NANOMOTION LTD.

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Application Note NM 2

Considerations in Mounting and Operating Nanomotion Motors

Introduction

This application note highlights the considerations faced in mounting and operating Nanomotion motors. By following these guidelines, smooth installation and mounting will be achieved, maximizing the motor's unique features.

Mounting

The mounting base and the method used for mounting the motor should facilitate high stiffness and resonant frequencies, affecting the system's overall accuracy.

The motor mounting base and the Ceramic Drive Strip (CDS) mounting fixture should be rigid. Avoid the use of cantilevers for the mounting.

Recommended Mounting Procedure

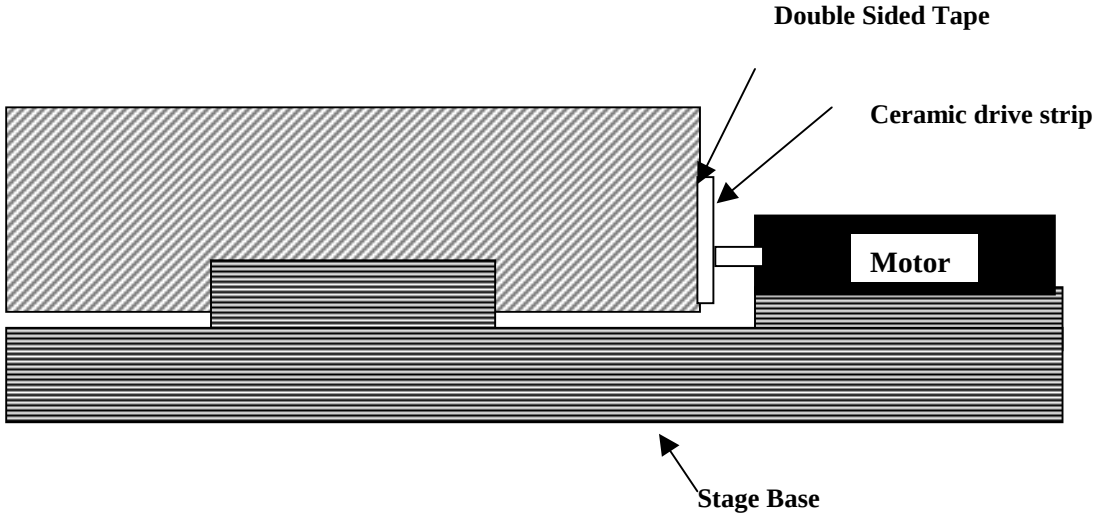

Figure 1

Mounting Procedure – ***Not Recommended***

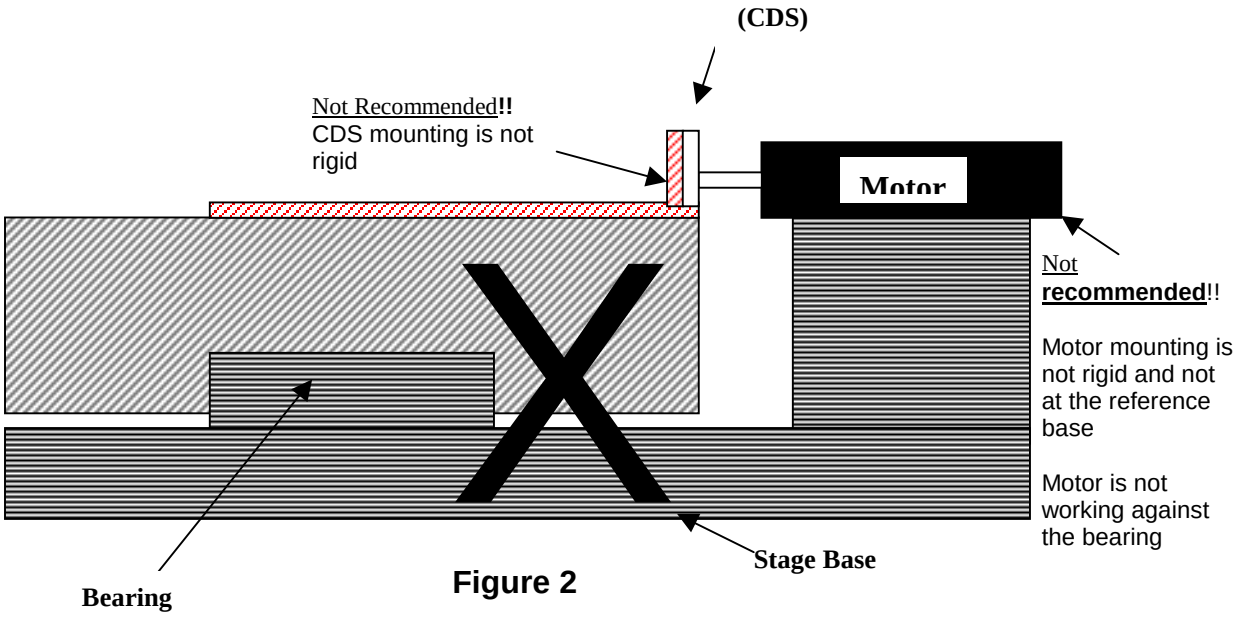

Figure 2

The motor should be mounted in such a way that the preload force is generated in the plane of the bearings, as shown in Figure 1. The bearings used with Nanomotion motors should be high quality linear or rotary bearings especially suitable for high precision applications. For linear applications, cross roller bearings are preferable, and air bearings are optimal. For low precision motion applications and those applications using actuators, lower cost ball bearing stages may be used.

In small linear stages, the problem of roller cage migration can occur during operation. It is therefore recommended that stages be designed with anti-creep mechanism, which eliminates cage migration.

The Ceramic Drive Strip

The CDS must meet specific requirements set by Nanomotion, such as low porosity and superior surface finish. For long-term stable operation it is recommended that Ceramic Drive Strips supplied by Nanomotion be used. The Ceramic Drive Strips are supplied with double sided adhesive tape attached to the back of the plate. Attention should be given to ensure that no air bubbles remain between the adhesive and the mounting surface.

Use epoxy only as described and shown in the motor installation guide. Additional use of epoxy to mount the ceramic drive strip will not allow for the difference in the expansion and construction of the ceramic drive strip material and might result in unsatisfactory system performance.

The ceramic drive strip must be mounted in such a way that all of the motor tips ride completely on the ceramic surface throughout the motor's complete path of travel. If the motor tip(s) runs off the end of the drive strip, damage to the motor will occur.

Nanomotion motors and the ceramic drive strips must be run-in for 12 to 24 hours. If the ceramic drive strips or the motors are changed, the run-in must be performed again. After the run-in, the ceramic drive strips must be cleaned thoroughly without removing the motor, using alcohol (IPA). Caution must be exercised to ensure that alcohol does not reach the inside of the motor.

Operation

Do not turn on the power of the motor driver unless the motor is mounted and preloaded. In multi-motor systems, be sure that all the motors to be driven by the same driver are mounted and preloaded before operating.

Do not reduce the length of the motor cable. The motors are supplied with a standard 3 meter cable or optional 10 meter cable. The LC tank circuit supplied with the motor is designed for the specific length and type of the cable. Reducing the length of the cable may damage the motor. Extending the cable length will not damage the motor; however, it will affect the motor's performance.

For further information please consult Nanomotion Customer Support Division.

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