## Fiberoptic Sensor - *Reflectance Dependent\**

# Model DMS-D20

Fiberoptic Cable & Sensor Tip - Actual Size

mDMS Sensor

These sensors provide a linear distance output with RS232 or USB communication.

## For The Measurement of Distance, Displacement and Vibration of Small Targets > Ø 510 μm

### Features
- Reflectance Dependent Output
- Ø 510 Micron Target Spot Size (0.020 inch)
- 1.27 mm Total Operating Range

### Tip & Cable Dimensions

A     B     C

TYPICAL D MODEL

OPTICAL PEAK

FAR SIDE

NEAR SIDE

Volts

Increasing Gap >>>
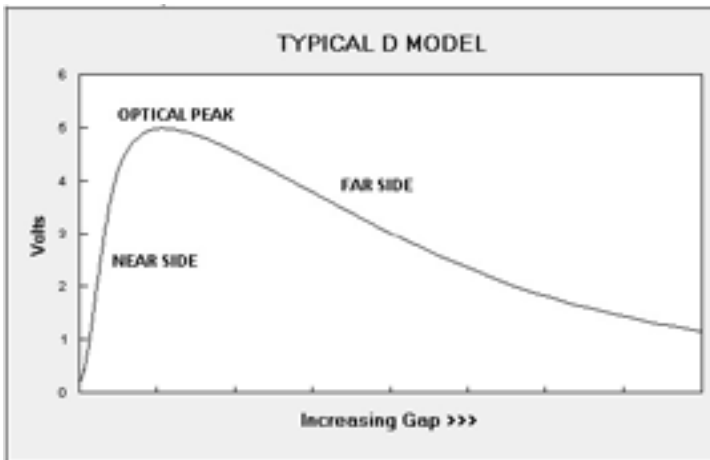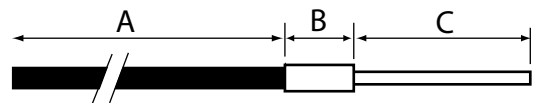
| FEATURE | mm | inch |
|---|---|---|
| Tip Outer Diameter, Ø C | 0.81 | 0.032 |
| Fiberoptic Diameter | 0.5 | 0.020 |
| Tip Length, C | 38.1 | 1.5 |
| Collar Length, B | 12.7 | 0.5 |
| Collar Diameter, Ø B | 6.35 | 0.25 |
| Cable Length, A | 914 | 36 |
| Cable Diameter, Ø A | 4.27 | 0.168 |
| Cable Min. Bend Radius | 19 | 0.75 |

The analog input function includes NEAR and FAR SIDE regions. NEAR SIDE operation gives highest resolution with limited operating range. Operation on the FAR SIDE gives moderate resolution with much greater operating range.

*These are reflective type transducers based upon detecting the intensity of reflected light. The output is proportional to:*
- *distance between the sensor tip and target; and,*
- *the reflectivity of the target surface.*

### DISTANCE (GAP) OUTPUT

These sensors provide a linearized distance output with RS232 or USB communication. Dynamic light signals reflected from target surfaces are converted to distance by comparing the sensor signals to gap calibration tables stored on-board the sensor.

# PHILTEC®

**DMS-D20 Digital Output**

**DMS-D20 Typical Analog Output**

**Accuracy**
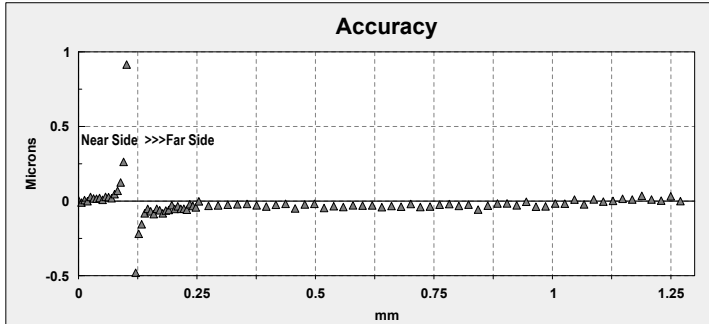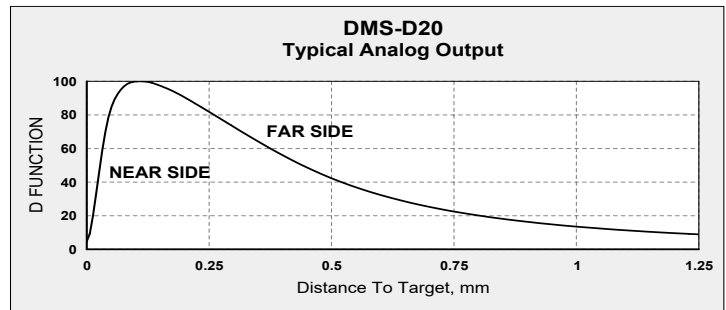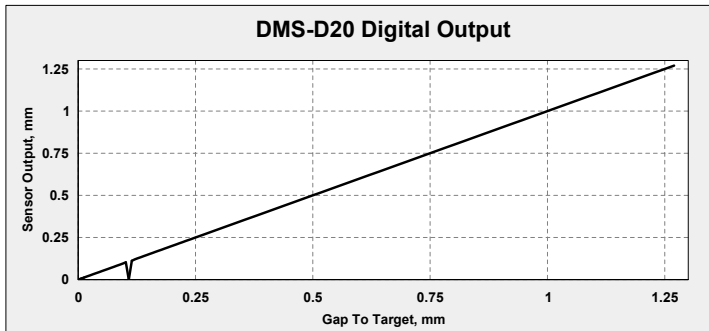
The chart above shows the analog signal input to the sensor's microprocessor. That signal is converted to a linearized distance output by comparing the input signals to gap calibration tables stored on-board the sensor. The sensor can be gapped for measurements anywhere within the sensor's total operating range. Optimum performance is achieved where the input signal has the steepest slope:

- Near Side ~0 - 120 microns
- Far Side - ~0.2 to 1.2 mm

Accuracy is a measure of the sensor's repeatability. It is measured at 2.5 samples/sec.

## Standard Specifications, Model DMS-D20

| Electronics | | Fiberoptics | | USB or RS232 | Near Side | Far Side |
|---|---|---|---|---|---|---|
| **Light Source** | 850 nm | **Light Beam Spread** | 66° | **Total Range** | **120 µm** | **1.15 mm** |
| **Input Voltage** | +12 VDC | **Cable Sheathing** | PVC / Steel Monocoil | **Linear Range** | **120 µm** | **1.15 mm** |
| **Input Current** | 500 ma max | **Tip Epoxy Outgas** | 0.3% @ 200°C 2.4% @ 300°C | **Reflectance Resolution** | 0.5% | |
| **Bandwidth** | 5 KHz | **Tip Operating Pressure** | 10  bar | **Temperature Resolution** | 0.06°C | |
| **Iso-thermal Drift** | 0.05% | **Tip Operating Temperature** | -55 to 200°C continuous; to 300°C intermittent 1-2 hours | ADC AVG   Samples/Sec<br>2            5208<br>16           651<br>256           41<br>4096          2.5 | * Pk-Pk Resolution<br>50 nm<br>40 nm<br>10 nm<br>2.5 nm | * Pk-Pk Resolution<br>200 nm<br>150 nm<br>40 nm<br>8 nm |
| **Weight** | 1.1 kg 2.4 lbs. | **Fibers** | Glass | | | |

* Pk-Pk Resolution is the smallest measurable displacement limited by the sensor's self-noise.

NOTES:
1. 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 (~mid-range)
   - fiberoptic cable lengths are standard and the cables are not connectorized

2. DMS Control Software includes a data averaging filter for averaging data samples from:
   2 samples (the fastest rate) to 4096 samples (highest resolution).

3. Internally, the sensor continuously reads target data at a clock rate of 10,416.75 Hz.

4. ADC AVG = the number of internal readings averaged before sending data out to the PC.

5. Samples/Sec for any ADC AVG setting can be calculated as follows:  S/S = 10,416.75 / ADC AVG

# Three Instruments To Choose From:

- *Model mDMS-D20* ... miniDMS with RS232 output
- *Model muDMS-D20* ... miniDMS with USB output
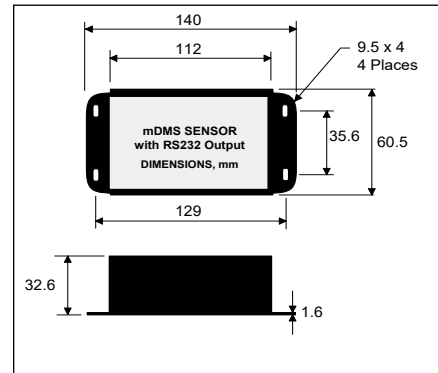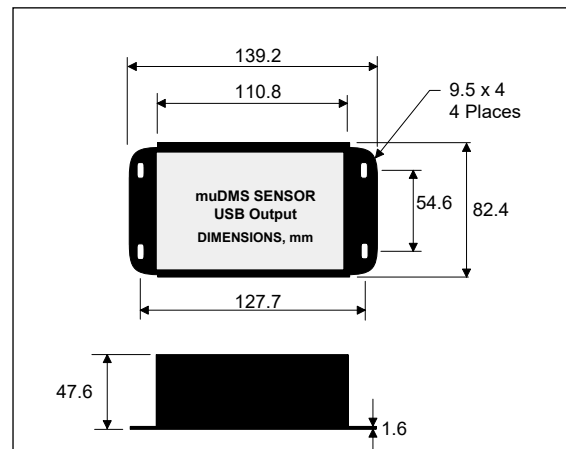- *Model mu2DMS-D20 ...* Two Channel DMS with USB & RS232 outputs



**mDMS-D20**



mDMS SENSOR
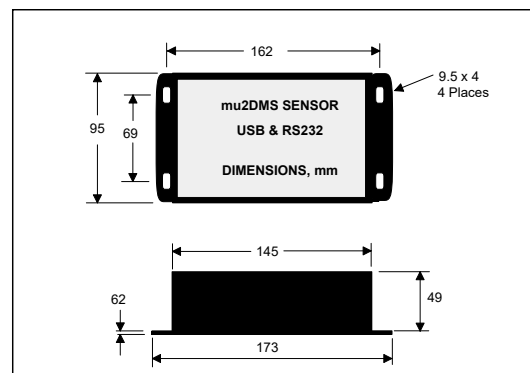with RS232 Output
DIMENSIONS, mm

140 · 112 · 9.5 x 4 4 Places · 35.6 · 60.5 · 129 · 32.6 · 1.6

**1. mDMS** units include:
- Electronics with RS-232 communication



**muDMS-D20**



muDMS SENSOR
USB Output
DIMENSIONS, mm

139.2 · 110.8 · 9.5 x 4 4 Places · 54.6 · 82.4 · 127.7 · 47.6 · 1.6

**2. muDMS** units include:
- Electronics with USB communication



**mu2DMS-D20**



mu2DMS SENSOR
USB & RS232
DIMENSIONS, mm

162 · 9.5 x 4 4 Places · 95 · 69 · 145 · 62 · 49 · 173

**3. mu2DMS** units include:
- Electronics with USB and RS232 communication

PHILTEC, INC., ANNAPOLIS, MD   USA   410-757-4404
Fax 410-757-4404     e-mail  sensors@philtec.com
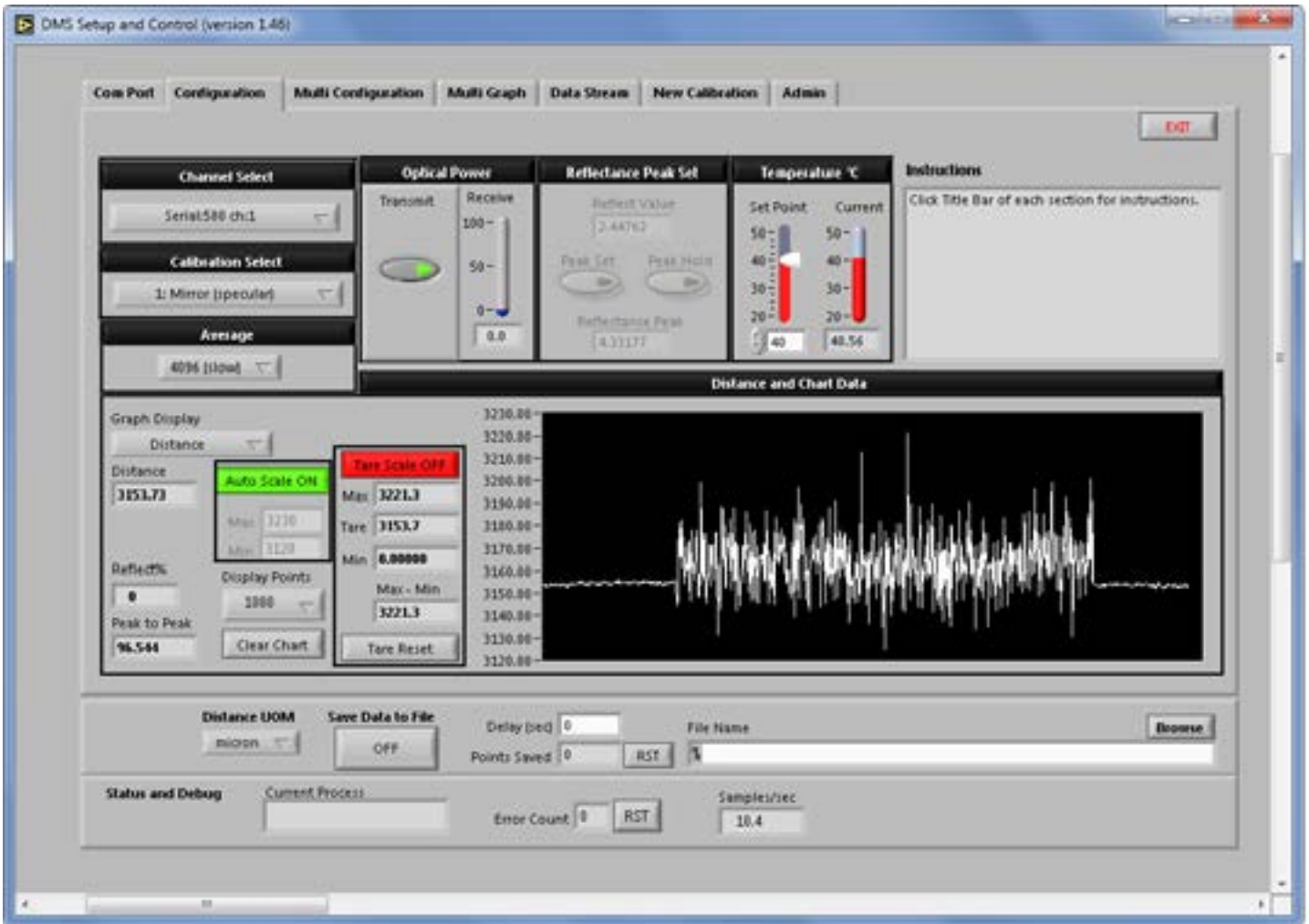
## DMS SETUP and CONTROL SOFTWARE

Philtec provides freeware with every digital sensor purchase. This powerful software is a very useful tool for controlling sensors, viewing live data, and for saving data to files.

Sensors have storage capacity for 25 calibration tables. Every new sensor is provided with calibrations to:

1. A front surface mirror
2. A diffuse aluminum target

The DMS software provides means for copying and pasting sensor calibration data, as well as for creating and storing new calibration tables.

SOFTWARE & FIRMWARE UPDATES

DMS sensors can be updated remotely at any PC. The most current edition of software and firmware is posted at http://www.philtec.com/downloads/firmware-software. A short tutorial video link is also available there.