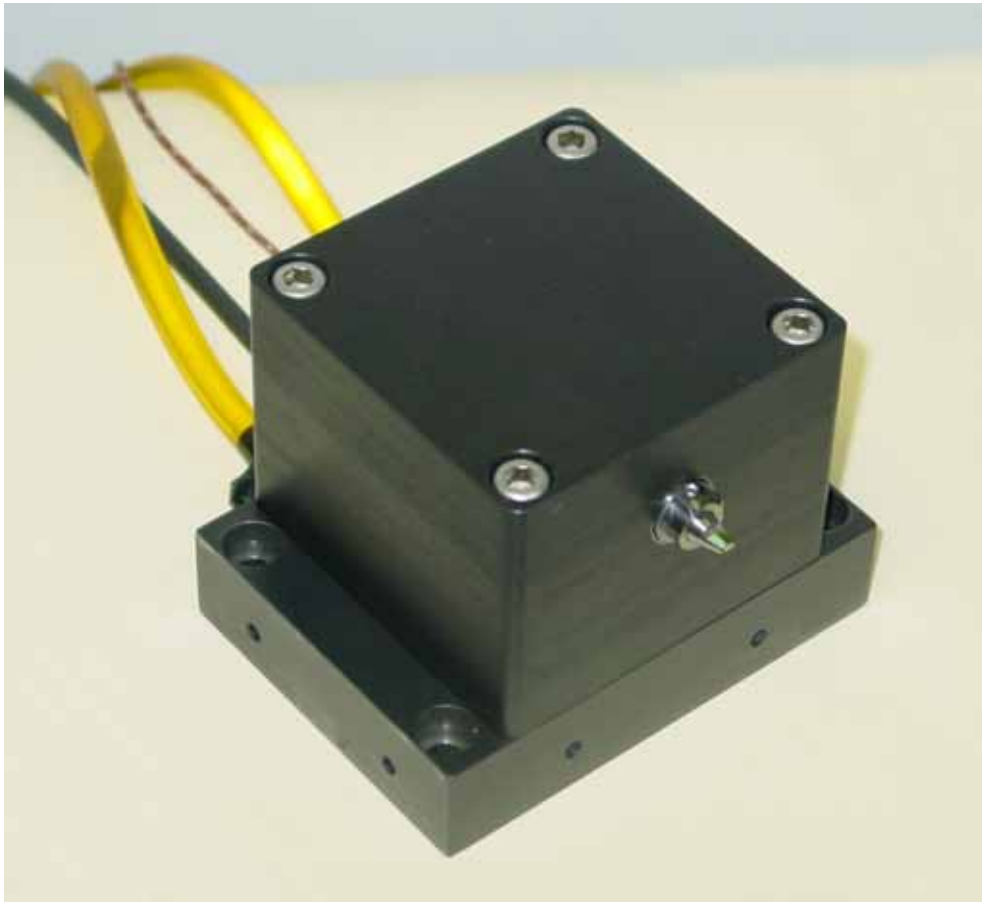




Kinetic Ceramics Inc.
Hayward CA.

Rotary Fast Tool Servo Module for Precision Lathe



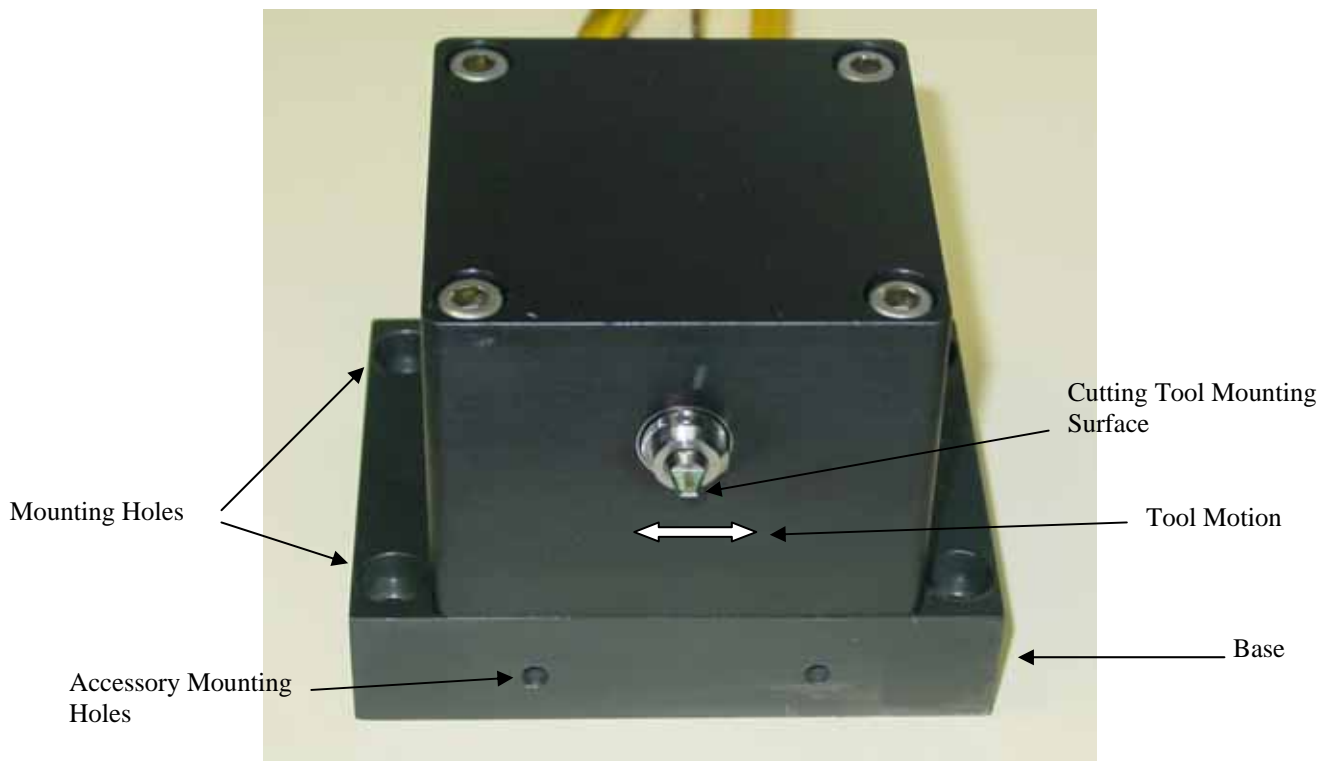


Rotary Fast Tool Servo Module

System Description:

The Kinetic Ceramics Rotary Fast Tool Servo utilizes a unique piezoelectric shearmotor to produce high frequency angular motion of a lightweight single crystal diamond cutting tool. The shearmotor is mounted in a sealed housing containing a cooling fluid to control the temperature of the high performance piezoelectric driving elements. The housing also contains a temperature sensor to monitor the shearmotor temperature. Fluid ports permit circulation of the coolant. The tool holder is mounted in a titanium flexure that has very high rigidity in the vertical axis as well as in the tool longitudinal axis. Side to side motion of the cutting tool is unrestricted by the flexure.

A high power amplifier drives the shearmotor. A drive signal is synthesized for the amplifier in an oscillator unit and is programmed by two analog input voltages provided by the user. The first input voltage (0 to +10 volts) controls the shearmotor drive amplitude. The second input voltage (0 to +10 volts) represents the desired frequency for the tool oscillation within the range 2kHz to 24 kHz. An enable input to the oscillator prevents drive signals from being generated when enable contacts are not closed.



RFTS "Head"- Front View



RFTS "HEAD" Rear View

February 23, 2007



Rotary Fast Tool Servo Module

KC FTS-R Preliminary System Specification

Tool Travel : ± 10 Microns at tool cutting surface from 2kHz to 7kHz
 ± 4 Microns at tool cutting surface at 20 kHz
Motion Radius = 1.0cm (Dependant on tool holder design)

Operating Bandwidth : 2kHz to 24 kHz

Environment:

Operating Temperature 63° F to 77° F (17° C to 25° C)
Storage and Transport Temperature 0° F to 150° F (-18° C to 65° C)
Relative Humidity 25% to 65 % (non-condensing)

Tool Head weight 4.44 lbs including coolant

Titanium Tool Holder mass (with single crystal diamond cutting tool). 1.4g

Maximum Tool Holder Mass 3.0g

Coolant Type & Quantity 200 DSI-HTF-200 Approximately 24 fl oz.

FTS Control Amplifier with Oscillator

Drive Amplifier

Input Command Signals
Input 1: Amplitude 0 to +10 Volts
Input 2: Frequency 0 to +10 Volts represents 2kHz to 24kHz

Output Voltage 1000V pk-pk

Maximum Average Continuous Output Power 1000 Watts

Electrical Connectors

Control Signals BNC

Amplifier Output Terminal Strip

Input Power 90-120 VAC 50 – 60 Hz



Kinetic Ceramics Inc.
Hayward CA.

Rotary Fast Tool Servo Module

Input Power Protection

Circuit Breaker

Chassis Size:

Standard 19 inch rack mount x 24 inches depth x 15 inches total height.

Weight:

150 lb



Amplifier and Oscillator Front View



Rotary Fast Tool Servo Module

ROTARY FAST TOOL SERVO WIRING

