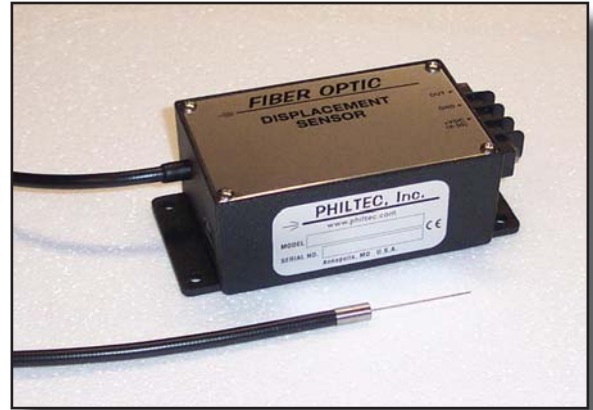
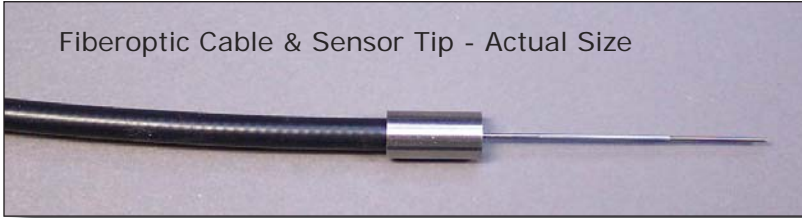
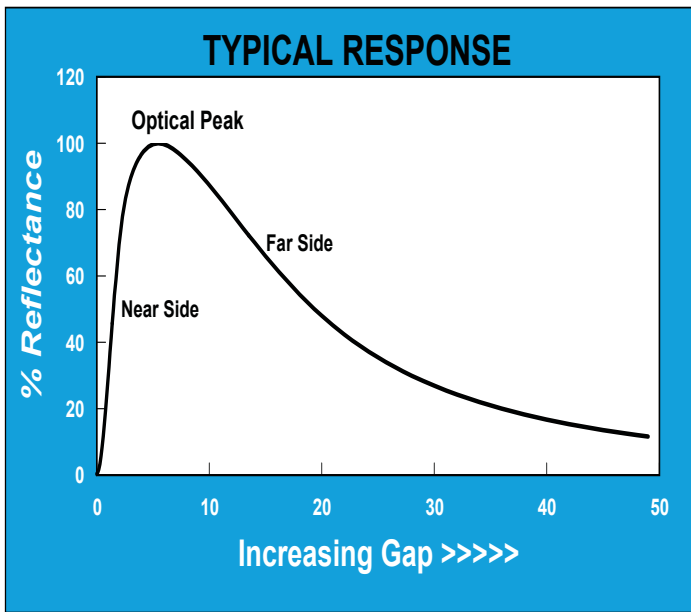
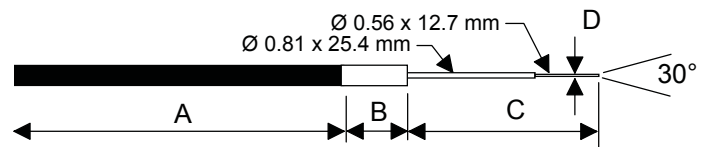


**Fiberoptic Sensor - Reflectance Dependent\*****Model D12**

Fiberoptic Cable &amp; Sensor Tip - Actual Size

**For The Measurement of Distance, Displacement and Vibration****Features**

- Reflectance Dependent Output with Dual Functions: Far Side/Near Side
- $\varnothing$  310 Micron Target Spot Size (0.012 inch)
- 2 mm Total Operating Range (0.080 inch)
- 4.4 mv/ $\mu$ m Far Side Sensitivity (113 mv/mil)
- 40 mv/ $\mu$ m Near Side Sensitivity (1000 mv/mil)

**Tip & Cable Dimensions**

| FEATURE                             | mm   | inch  |
|-------------------------------------|------|-------|
| Tip Outer Diameter, $\varnothing$ D | 0.56 | 0.022 |
| Fiberoptic Diameter                 | 0.31 | 0.012 |
| Tip Length, C                       | 38.1 | 1.5   |
| Collar Length, B                    | 12.7 | 0.5   |
| Collar Diameter, $\varnothing$ B    | 6.35 | 0.25  |
| Cable Length, A                     | 914  | 36    |
| Cable Diameter, $\varnothing$ A     | 4.27 | 0.168 |
| Cable Min. Bend Radius              | 19   | 0.75  |

\*These are reflective type transducers based upon detecting the intensity of reflected light. The output signal is proportional to:

- the gap distance from the sensor tip-to-target; and,
- the reflectivity of the target surface.

D models are commonly used in applications where the target reflectivity stays constant; i.e., the target has a reciprocating or vibratory motion parallel to the axis of the sensor.

**PHILTEC**

www.philtec.com

Precision Dynamic Measurements



## Two Instrument Outputs To Choose From

This sensor can be provided as an analog or as a digital instrument.

- Model D12 - analog output
- Model DMS-D12 ... standard DMS with RS232 output
- Model mDMS-D12 ... miniDMS with RS232 output
- Model muDMS-D12 ... miniDMS with USB output

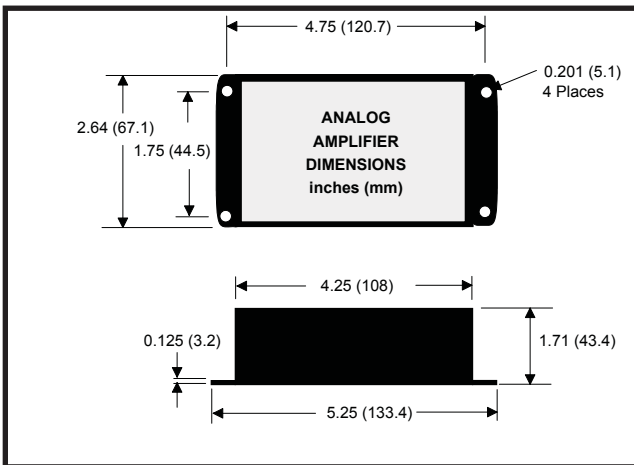


**A**nalog sensors are fast responding units ideal for relative motion measurements in dynamic applications:

- 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

Calibration charts are provided with each sensor tip giving the near and far side voltage output responses to distance. There are three ways to derive accurate distance measurements:

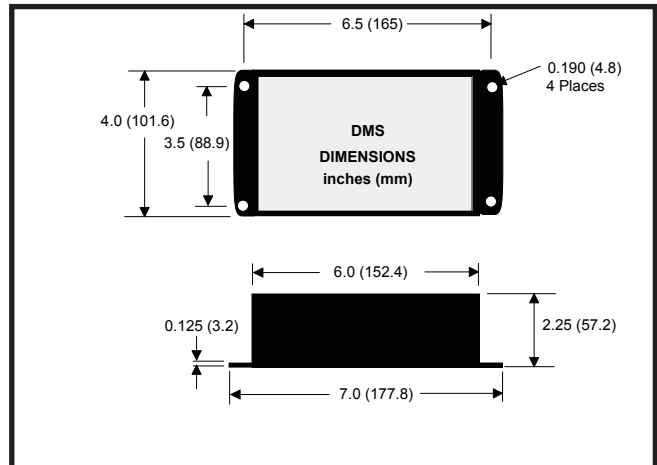
- within the bounds of the linear range, multiply sensitivity by the change in voltage output
- create a lookup table using the XY calibration data points
- use a polynomial curve fit to accurately map the sensor's output function

The effect of changing target reflectance is to shift the voltage output higher or lower. A gain control is provided for calibration of the sensor output to various target surfaces. In-situ calibration is performed simply, by adjusting the sensor's tip-to-target gap until the peak output is attained, and then by using the gain control to set the peak voltage reading to full scale. This allows the sensor to be used to perform precision linear motion measurements on most materials.

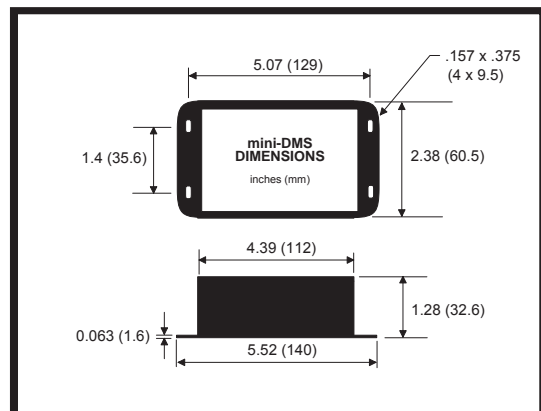
**D**isplacement Measurement Systems (DMS) are the best choice for absolute distance measurements, multiplexing and process control applications, with data rates up to 5,000 readings/second. They provide linearized distance output and on board calibration storage capacity for 25 calibrations. Three types are available, each equipped with temperature stabilized electronics:

1. **Standard DMS** units include:

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



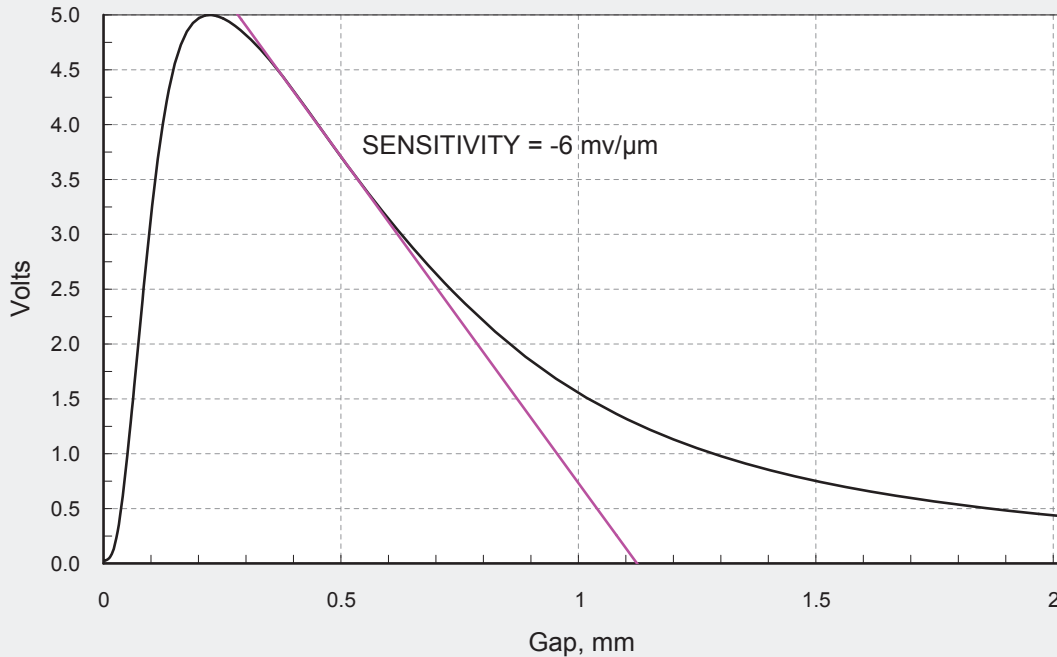
2. **Mini-DMS** units are full-featured for PC operation via RS232 communication, they are not equipped with keypad/display.



3. **muDMS** units are full-featured for PC operation via USB communication, they are not equipped with keypad/display. They are supplied in the RC analog sensor enclosure, 82 x 111 x 48 mm.

## PHILTEC Model D12

Typical Response - Far Side



### Conversions

1 μm = 39.37 μinch  
 1 mm = 39.37 mils  
 1 mil = 0.001 inch  
 1 mil = 25.4 μm  
 1 mil = 0.0254 mm

## Standard Specifications - D12 Far Side

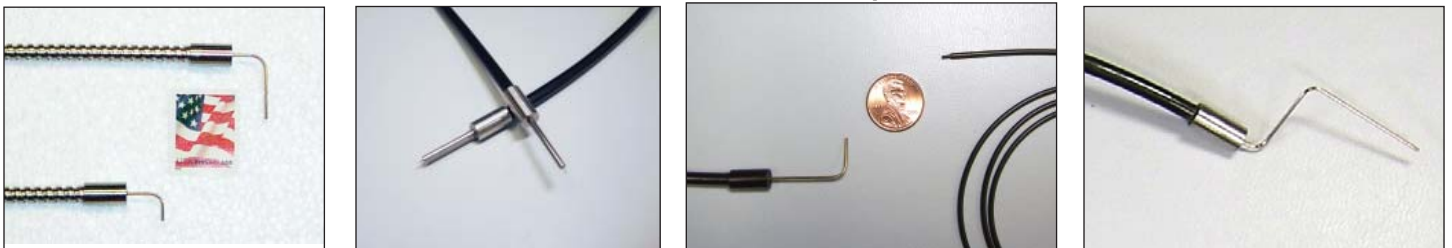
| Electronics       |                        | Fiberoptics |                           | Outputs   |                      |   |                           |   |   |
|-------------------|------------------------|-------------|---------------------------|---|----------------------|---|---------------------------|---|---|
|                   | Analog                 | DMS         | Light Beam Spread         | 30°   | Analog (0-5 Volts)   |   | Digital (USB or RS232)    |   |   |
| Light Source      | LED, 880 nm            |             | Cable Sheathing           | PVC over Steel Monocoil                                     | Total Range          | 0.080 in.                                 | 2 mm                      | Total Range   | 2 mm  |
| Input Voltage     | +12 to +24 VDC         | +12 VDC     | Tip Material              | 300 Series SS   | Linear Range*        | 0.016 in.                                 | 0.41 mm                   | Linear Range  | 2 mm  |
| Input Current     | 125 ma max             | 500 ma max  | Tip Epoxy Outgas          | 0.3% @ 200°C<br>2.4% @ 300°C                                | Nominal Standoff**   | 0.021 in.                                 | 0.53 mm                   | Reflectance Resolution  | 0.5%  |
| Band-width        | DC-20 KHz<br>3 db down | 5 KHz max   | Tip Operating Pressure    | 35 bar  | Nominal Sensitivity* | 110 mv/mil                                | 4.4 mv/μm                 | Temperature Resolution  | 0.06°C  |
| Iso-thermal Drift | 0.5%                   | 0.05%       | Tip Operating Temperature | -55 to 175°C continuous;<br>to 350°C intermittent 1-2 hours | Resolution**         | DC - 200KHz<br>DC - 20 KHz<br>DC - 100 Hz | 60 μin<br>30 μin<br>3 μin | Resolution**<br>Pk-Pk Units at Mid Range using 50% Signal Power | ADC AVG = 2    pk-pk = 0.4 μm<br>ADC AVG = 16    pk-pk = 0.25 μm<br>ADC AVG = 256    pk-pk = 80 nm<br>ADC AVG = 4096    pk-pk = 15 nm |

\*Standard Specifications provide nominal values only. Actual production values may vary by as much as ±15%.

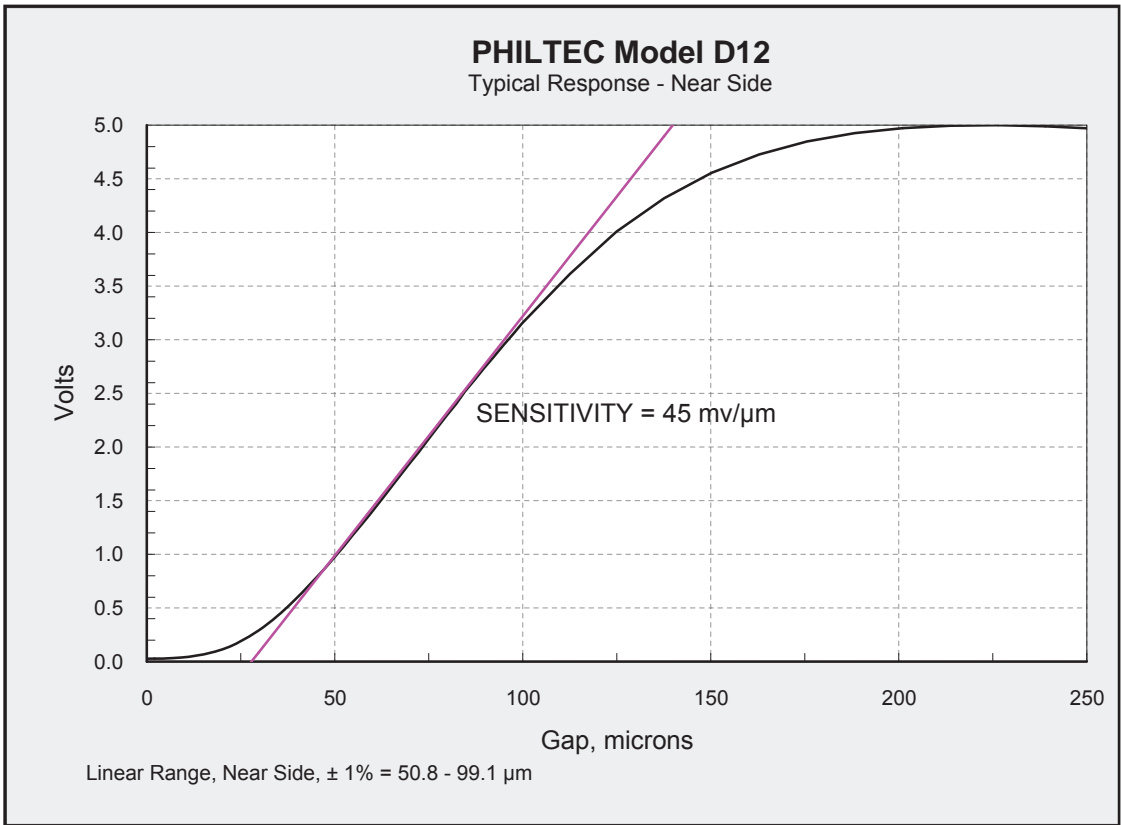
\*\*These specifications represent best case performance where: the target is flat, smooth and highly reflective, the sensor is perpendicular to the target, the sensor is gapped to its range of highest sensitivity, fiberoptic cable lengths are standard and the cables are not connectorized.

NOTE: Nominal Standoff = the gap distance that places the sensor at the middle of the linear operating range.

## Custom Hardware To Customer Specifications



PHILTEC, INC., ANNAPOLIS, MD USA 410-757-4404  
 800-453-6242 e-mail sensors@philtec.com



#### Conversions

- 1 μm = 39.37 μinch
- 1 mm = 39.37 mils
- 1 mil = 0.001 inch
- 1 mil = 25.4 μm
- 1 mil = 0.0254 mm

### Standard Specifications - D12 Near Side

| Electronics       |                        |            | Fiberoptics               |   | Outputs              |   |                           |                         |   |   |
|-------------------|------------------------|------------|---------------------------|---|----------------------|---|---------------------------|-------------------------|---|---|
|                   | Analog                 | DMS        | Light Beam Spread         | 30°   | Analog (0-5 Volts)   |   |                           | Digital (USB or RS232)  |   |   |
| Light Source      | LED, 880 nm            |            | Cable Sheathing           | PVC over Steel Monocoil                                     | Total Range          | 10 mils                                   | 250 μm                    | Total Range             | 250 μm  |   |
| Input Voltage     | +12 to +24 VDC         | +12 VDC    | Tip Material              | 300 Series SS   | Linear Range*        | 1.8 mils                                  | 45 μm                     | Linear Range            | 250 μm  |   |
| Input Current     | 125 ma max             | 500 ma max | Tip Epoxy Outgas          | 0.3% @ 200°C<br>2.4% @ 300°C                                | Nominal Standoff*    | 2.8 mils                                  | 70 μm                     | Reflectance Resolution  | 0.5%  |   |
| Band-width        | DC-20 KHz<br>3 db down | 5 KHz max  | Tip Operating Pressure    | 35 bar  | Nominal Sensitivity* | 1 mv/μIN                                  | 40 mv/μm                  | Temperature Resolution  | 0.06°C  |   |
| Iso-thermal Drift | 0.5%                   | 0.05%      | Tip Operating Temperature | -55 to 175°C continuous;<br>to 350°C intermittent 1-2 hours | Resolution**         | DC - 200KHz<br>DC - 20 KHz<br>DC - 100 Hz | 6 μin<br>3 μin<br>0.3 μin | 120 nm<br>75 nm<br>8 nm | Resolution**<br>Pk-Pk Units at Mid Range using 50% Signal Power | ADC AVG = 2    pk-pk = 50 nm<br>ADC AVG = 16    pk-pk = 40 nm<br>ADC AVG = 256    pk-pk = 10 nm<br>ADC AVG = 4096    pk-pk = 2.5 nm |

\*Standard Specifications provide nominal values only. Actual production values may vary by as much as ±15%.

\*\*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.

NOTE: Nominal Standoff = the gap distance that places the sensor at the middle of the linear operating range.

**Many Options are Available Including Replaceable Tips, Vacuum Passthru and Non-Metallic Tips**

