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# TRANS•TEKNOTE

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## Mechanical Frequency Response of Gaging Transducers

Trans-Tek has 3 different series of spring loaded LVDTs: Series 310-320 Long Stroke AC Gaging, Series 330 3/8" AC Gaging, and the Series 350 DC-DC Gaging. These transducers are normally supplied in a spring extended configuration, requiring a force on the tip to displace the shaft. Many times, we are asked to identify the frequency response of the transducer, to insure that the sensor will track the movement of the object being measured.

In a standard LVDT, the frequency response is an electrical characteristic only, determined by the signal conditioning circuitry. In a gaging transducer, there is also a mechanical frequency response, which is usually lower than the electrical response, and is the specification which must be used to determine if the sensor will physically track the moving object. The tip force and mass of the shaft assembly are the major factors in determining the mechanical response rate of a gaging LVDT. Applying those values into the formula:

$$F_{\text{Response}} = 66.7 \sqrt{\frac{F}{ma}}$$

results in mechanical frequency response. The variables are defined as:

F = Preload force (lbs.)

m = mass of the shaft assembly and friction (grams)

A = the working range of displacement (inches).

The preload force is the minimum force of shaft extension, found at full extension.

This mechanical response for the Series 330 transducers has been included in the new product bulletin. When comparing these values against competitive transducers, you will see that our values are typically higher, allowing the customer to track faster moving objects without losing physical contact. The mechanical frequency response specification for the Series 310-320 and Series 350 was not included in the product bulletins, but the values are tabulated below for your future reference. The Series 350 transducers have alternate springs available for lower or greater response rates if required.

SERIES 310-320	
Model	Frequency (Hz)
0315-0000	7
0316-0000	4
0317-0000	3
0318-0000	2
0319-0000	1.5
0320-0000	1
0321-0000	0.8
0322-0000	0.7

SERIES 330	
Model	Frequency (Hz)
0330-0000	250
0331-0000	180
0332-0000	110
0333-0000	75
0334-0000	45
0335-0000	18
0336-0000	6
0337-0000	4

SERIES 350	
Model	Frequency (Hz)
0350-0000	30
0350-0010	36
0351-0000	20
0351-0006	18
0352-0000	11
0353-0000	8
0354-0000	3
0355-0000	3
0356-0000	2