Precitech FTS units can be added to all Precitech ultra-precision Nanoform and Freeform systems. The FTS 35 has 35 µm of usable stroke and a maximum operating frequency of 1 kHz. The FTS 70 has a 70 µm stroke and a max operating frequency of 900 Hz. Tool movement is actuated by a piezo ceramic device and position feedback is provided by capacitive gage at 0.5 nm resolution. The FTS 70/35 use “one to one” piezo movement to tool movement technology with high stiffness flexures maximizing tool moment stiffness.

## Overview

<table>
<thead>
<tr>
<th>Model</th>
<th>FTS 70</th>
<th>FTS 35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel</td>
<td>70 µm ~ 100 Hz</td>
<td>35 µm ~ 140 Hz</td>
</tr>
<tr>
<td>Peak Acceleration</td>
<td>3000 m/s²</td>
<td>5000 m/s²</td>
</tr>
<tr>
<td>Typical Form</td>
<td>&lt; 0.3 µm PV</td>
<td>&lt; 0.2 µm PV</td>
</tr>
<tr>
<td>Typical Finish</td>
<td>&lt; 3 nm Sa</td>
<td>&lt; 2 nm Sa</td>
</tr>
<tr>
<td>Servo Band Width</td>
<td>900 Hz</td>
<td>1000 Hz</td>
</tr>
</tbody>
</table>

### FastCom Control System

- **Operating System:** Windows 7
- **DSP:** Sharc ADSP
- **Typical position command update rate:** 20 to 35 kHz
- **D to A converter:** 18 bit, ultra-low-noise
- **Update time jitter:** < 50 ns
- **GUI:** Windows based UPx style

### Two optional packages

- Fiducial library – Programming objects defining the cutting path for frequently used fiducial (alignment) marks
- 20th order aspheric lens arrays with blend zones and on-the-fly tool compensation

### Fast Com III FTS fast command generator

Precitech has more Fast Tool Servo (FTS) systems in use worldwide than any other supplier. Over the last 20 years Precitech has delivered over 500 FTS systems.

FTS systems provide a rapid method to fabricate free form surfaces including: light management micro-structures, toric optics and mechanical features in contact lenses, lens arrays and laser collimators. FTS cutting is typically 10-15 times faster than other servo tool cutting methods (e.g. slow tool servo).

### Benefits of defining a surface by mathematical expression include:

- No “point cloud” related limitations on the size of the surface or on the fine definition of individual features.
- Tool path commands are generated without interpolation between the lower resolution points in a point cloud rendering a more accurate surface.

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**FTS control architecture**

**Light management array, 40 mm OD brass disk**

620,000 lenses Lens pitch 45 µm, Lens form 250 µm R sphere.

**3D Metrology of micro lenses on the brass disk**