

Fiberoptic Sensor - *Reflectance Dependent**

Model D170

Fiberoptic Cable & Sensor Tip - Actual Size

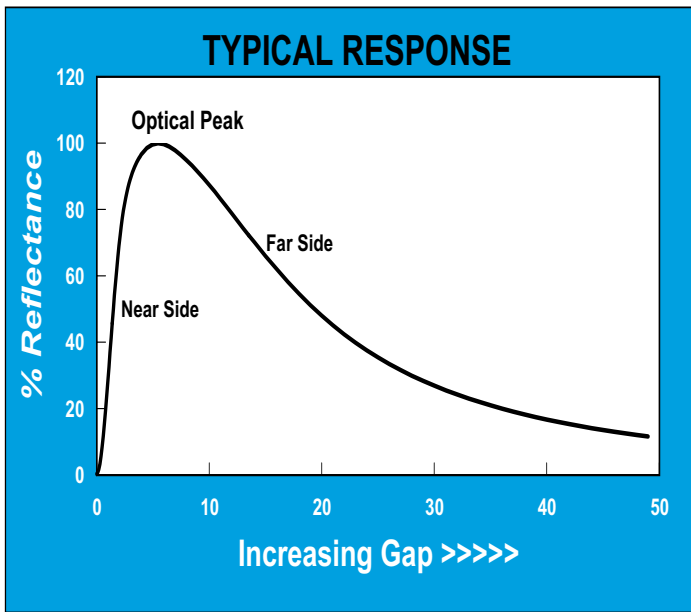
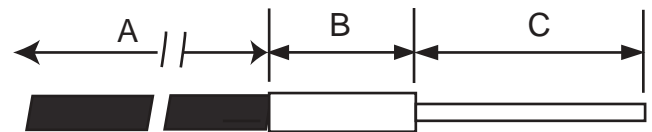


For The Measurement of Distance, Displacement and Vibration

Features

- Reflectance Dependent Output with Dual Functions Far Side/Near Side
- $\text{\O} 4.29$ mm Target Spot Size (0.170 inch)
- 30 mm Total Operating Range (1.20 inch)
- 200 mv/mm Far Side Sensitivity (8 mv/mil)
- 16 mv/ μm Near Side Sensitivity (625 mv/mil)

Tip & Cable Dimensions



| FEATURE | mm | inch |
|-----------------------------------|------|-------|
| Tip Outer Diameter, $\text{\O} C$ | 4.75 | 0.187 |
| Fiberoptic Diameter | 4.32 | 0.170 |
| Tip Length, C | 76.2 | 3 |
| Collar Length, B | 15.9 | 0.625 |
| Collar Diameter, $\text{\O} B$ | 7.92 | 0.312 |
| Cable Length, A | 914 | 36 |
| Cable Diameter, $\text{\O} A$ | 6.86 | 0.27 |
| Cable Min. Bend Radius | 25.4 | 1 |

*These are reflective type transducers based upon detecting the intensity of reflected light. With D Model sensors, the output signal is proportional to: a) the gap distance from the sensor tip-to-target; and, b) the reflectivity of the target surface. D models are commonly used in applications where the target has a reciprocating or vibratory motion parallel to the axis of the sensor.

PHILTEC

A-tech Instruments Ltd. Ph: (416) 754-7008 Fax: (416) 754-2351 Email: sales@a-tech.ca Web: www.a-tech.ca

Precision Dynamic Measurements



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

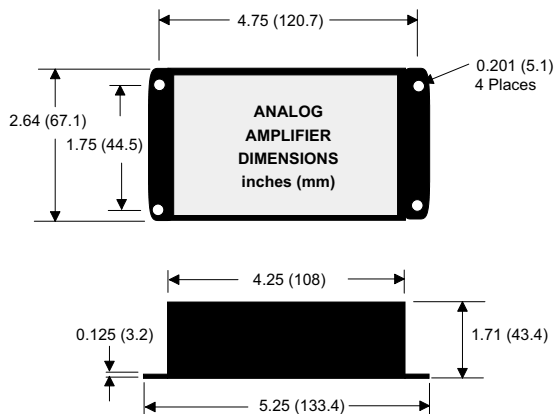


Analog sensors are fast responding units ideal for relative motion measurements in dynamic applications:

- DC-20 KHz is standard
- DC-200 KHz or higher is optional

Standard analog units include:

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



ANALOG OUTPUT

There are three ways to derive accurate distance measurements:

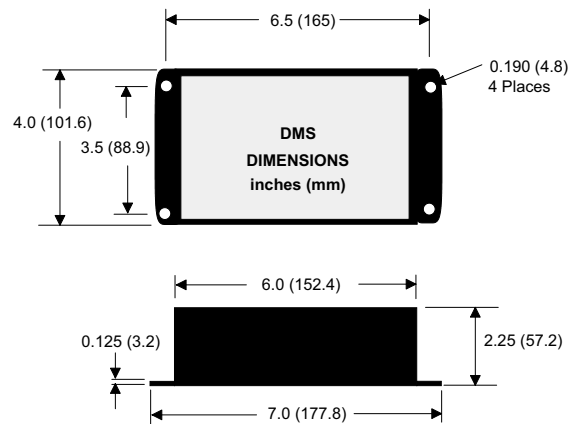
- within the bounds of the linear range, multiply sensitivity x the change in voltage output
- create a lookup table using the XY calibration data points
- use a polynomial curve fit to accurately map the sensor's output function

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.

Displacement 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.

Standard DMS units include:

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



DMS dimensions shown are for single and for dual channel systems

DIGITAL OUTPUT

Accurate gap calibration data is stored on board the DMS. The D model DMS provides accurate distance measurements over the sensor's entire operating range, near side and far side, so long as the reflectivity of the target surface remains unchanged.

To make these distance measurements, two preliminary commands must be given:

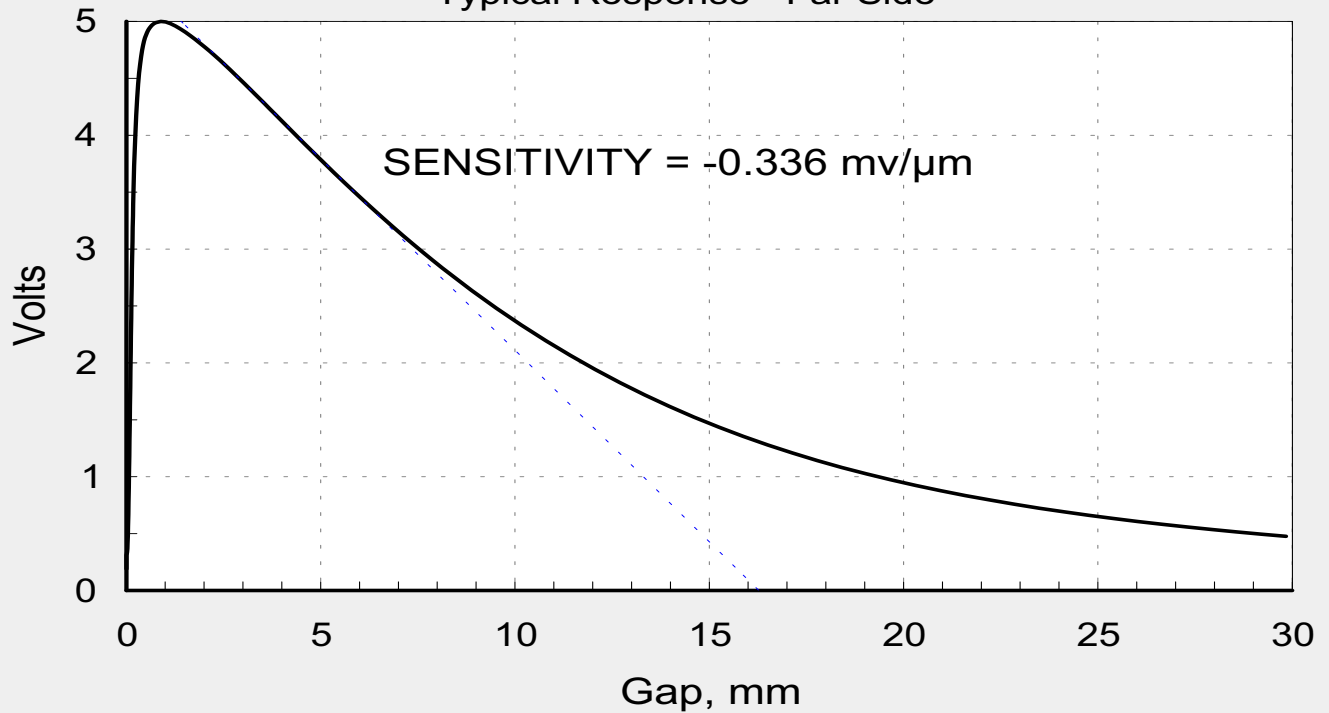
- select near side or far side
- set the optical peak

The peak is set simply by adjusting the sensor's tip-to-target gap until the peak reflectance value is attained, and then by pressing SELECT OPTICAL PEAK.

30 additional slots are provided for storage of calibration data. Functions include tare, calibration scaling and pk-pk readings.

PHILTEC Model D170

Typical Response - Far Side



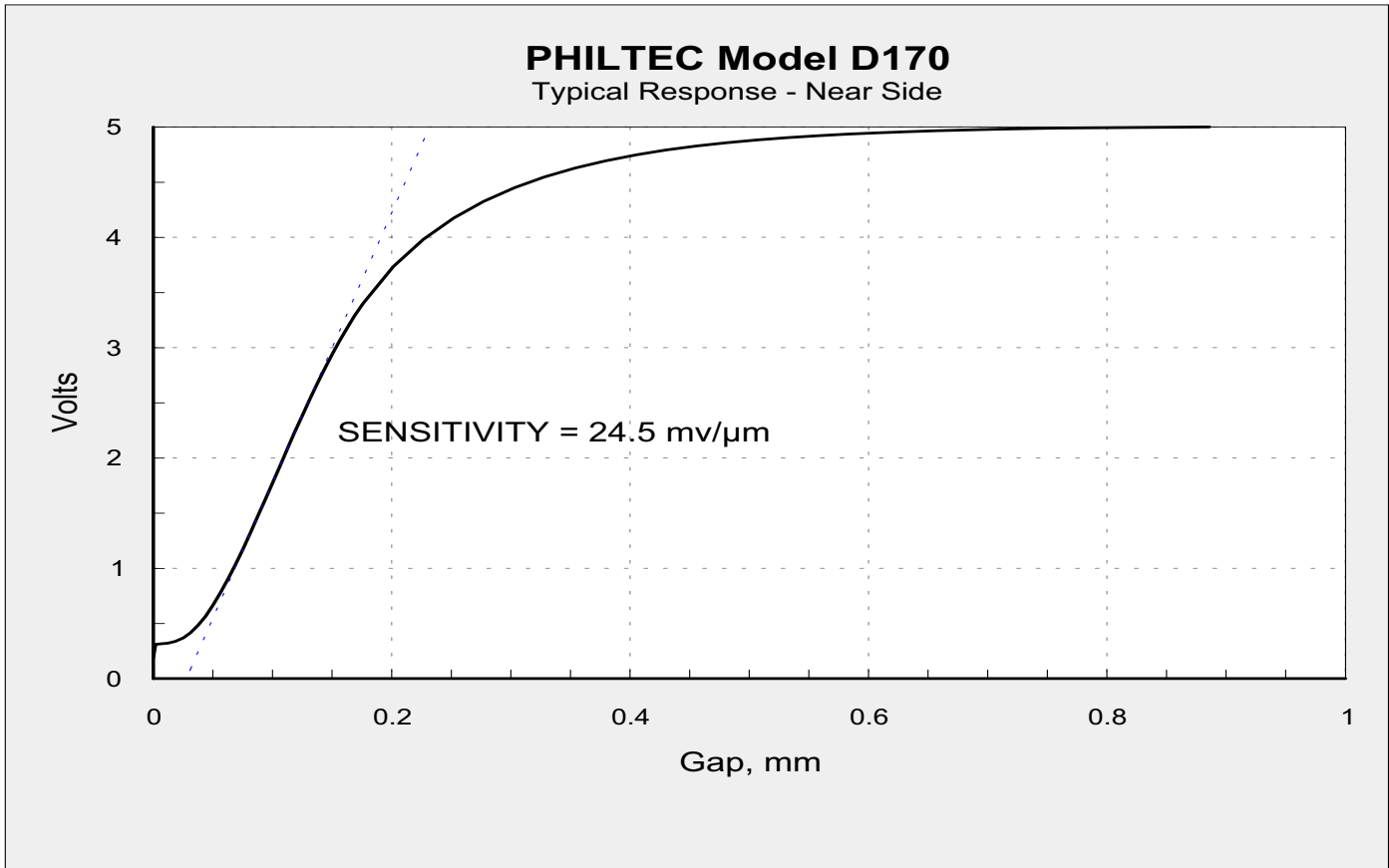
Conversions: 1 micron = 39.4 microinch 1 mm = 39.4 mils 1 mil = 0.001 inch = 25.4 microns = 0.0254 mm

Standard Specifications - D170 Far Side

| Electronics | | Fiberoptics | | Outputs | | | | | |
|-------------------|------------------------|-------------|---------------------------|---|--|------------------------------|-------------------------|--|---|
| | Analog | DMS | Light Beam spread | 25° | Analog Voltage | | DMS RS232 | | |
| Light Source | LED, 850 nm | | Cable Sheathing | PVC over Steel Monocoil | Total Range | 1.2 in. | 30 mm | Total Range | 30 mm |
| Input Voltage | +12 to +24 VDC | +12 VDC | Tip Material | 300 Series SS | Linear Range | 0.200 in. | 5.1 mm | Distance | 16 bit resolution (18 μinch; 0.46 μm) |
| Input Current | 125 ma max | 500 ma max | Tip Epoxy Outgas | 0.3% @ 200°C 2.4% @ 300°C | Nominal Standoff | 0.165 in. | 4.2 mm | Reflectance | 8 bit resolution |
| Bandwidth | DC-20 KHz 3 db down | 5 KHz max | Tip Operating Pressure | 35 bar | Sensitivity | 8 mv/mil | 200 mv/mm | Amplifier Temperature | 12 bit resolution |
| Iso-thermal Drift | 0.5% | 0.05% | Tip Operating Temperature | -55 to 175°C continuous; to 350°C intermittent 1-2 hours | Noise DC - 200KHz DC - 20 KHz DC - 100 Hz | 500 μin 245 μin 25 μin | 13 μm 6 μm 0.6 μm | Noise Pk-Pk Units/Second at Mid Range using 50% Signal Power | ADC AVG = 1 pk-pk = 5 μm ADC AVG = 16 pk-pk = 1.5 μm ADC AVG = 256 pk-pk = 0.3 μm ADC AVG = 4096 pk-pk = 90 nm |

Custom Hardware To Customer Specifications





Conversions: 1 micron = 39.4 microinch 1 mm = 39.4 mils 1 mil = 0.001 inch = 25.4 microns = 0.0254 mm

| Standard Specifications - D170 Near Side | | | | | | | | | |
|---|------------------------|------------|---------------------------|---|------------------|---|----------------------------|------------------------------|--|
| Electronics | | | Fiberoptics | | Outputs | | | | |
| | Analog | DMS | Light Beam spread | 25° | Analog Voltage | | | DMS RS232 | |
| Light Source | LED, 850 nm | | Cable Sheathing | PVC over Steel Monocoil | Total Range | 0.039 in. | 1 mm | Total Range | 1 mm |
| Input Voltage | +12 to +24 VDC | +12 VDC | Tip Material | 300 Series SS | Linear Range | 0.0035 in. | 0.09 mm | Distance | 16 bit resolution (0.6 μinch; 15 nm) |
| Input Current | 125 ma max | 500 ma max | Tip Epoxy Outgas | 0.3% @ 200°C 2.4% @ 300°C | Nominal Standoff | 0.0035 in. | 0.09 mm | Reflectance | 8 bit resolution |
| Bandwidth | DC-20 KHz 3 db down | 5 KHz max | Tip Operating Pressure | 35 bar | Sensitivity | 625 mv/mil | 16 mv/μm | Amplifier Temperature | 12 bit resolution |
| Iso-thermal Drift | 0.5% | 0.05% | Tip Operating Temperature | -55 to 175°C continuous; to 350°C intermittent 1-2 hours | Noise | DC - 200KHz DC - 20 KHz DC - 100 Hz | 21 μin 4 μin 0.4 μin | 0.5 μm 0.09 μm 0.01 μm | Noise Pk-Pk Units/Second at Mid Range using 50% Signal Power ADC AVG = 1 pk-pk = 85 nm ADC AVG = 16 pk-pk = 30 nm ADC AVG = 256 pk-pk = 6 nm ADC AVG = 4096 pk-pk = 2 nm |

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

