Kinetic Ceramics Inc.
Hayward CA.

FTS 20

Linear Cutting Module for Precision Lathe

Kinetic Ceramics Inc.
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System Description

The Kinetic Ceramics FTS 20 utilizes piezoelectric actuation to produce high frequency motion of a lightweight single crystal diamond cutting tool. The actuator is preloaded inside 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 cooling fluid temperature as it exits the tool head. A temperature indicator is mounted in the top position of the control cabinet. Coolant lines permit circulation of the cooling fluid between the head and a pump and reservoir mounted in the control cabinet. The tool holder is integral with a flexure that has very high rigidity in the vertical and horizontal axes. Axial motion of the cutting tool is unrestricted by the flexure. A light weight Tool Carrier mounts in the Tool Holder. The Tool Carrier facilitates mounting a single crystal diamond cutting tool.

A high bandwidth amplifier drives the piezoelectric actuation mechanism. An externally generated synthesized sinusoidal drive signal must be provided to the amplifier. The allowable frequency range is 2.0 kHz to 20.0 kHz. An externally provided "Enable" signal allows tool motion to begin.

The mounting is fully compatible with the FTS-400 and FTS-600 machines, but FTS20 may also be base mounted.

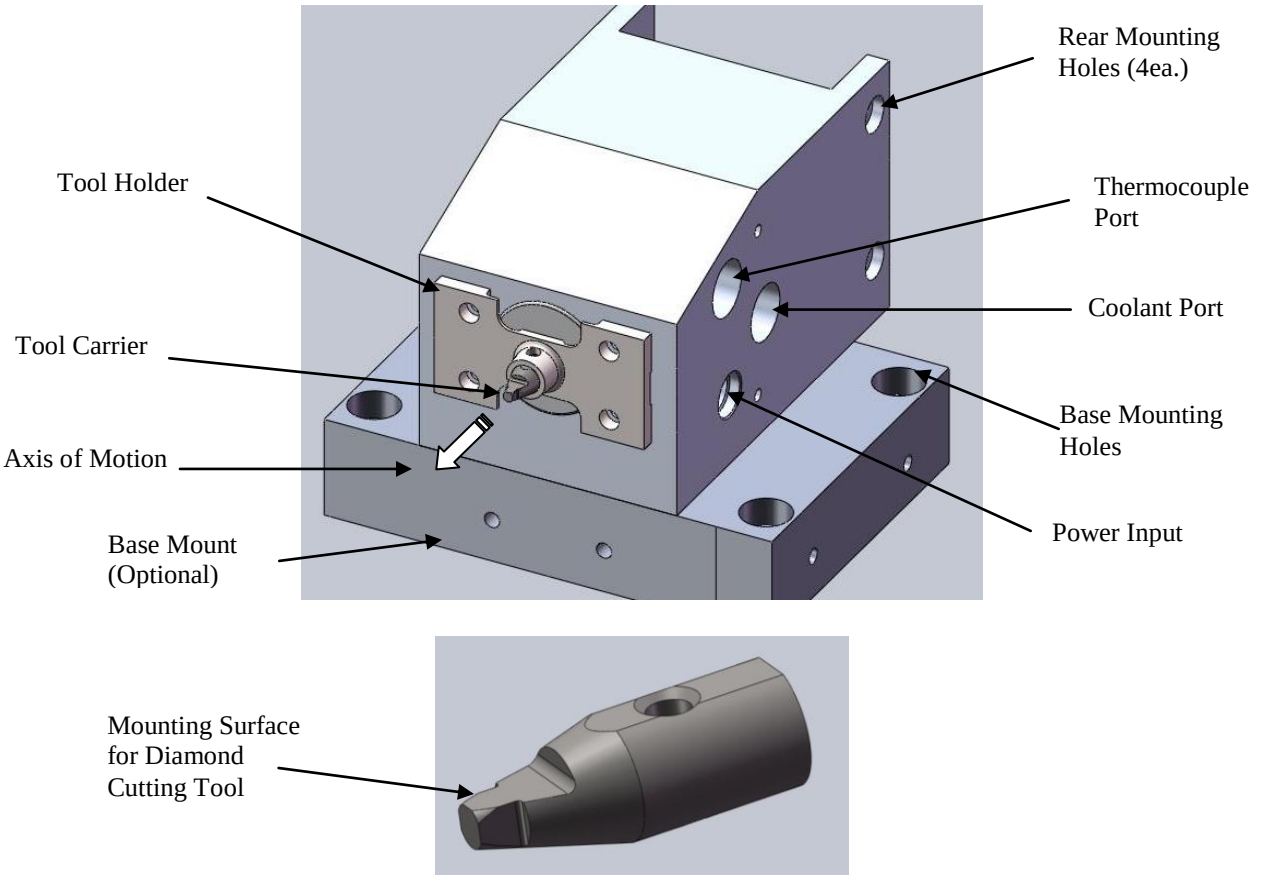

Figure 1 FTS-20 Parts Identification

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KC FTS-20 System Specifications

Tool Travel :	Linear. ±5 Microns (10 µm total travel) at tool cutting surface. In and out motion perpendicular to the cutting surface at 20kHz.
Bandwidth :	2.0kHz to 20.0 kHz
Environment:	
Operating Temperature	10°C to 30°C
Storage and Transport Temperature	-20°C to 45°C
Relative Humidity	10% to 65 % (non-condensing)
Tool Head weight	2.0 kg
Tool Holder mass (with single crystal diamond cutting tool).	1.4g
Coolant	DSI HTF-200, Quantity: Approximately 2 liters.
Temperature Monitors	Coolant outlet temperature from the FTS 20 Tool Head. Optional: Coolant inlet temperature.
Conduit between Head and Control Chassis	Flexible x 25 mm diameter containing Power Cable, Cooling lines and thermocouple leads. Length: 11 meters. Minimum Bend Radius: 6.5cm.
Command Input	Amplitude: 0 to 10 Volts Peak – Peak Max. 16 Volts Peak – Peak Max at 20kHz only. Frequency: 2 – 20kHz
Enable Input	24 VDC
Input Power	
Power Amplifier & Coolant Pump	120 VAC 50 – 60 Hz, 2.0kVA
Temperature Monitors & Enable Relay.	24 VDC, 1A.
Input Power Protection	
Power Amplifier	Circuit Breaker
DC Power Supply	2A Fuse
Coolant Pump	4A Fuse
Temperature Monitor(s)	1/2A Fuse
Control Cabinet Dimensions:	22”W x 31”D x 41”H. This cabinet contains the drive electronics (2 x 19”rack mount boxes) , temperature monitor and cooling pump. DIN strip mounted connector block for chassis power and distribution connections. Cabinet has a storage location for the Tool Head and Conduit.
Weight:	130kg

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FRONT

REAR

Control Cabinet

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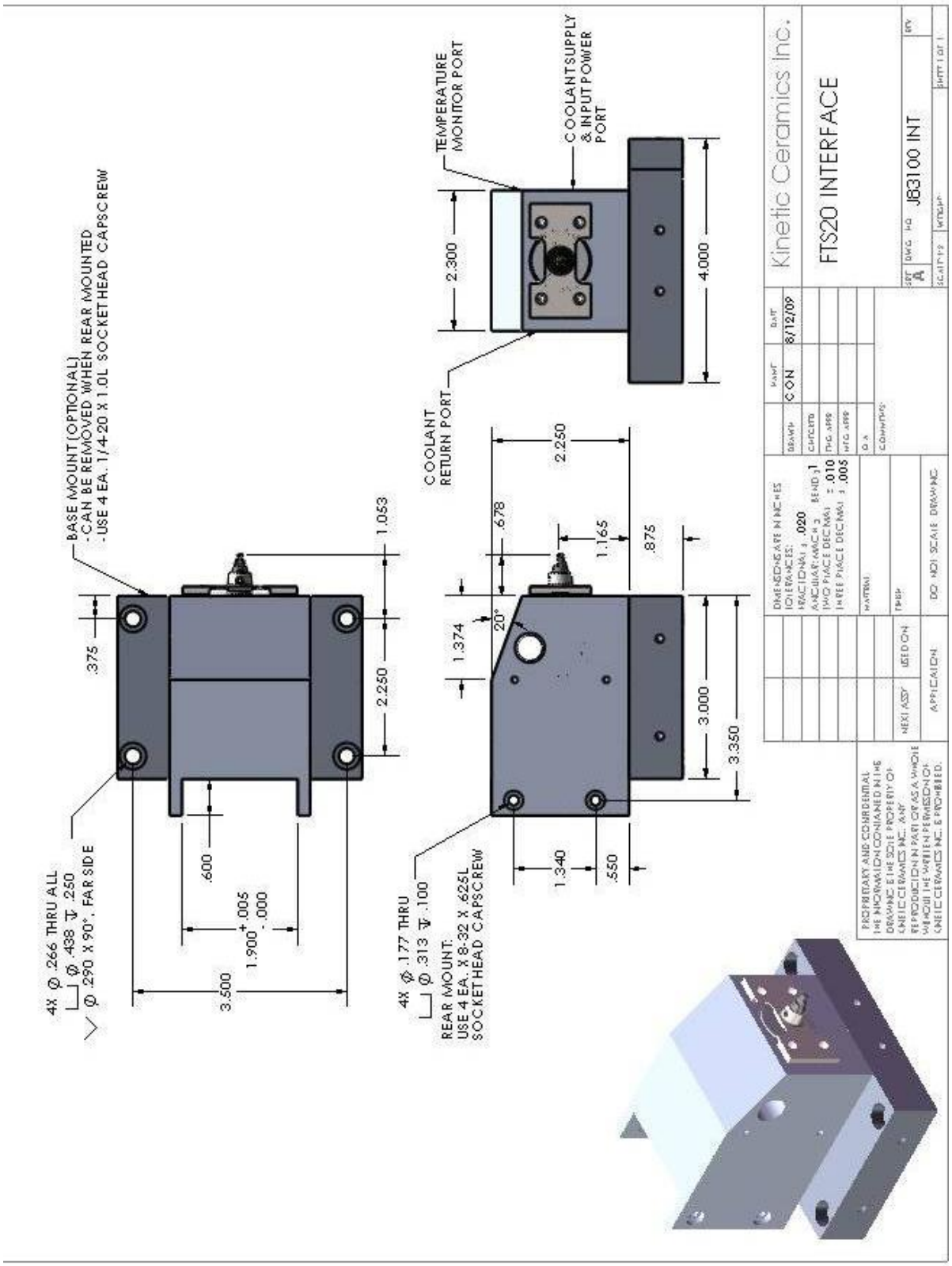

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