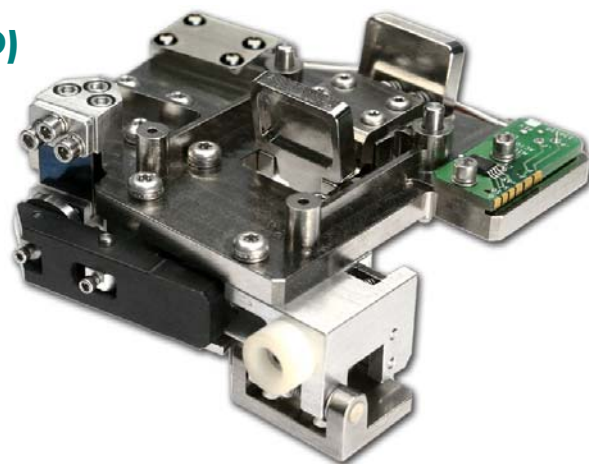


Piezo-Actuator Cartridge for Guzik V2002 Spinstand

- **Typical Non-Repeatable Run-Out (NRRO) 0.35–0.60 nm (0.014–0.024 μ Inch), 1 σ**
- **Servo Bandwidth 2–3 kHz**
- **Improved Test Time**
- **Estimated Spinstand Capability 420–720 kTPI**



The new generation of Guzik cartridges¹ is equipped with Piezo actuator to achieve higher servo closed loop bandwidth. The typical bandwidth is in the range of 2–3 kHz. This allows for non-repeatable run-out reduction down to 0.35–0.60 nm (0.014–0.024 μ Inch)², 1 σ . The higher servo bandwidth also improves seek time, which leads to test time improvement for several tests.

TPI Capability

The TPI capability of a tester is normally calculated such that the error of the measurement does not exceed some percentage of the magnetic head Track Size. One of the recommended criteria is that 1 σ of NRRO does not exceed 1% of the Track Size. Based on this criteria the 0.35–0.60 nm (0.014–0.024 μ Inch) would be 1% of the 1.4–2.4 μ Inch wide head, which means that the V2002 tester capability with Piezo-Actuator Cartridge is 420–720 kTPI.

¹ Patent Pending

² Typical value. Measurement results may vary for different head types.

Non-Repeatable Run-Out Improvement

The figures below illustrate the 0.35–0.60 nm (0.014–0.024 μ Inch) NRRO with Piezo-Actuator Cartridge. The data was measured using 7200 RPM product.

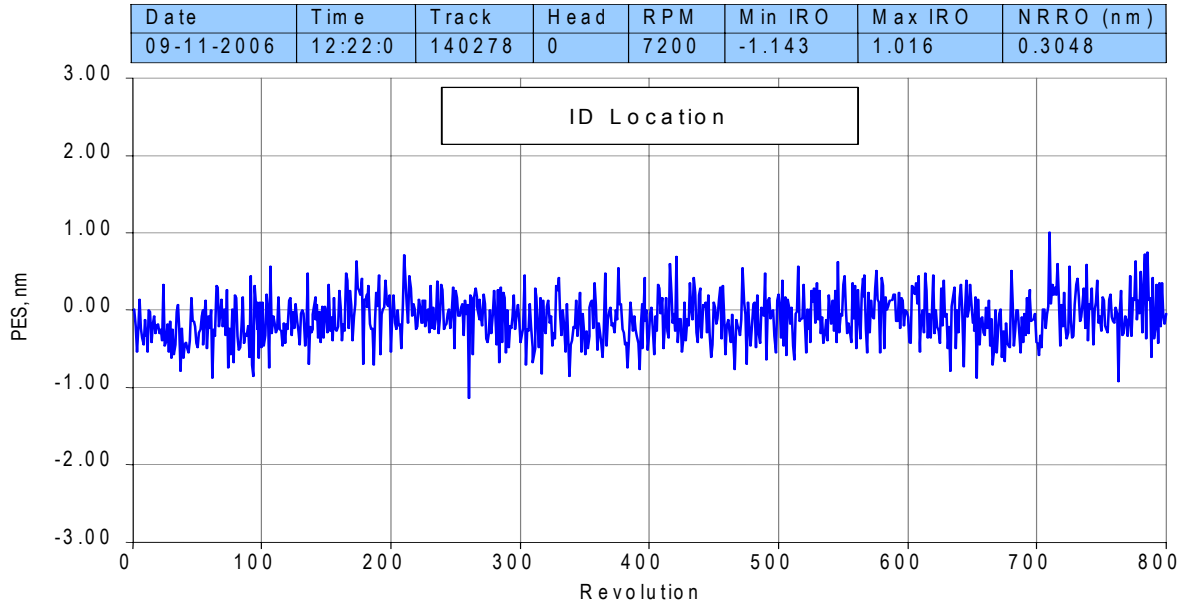


Figure 1: Position Error Signal at ID

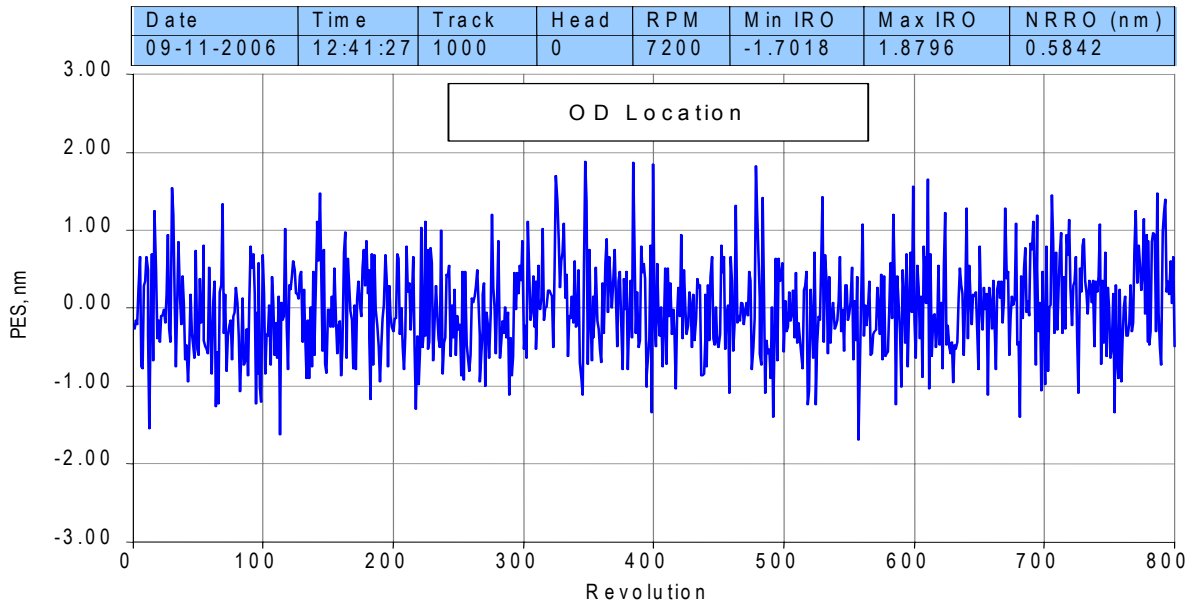


Figure 2: Position Error Signal at OD

The Figure 3 below compares V2002 spinstand performance in three configurations:

1. With the **Regular Cartridge**. Standard bandwidth servo loop is enabled, using the main piezo actuator of V2002 spinstand.
2. With the new **Piezo-Actuator Cartridge**. Standard bandwidth servo loop is enabled, using the main piezo actuator of V2002 spinstand. The piezo actuator on the cartridge is not used.
3. With the new **Piezo-Actuator Cartridge**. High-bandwidth servo loop is enabled, using the piezo actuator on the cartridge.

The Piezo-Actuator Cartridge and the Regular Cartridge are interchangeable on the same spinstand without need to realign the spinstand.

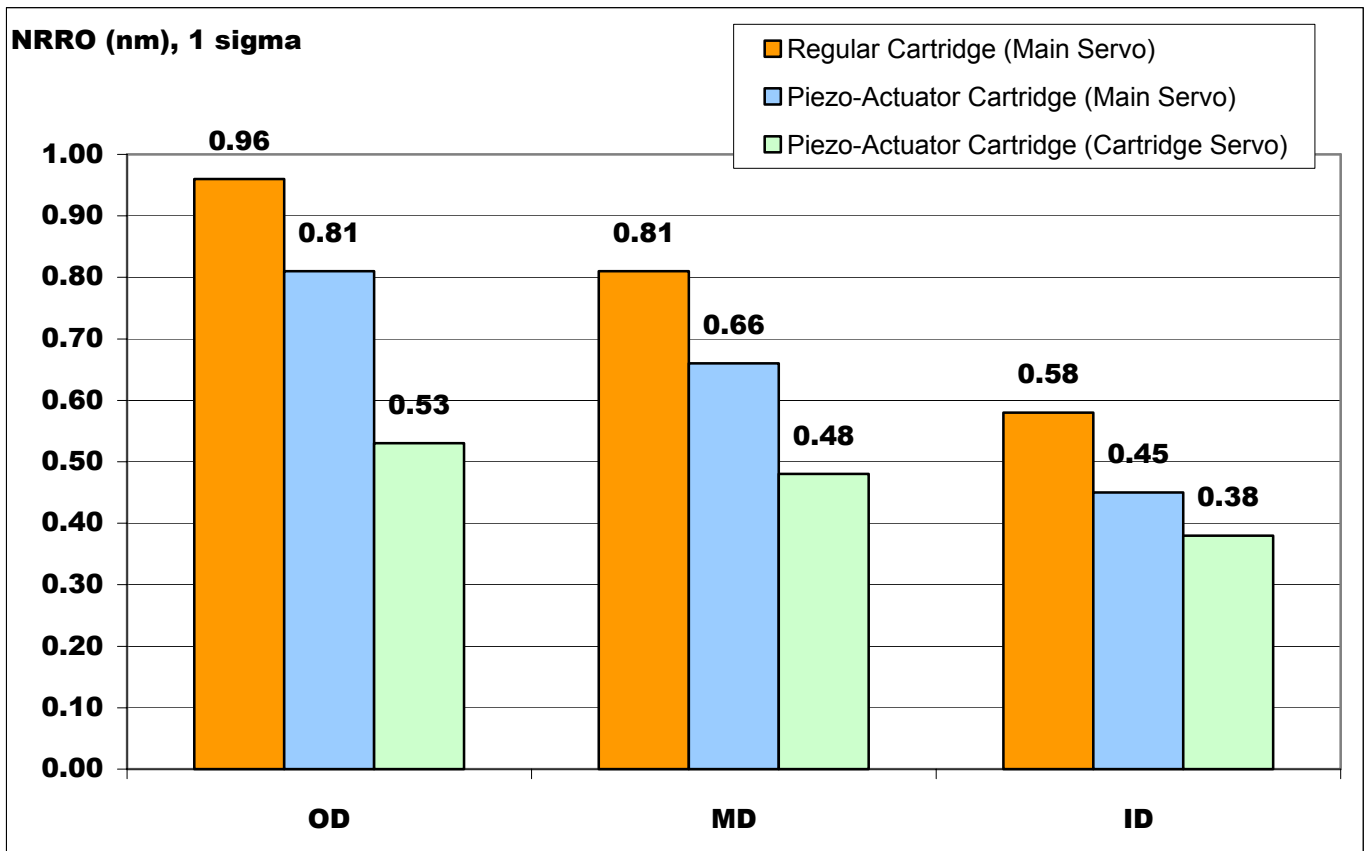


Figure 3: Cartridge Comparison

When you use the new Piezo-Actuator Cartridge and enable the high-bandwidth servo loop, you will typically get 35–45% improvement in NRRO, shown in green.

The figure above also shows that the new Piezo-Actuator Cartridge is a more stable platform comparing to Regular Cartridge. It delivers 15–20% better NRRO results, shown in blue, even if you do not enable the high-bandwidth servo loop using the piezo on the cartridge.

Test Time Improvement

When the high-bandwidth servo loop using the Piezo-Actuator Cartridge is enabled, the parametric tests may run up to 5–10% faster compared to the regular servo mode. Guzik is working on further improvement of test time.

System Requirements

The following test system components are required:

1. Guzik V2002 spinstand needs to have the following components:
 - Head Loading Mechanism upgraded with piezo-actuator cartridge interface,
 - Control Interface Board P/N 321850,
 - Combloder Interface Board P/N 324250 or 328390.
2. Spinstand Control Box needs to have the following components:
 - Servo Driver 5 board P/N 330880 (revision ‘B’),
 - Servo Controller 5 board P/N 330890 (any revision).
3. Guzik RWA-2000 series with the following servo revision:
 - Servo Revision 3 or
 - Servo Revision 4.
4. It is recommended that your RWA-2000 series has RWA Control 2 Board P/N 325800¹.
5. WITE32 Software Revision 4.00 or later.

For compatibility verification and upgrade quotation please send RWA and Spinstand EEPROM Dump information to sales@guzik.com.



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¹ If your RWA has an older RWA Control Board P/N 306180, you will not be able to use the Enhanced Performance Mode 2 (Partial Revolution) with the high number of sectors required for Piezo Actuator Cartridge.