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APD-800 Polisher and Tribometer

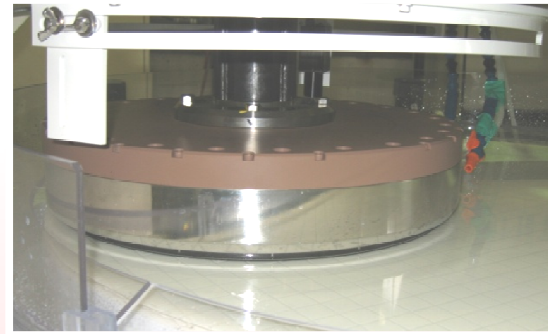
World's first 300-mm single-platen CMP and polishing system capable of real-time measurement & analysis of:

- Shear force and down force
- Pad temperature, conditioner motor current and other critical polishing parameters

Manufactured by Fujikoshi Machinery Corporation

Powered by Araca's FSX™ – 800 proprietary force acquisition and data analysis system

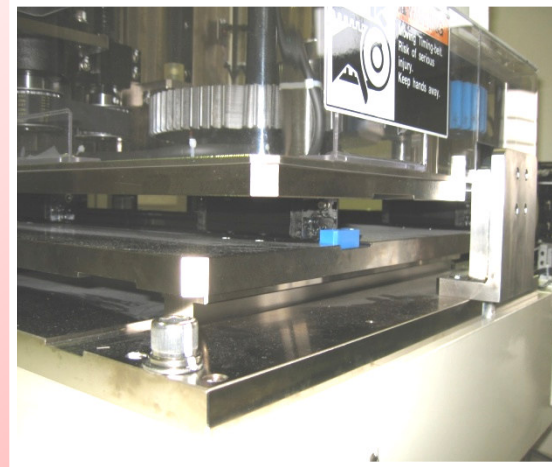
Intended for process R & D



Wafer Carrier



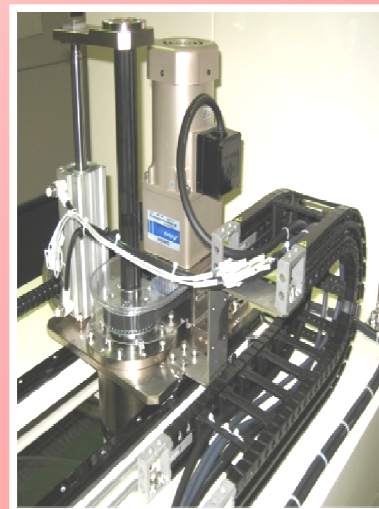
Control Panel



Frictional Table and Force Transducers



Force Transducer Signal Amplifiers and USB Port



Conditioning System



Slurry Tank, Pump, and Flow Controller

Specification

Manufacturers	Fujikoshi Machinery Corporation and Araca Incorporated
Wafer Size	300-mm (or smaller)
Wafer Carrier	Down force control = Pneumatic Pressure = 0.6 to 8.0 PSI (1.4 to 8.0 PSI for 200-mm) Rotation rate = 15 to 200 RPM
Platen	$\Phi = 800$ mm Rotation rate = 20 to 180 RPM Material = SUS410 Built-in heat exchanger (requires external coolant)
Conditioner	$\Phi = 108$ mm Rotation rate = 12 to 120 RPM Stroke length = 320 mm Sweep velocity = 0 to 500 mm/sec through 10 independently controlled zones Down force = 3.3 to 13.2 lb Scheme = ex-situ or in-situ
Chemical Delivery Systems	Three computer-controlled, 20-liter, chemical-resistant, removable tanks with impeller mixers, roller pumps and level sensors Flow rate = 10 to 450 cc/min
Pad Water Rinse	Dedicated high flow rate water rinse injector Flow rate up to 3,000 cc/min
Force Sensors	Shear force (1 sensor) and down force (4 multiplexed sensors)
Temperature Sensor	Adjustable single-point pad surface IR detector
Data Capture vs. Time (capture frequency up to 2,300 Hz; display frequency = 1 Hz)	Platen rotational velocity Carrier rotational velocity Conditioner rotational velocity, position, oscillation speed and motor current Tanks 1, 2 and 3 chemical flow rates Shear force and down force Coefficient of Friction (COF) Pad surface temperature
Basic Data Analysis	Average and variance for the entire (or a subset of the) polishing period for all parameters being captured
Advanced Data Analysis and Correlation	Shear force and down force Fast Fourier Transform (FFT) COF vs. Sommerfeld number COF vs. pad temperature
Control, Monitoring and Analysis	Programmable touch-screen controller for polisher operation Notebook computer for process monitoring and data analysis
W x L x H	100 x 140 x 203 cm (polisher) 80 x 38 x 190 cm (electrical cabinet) 50 x 150 x 81 cm (three chemical delivery systems)
CDA	Minimum pressure = 72 PSI (500,000 Pa) Flow rate = 50 liters per minute
Platen Coolant Water	Maximum pressure = 43 PSI (300,000 Pa) Flow rate = 15 liters per minute

Software and Graphical User Interface

The software designed for APD-800 is written in LabVIEW version 8.0 and used for data acquisition and analysis. The software provides a main menu that contains six programs: calibration, setup, data acquisition, waveform analysis, spectral analysis, and correlation.

