



● **CETR-UMT-EC** Comprehensive Tribo Corrosion Tester

One Precision Platform, Easily-Interchangeable Modules

**UMT2-EC** Nano & Micro Tribo Corrosion Tester – from  $\mu\text{N}$

**UMT3-EC** High Load Tribo Corrosion Tester – up to 1000N

# CETR-UMT-EC Technical Highlights

**Electro-Chemical Module** – Electrically insulated anti-splash chambers

- 3-electrode system (reference, counter electrode, working electrode)
- Working electrode – choice of upper or lower specimen
- Integrated advanced potentiostat
- Current vs potential plots
- Dynamic and passive re-circulation of liquid

**Precision Servo-Control** of loads, speeds, and positions for uniquely reproducible data and highly productive tests. NO DEAD WEIGHTS used.

**Multiple Tests** on nano, micro and macro scales:

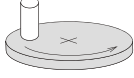
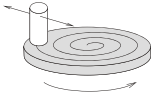


- Static and dynamic friction
- Ultra-low-speed (0.1 micron/s) stick-slip
- Adhesive, abrasive and scratching wear
- Multi motions-cycle, clockwise/counter-clockwise
- Variable sliding to rolling
- Instrumented indentation
- Scratch test

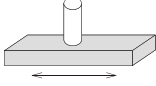
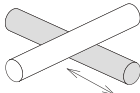
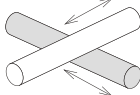
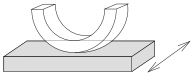
**Multiple Sensors** for in-situ test monitoring:

- Ultra-precision force sensors of the proprietary technology and patented design (1 mN to 1 kN)
- 6-D sensors for simultaneous measurements of 3 forces and 3 torques in all X, Y and Z axes
- High-frequency acoustic emission sensors to detect tiniest cracks and wear
- Wear and deformation sensors of nm resolution
- Temperature and humidity sensors
- pH probes

**Multiple Synchronized** linear and rotary motions of upper and lower specimens in all X, Y and Z axes, including oscillations for sophisticated multi-axis tests, e.g., with spiral, zigzag or butterfly scratch/wear tracks

**Multiple Chambers** with computer-controlled temperature (–25 to 150°C), humidity (10 to 95% RH), gases

Rotation:	cw/ccw at two speed ranges: 0.1 to 3,000 rpm or 0.001 to 100 rpm	
Upper Specimen:	ball, pin, indenters, cylinders	
<b>Single-Radius Pin/Ball-on-Disc Tests</b>		
Upper Pin or Ball:	stationary during test, automatic positioning on disc radii 0 to 75 mm, resolution 1 µm	
<b>Spiral-Wear Pin/Ball-on-Disc Tests</b>		
Upper Pin or Ball:	sliding radially on lower disc, speeds 0.001 to 10 mm/s Lower disc angular speed auto-adjusted for constant linear speed	
<b>Single/Multi-Crater Tests</b>		
Upper Pin or Ball:	rotating cw/ccw, speeds 0.1 to 3,000 rpm	
	Positioning on new craters: automatic radial positioning, range 75 mm, resolution 1 µm, circumferential positioning, range 360°, resolution 0.5 µm	
<b>Disc/Ring-on-Disc Tests</b>		
Upper Pin or Ring:	up to 150 mm	
	Stationary or rotating: cs/ccw, speeds 0.1 to 3,000 rpm	

Reciprocation Frequency:	0.1 to 60 Hz	
Reciprocation Stroke:	50 µm to 25 µm	
Options:	ball, pin, cylinder, indenter	
<b>Wear &amp; Fretting Tests</b>		
Upper Pin/Ball/Block:	stationary	
Multiple Wear Tracks:	auto-positioning, distance 0 to 75 mm, resolution 1 µm	
<b>Cross-Cylinder Tests</b>		
Upper Cylinder:	0.1 to 25 mm	
Upper Tensioned Wire/Suture/Fiber:	1 µm to 1 mm	
Narrow Wear Track:	stationary upper sample	
Wide Wear Track:	sliding upper sample, 0.001 to 10 mm/s	
Multiple Wear Tracks:	auto-positioning 0 to 75 mm, resolution 1 µm	
<b>Engine Tests</b>		
Upper Piston Ring:	stationary	
Lower Cylinder Liner:	reciprocating	

 **Bruker Nano Surfaces Division**

Campbell, CA · USA  
Phone 1.408.376.4040  
info@cetr.com

[www.cetr.com](http://www.cetr.com)