

## **Dynamic Response Characteristics of Linear Translation Stage: A Review**

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### **Abstract**

This paper explores the various factors that influence the dynamic response of a linear translation stage. The dynamic behavior of a linear translation stage is dominated by various factors such as friction, stiffness and resonant frequency. Friction behavior hinges on the preload level, while vibration behavior is dominated by the resonant frequency of the stage. Dynamic stiffness depends on the bearing preload and the mechanical properties of the linear motion stage. Damping is influenced by the linear bearing preload, friction, and the lubricant film. The preload applied to the rolling element bearings plays a key role in the dynamic response of the system since it influences friction, damping, resonant frequency, and stiffness of the linear translation stage.

**Keywords:** Linear Translation Stage, Dynamic Response, Dynamic Stiffness, Dynamic Behavior, Friction Behavior, Damping