

Fiberoptic Sensor - *Reflectance Dependent**

Model D169

Fiberoptic Cable & Sensor Tip - Actual Size

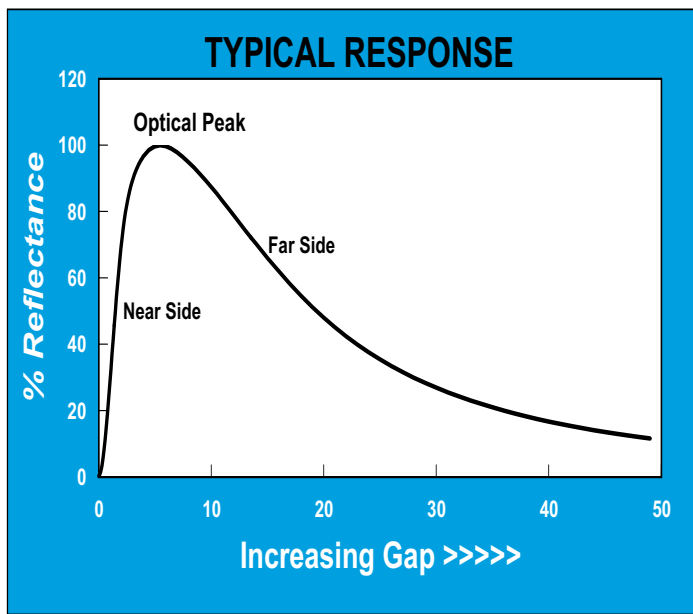
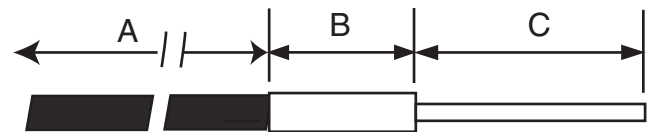


For The Measurement of Distance, Displacement and Vibration

Features

- Reflectance Dependent Output with Dual Functions Far Side/Near Side
- $\text{\O} 4.29 \text{ mm}$ Target Spot Size (0.169 inch)
- 20 mm Total Operating Range (0.750 inch)
- 0.4 mv/ μm Far Side Sensitivity (10 mv/mil)
- 40 mv/ μm Near Side Sensitivity (1000 mv/mil)

Tip & Cable Dimensions



FEATURE	mm	inch
Tip Outer Diameter, $\text{\O} C$	4.75	0.187
Fiberoptic Diameter	4.29	0.169
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

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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

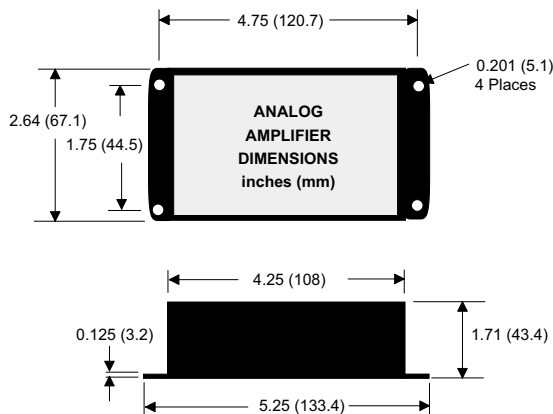


Analog sensors are fast responding units ideal for relative motion measurements in dynamic applications:

- 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:

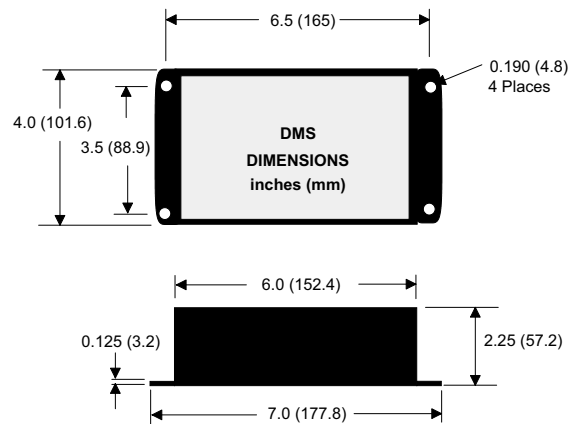
- within the bounds of the linear range, multiply sensitivity x the change in voltage output
- create a lookup table using the XY calibration data points
- use a polynomial curve fit to accurately map the sensor's output function

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.

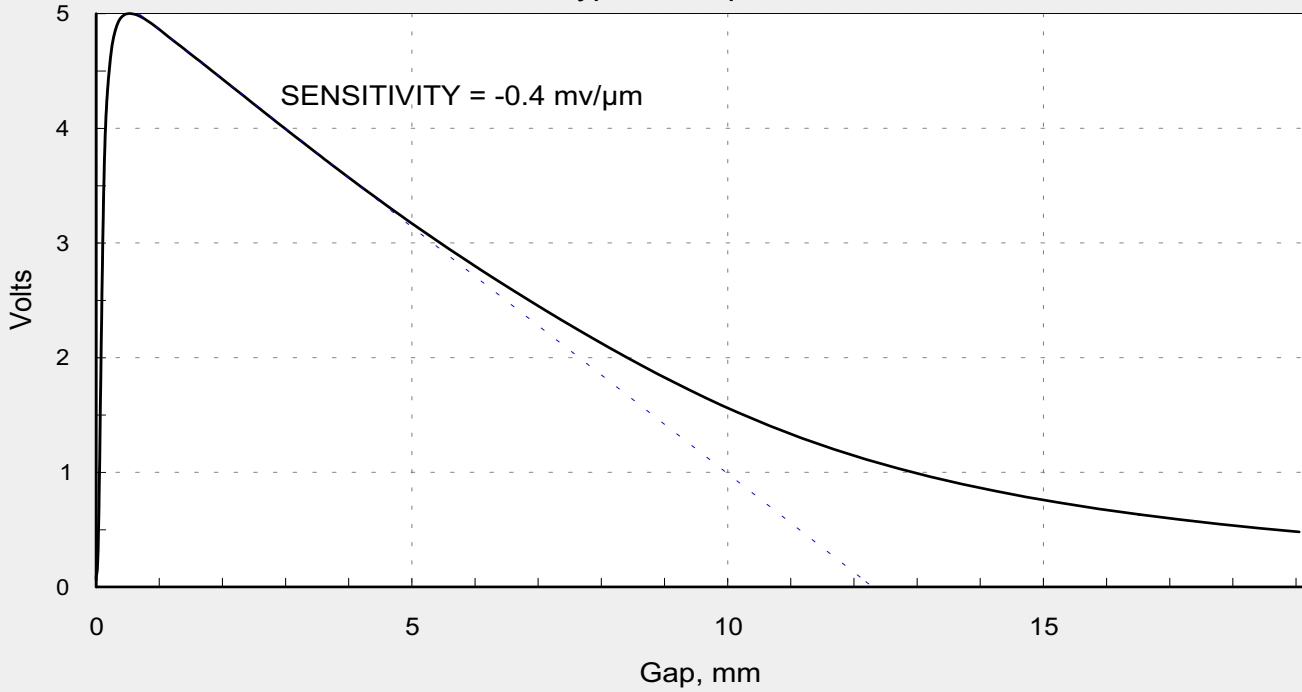
To make these distance measurements, two preliminary commands must be given:

- 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 D169 Typical Response



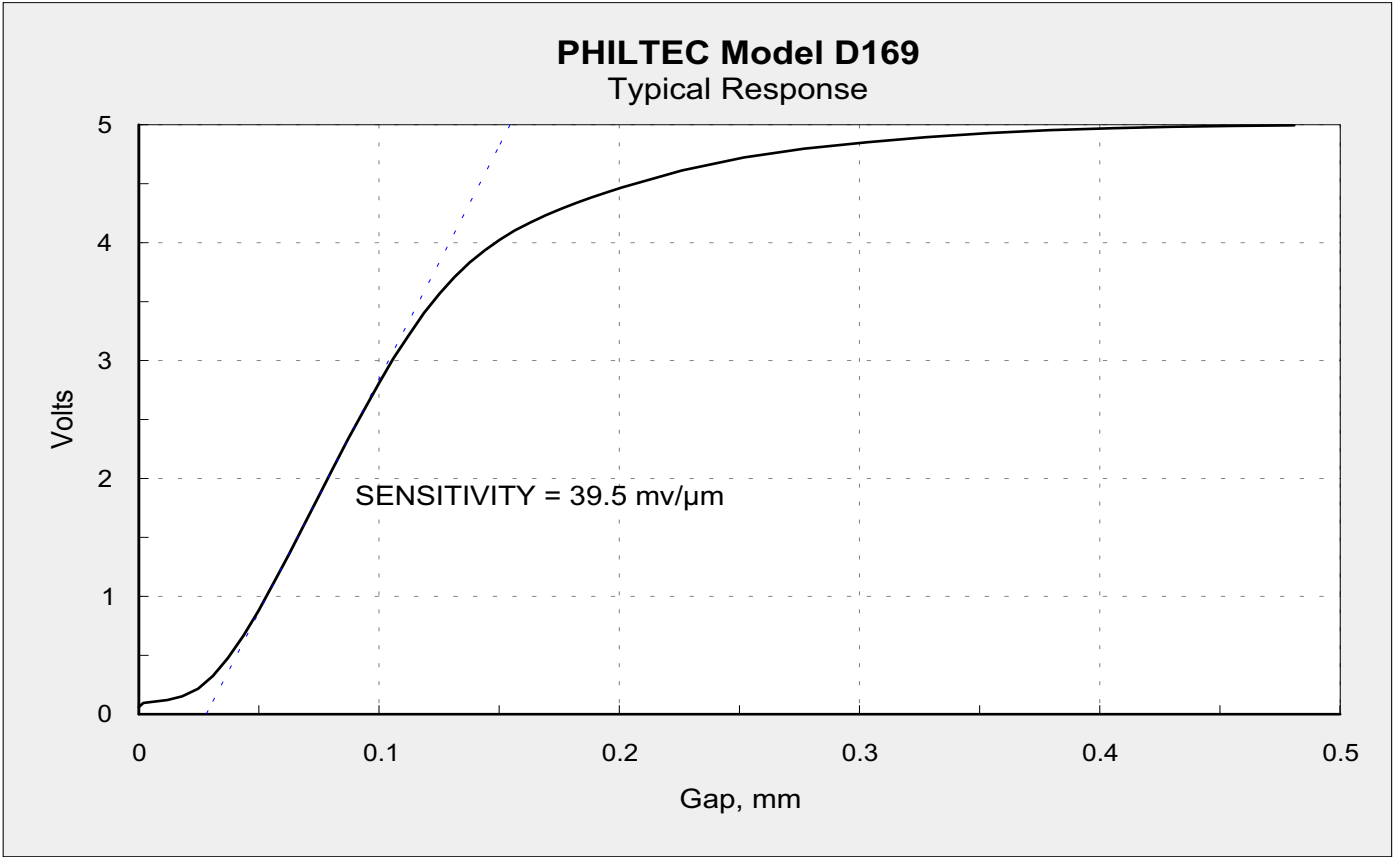
Conversions: 1 micron = 39.4 microinch 1 mm = 39.4 mils 1 mil = 0.001 inch = 25.4 microns = 0.0254 mm

Standard Specifications - D169 Far Side

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	0.750 in.	20 mm	Total Range	20 mm
Input Voltage	+12 to +24 VDC	+12 VDC	Tip Material	300 Series SS	Linear Range	0.16 in.	3.9 mm	Distance	16 bit resolution (12 μinch; 0.31 μm)
Input Current	125 ma max	500 ma max	Tip Epoxy Outgas	0.3% @ 200°C 2.4% @ 300°C	Nominal Standoff	0.115 in.	2.9 mm	Reflectance	8 bit resolution
Bandwidth	DC-20 KHz 3 db down	5 KHz max	Tip Operating Pressure	35 bar	Sensitivity	10 mv/mil	0.4 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	250 μin 125 μin 17 μin	Noise Pk-Pk Units/Second at Mid Range using 50% Signal Power	ADC AVG = 1 pk-pk = 3.0 μm ADC AVG = 16 pk-pk = 1.5 μm ADC AVG = 256 pk-pk = 240 μm ADC AVG = 4096 pk-pk = 100 μm

Custom Hardware To Customer Specifications





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Standard Specifications - D169 Near Side										
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	20000 μin.	500 μm	Total Range	500 μm	
Input Voltage	+12 to +24 VDC	+12 VDC	Tip Material	300 Series SS	Linear Range	2300 μin.	58 μm	Distance	16 bit resolution (0.31 μinch; 7.6 nm)	
Input Current	125 ma max	500 ma max	Tip Epoxy Outgas	0.3% @ 200°C 2.4% @ 300°C	Nominal Standoff	3300 μin.	84 μm	Reflectance	8 bit resolution	
Bandwidth	DC-20 KHz 3 db down	5 KHz max	Tip Operating Pressure	35 bar	Sensitivity	1000 mv/mil	40 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	6 μin 1.5 μin 0.3 μin	0.15 μm 0.04 μm 0.008 μm	Noise Pk-Pk Units/Second at Mid Range using 50% Signal Power	ADC AVG = 1 pk-pk = 150 nm ADC AVG = 16 pk-pk = 45 nm ADC AVG = 256 pk-pk = 11 nm ADC AVG = 4096 pk-pk = 4 nm

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

