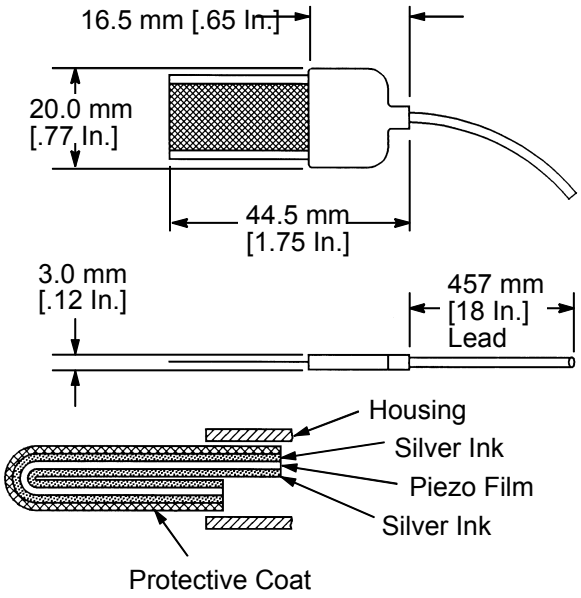

Fiaure 1

INTRODUCTION

Vibration Sensor 1-1000288-0 (SDT1-028K) is a fully shielded, low mass, surface mounted vibration sensor. It consists of a sensing element constructed of piezo film and a shielded cable and housing. See Figure 1.

Different than a conventional accelerometer, the piezo film element develops a charge proportional to the amount of strain imparted to it. Consequently, when bonded to any vibrating surface, the bulk waves in the vibrating object are converted to an electrical signal by the sensor, which accurately characterizes both the frequency and amplitude of vibration.

USES

Machine monitoring, acoustic emission detection, contact microphone, vibration/impact sensing, acoustic pickup, detecting machine tool chatter, vibration analysis for equipment and product design.

INSTRUCTIONS

Using a double sided adhesive tape, adhere the sensing element to the vibrating object. The adhesive tape should have a thin and nonfoam type carrier. A double-sealed tape, such as 3M† 444, works well.

Clean off the surface of the object upon which the sensor is to be placed, removing any foreign particles such as dirt, dust, grease, etc. Then apply the adhesive tape to the clean surface. Next, adhere the SDT1-028K to the adhesive by attaching the end of the sensor element first and smoothing out the element (avoiding any creases or air bubbles) towards the lead attach.

The adhesive must continue out and hold down the lead attach housing as well, to prevent errant results. Similarly, it is recommended that the wire be taped down in some instances (this can be done with masking tape in a designated position).

If the sensor is to be used in an environment above 45°C [114°F], then a different adhesive system is recommended since the double sided tape can become soft and affect the sensor's ability to detect vibration.

Cyanoacrylate or a five minute epoxy are useable, but are permanent.

The leads can be connected directly into an oscilloscope or frequency analyzer with preferably 10 MΩ impedance.

SENSOR OPERATION

Operating in a reciprocal fashion, changes in length generate a corresponding charge and hence, voltage to appear on the electrodes of the film. The transducer behaves like an “active” capacitor, consequently, loading of the signal by the input impedance of the measuring device must be considered. Due to the thinness of the films, the associated capacitance can be sufficient to give adequate low frequency response into standard 1 MΩ loads, but use of an X10 probe will extend the low frequency range by a decade. For extremely small devices and low frequency vibration levels, some buffering may be desirable. For the majority of analysis work, this is unnecessary and the film can feed directly to the instrument.

Again, the low mass contributed by the transducer is of major importance, and its nonresonate behavior. Frequency response is inherently flat into the MHZ region with only the R-C rolloff at low frequencies distorting the profile.

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P/N: 1004567-1

Since it is responding to strain rather than acceleration, high signal levels may be generated by low frequency flexing, so a distinction must be made between the frequency response of the film for changes in its primary parameter (i.e., strain) and its relative behavior compared with, say piezoelectric accelerometers.

The response of the sensor to strain enforces its likeness to a strain gauge, but with much higher output. The sensor performs well at low frequencies where displacement is large and acceleration low, as well as at high frequencies where displacement is small and acceleration high. The sensor has a flat response over a very wide frequency range, with resonant frequency points above 10 MHZ. See Figure 2.

Typical Frequency Response Plot
Vibration Sensor 1-1000288-0
(SDT1-028K)

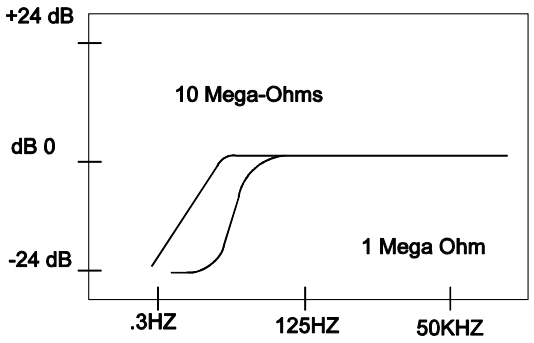

Figure 2

ADDITIONAL INFORMATION

For additional information or assistance, please contact:

Measurement Specialties, Inc.
Sensor Products Division
P.O. Box 799
Valley Forge, PA 19482

Tel: 610.650.1500
Fax: 610.650.1509

OTHER SPECIFICATIONS

Minimum Impedance	:	1 MΩ
Preferred Impedance	:	10 MΩ
Output Voltage @ 10 mΩ	:	Min 15 V
Storage Temperature	:	-40◦C to +70◦C [-40◦F to 160◦F]
Operating Temperature	:	0◦C to +70◦C [32◦F to 160◦F] (Depending on adhesive system). For more stringent, high operating temperature requirements, special preparation of the sensor can be arranged.
Operating Force Range	:	≥2 g's
Output	:	20 mv/g
Circuit Connection	:	Red Wire-Signal White/Braided Wire-Ground
Physical Characteristics	:	Wire Length 457.2 mm [18 In.] Total Sensor Length/Width/Height 44.5 x 19.7 x 3.2 mm [1.75 x .775 x .125 In.] Sensor Element Length/Width/Height 28.6 x 11.2 x .13 mm