

## Notes (Technical Data)

### A3 Design Resolution

The theoretical minimum movement that can be made, based on the selection of the mechanical drive components (drive screw pitch, gear ratio, angular motor resolution etc.). Design resolution is usually better than the practical position resolution (minimum incremental motion). The resolution of piezo actuators and PZT flexure NanoPositioners is not limited by stiction and friction (it depends on amplifier, sensor and servo noise). The practical resolution of most PI PZT NanoPositioning systems is in the sub-nanometer range.

### A4 Minimum Incremental Motion

The minimum motion that can be repeatably executed for a given input, which is sometimes referred to as practical or operational resolution. Design resolution and practical resolution have to be distinguished. Design resolutions of 1 nm or better can be achieved with many motor, gearbox and lead-screw combinations. In practical applications, however, stiction/friction, windup, and elastic deformation limit operating resolution.

**Repeatable nanometer or sub-nanometer resolution can be provided by solid-state actuators (PZTs) and PZT flexure stages** (see the "PZT Flexure NanoPositioners" and "PZT Actuators" sections for details). Several PI MicroPositioners are available with additional PZT fine positioners for applications where repeatable nanometer scale resolution is required. **The resolution of PZT actuators is not limited by stiction and friction.**

### A5 Rotation / Linear Input, Tangent-Arm Length

Angular displacement of Tangent-Arm Rotation Stages is determined by the arm length and the linear motion input pushing the arm (see page 7-49 for information on how to calculate angular displacement from linear input).

### B1 Max. Normal Load Capacity

Centered, vertical load (horizontal installation).

### B2 Max. Push/Pull Force

Active and passive force limit in operating direction, at center of stage. Some stages may be able to generate higher forces at the cost of reduced lifetime.

### D1 PZT Drive

See the "PZT Actuators" section for details.

### D2 Recommended Motor Controller

See "Motor Controllers" section.

### L Body Material

Stages are usually made of anodized aluminum or stainless steel. Small amounts of other materials can be used internally (for bearings, preload, coupling, mounting, etc.).

Al: Aluminum

N-S: Nonmagnetic stainless steel

St: Steel

I: Invar