LION PRECISION

TechNote

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C-LVDT Bandwidth - Response Speed

Applicable Equipment:

C-LVDT systems

Applications:

Any application using the C-LVDT to make dynamic contact measurements of a moving target.

Summary:

The speed at which the C-LVDT can respond to movements of the surface it is measuring is determined by the amount of displacement and the adjustment of the contact force. This TechNote provides maximum speeds/displacements for a variety of contact forces.

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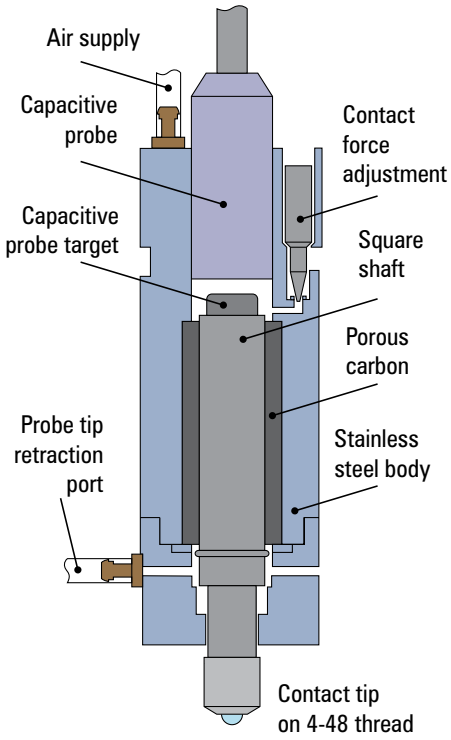
C-LVDT Mechanics

The C-LVDT uses air pressure to create a force that extends the contact point from the body of the device. This determines the contact force and is adjusted with a small valve.



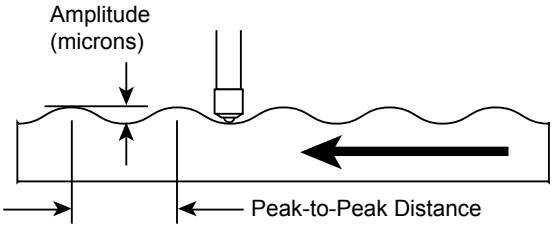
Contact Point Speed

The contact force determines the maximum speed at which the target can move away from the probe a given distance and not lose contact.

The calculation requires three datapoints:

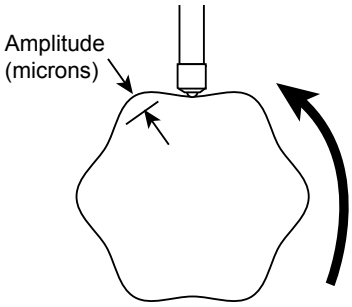
- Contact force in grams
- Amplitude of displacement in microns
- Frequency motion in Hertz

For Linear Motion



Freq. (Hz) = Speed (units/sec) / Peak-to-Peak Distance (units)

For Rotary Motion



Freq. (Hz) = RPM X 60 X Number of Peaks

The calculations here are based on a 6.9 g moving mass of a C-LVDT (5.55 g Shaft, 1.35 g Tip). Shorter, older models (no longer available) had lower mass and slightly higher response speeds.

Speed Chart

The graph on the next page charts the curves of maximum speed at which a target can move a given distance (in a sinusoidal pattern) and maintain contact with the contact point for reliable measurements.