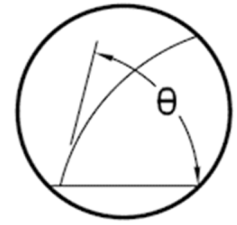


**ramé-hart instrument co.**

World Leader in Surface Science Instruments

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ramé-hart 500 Series  
Goniometer / Tensiometer Instruments

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*Model 590 Advanced Automated Goniometer / Tensiometer*

## ramé-hart 500 Series Goniometer / Tensiometers

The ramé-hart 500 Series represents the top-of-the-line instruments.

Currently, the 500 Series includes Model 500 and Model 590. Both of these models ship with DROPImage Advanced software and are capable tools for doing a wide range of measurements. Both instruments sport a 21-inch optical bench, German-made SuperSpeed U4 Series camera at 520 fps, Advanced 3-axis Stage with fine and coarse vertical adjustment, Specimen Stage with leveling, fiber optic illuminator, and microsyringe assembly which supports both microsyringe as well as the Automated Dispensing System.

**Model 500** supports every available accessory from ramé-hart. This includes the large Advanced Chamber as well as Rotating Wafer Supports up to 12 inches in diameter.

**Model 590** is nearly identical to Model 500 except that it also includes the Automated Dispensing System and Automated Tilting Base. This highly automated configuration is particularly useful for those who are doing advancing and receding contact angle studies.

Both Model 500 and 590 are complete turn-key systems which ship complete, ready to unbox and put to work. The systems include a PC and monitor, and all software is installed and configured.

Both models, with DROPImage Advanced software, are capable of measuring contact angle, surface energy (using 8 different tools), surface tension, and interfacial tension. Since DROPImage Advanced is methods-based, it's an excellent tool for building highly involved time-dependent and dynamic experiments.

With the appropriate accessories, these instruments can also measure surface dilatational elasticity and viscosity. An overhead kit is available for working on extremely hydrophilic surfaces, and a wide variety of chambers and cells are also available for doing temperature-controlled studies.

Whatever your application demands, a 500 Series goniometer / tensiometer equipped with the necessary accessories will exceed your expectations.

## DROPimage Advanced Software

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Both Models 500 and 590 ship with DROPimage Advanced, the most powerful software for measuring contact angle, surface energy, surface and interfacial tension, surface dilatational elasticity and viscosity, as well as advancing and receding contact angles, roll off angle, and contact angle hysteresis.

The drop shape method is determined by a contour fitting algorithm, and the profile coordinates are used to calculate the surface tension, contact angle and the area and volume of the drops. Calculation of surface tension is accomplished by precise mathematical analysis of the drop profile using cubic interpolation. Curves are fitted with linear polynomials using the method of least squares. The final calculations are accomplished using the theoretical profiles produced by a numerical integration of the Young-Laplace equation. The methods have been published in J. Colloid Interface Sci.

DROPimage Advanced includes all the tools and features that are included in in DROPimage Pro but features additional commands and tools. The following are features that are unique to DROPimage Advanced and are not part of DROPimage Pro:

- Experiment design tool with wizard for easy start
- The Automatic Measurement of Surface / Interfacial Tension from Sessile drops and bubbles using a methods-based experiment design tool.
- Automatic time-controlled experiments
- Support for the Automated Tilting Base option
- Static and Dynamic Surface Tension measurements
- Relaxation
- Oscillation with Surface Elasticity Calculations with support for the Oscillator option
- Image Save and Recalculation Features
- Video Replay
- Event and Pulse-drive Experiments
- Batch Experiments
- Constant Volume or Area
- Report Generation
- Graphing and Plotting

## Hardware Specifications

Specification	Model 500	Model 590
Camera	German-Made U4 Series	German-Made U4 Series
Camera Speed	520 frames/sec	520 frames/sec
Camera Interface	SuperSpeed USB 3.0	SuperSpeed USB 3.0
Camera Resolution	720 x 540 pixels	720 x 540 pixels
Backlight	Fiber Optic Illuminator	Fiber Optic Illuminator
Manual Dispensing via Microsyringe Assembly	Yes	Yes
Software-controlled Automated Dispensing System	Optional	Included
Software-controlled Automated Tilting Base	Optional	Included
Stage	Advanced 3-Axis Stage	Standard 3-Axis Stage
Power Requirement	110-240 VAC	110-240 VAC
Power Frequency	50-60 Hz	50-60 Hz
Instrument Dimensions	616 x 267 x 508 mm	1028 x 267 x 603 mm
Instrument Weight	9.70 kg	23.70 kg
Windows 10 PC and Monitor	Included	Included

## Software Specifications

Specification	Model 500 Model 590
Software Included with system	DROPIImage Advanced
Static Contact Angle Measurement Range	0-180°
Contact Angle Accuracy	+/-0.1°
Contact Angle Resolution	+/-0.01°
Continuous Contact Angle Reporting	Yes
Number of Surface Energy Tools	8 (Note 1)
Surface Tension and Interfacial Tension	Yes
Surface Tension Measurement Range	0.01-2500 mN/m
Surface Tension Accuracy	+/-0.01 mN/m
Methods-Base Experiment Design Tool	Yes
New Experiment Design Wizard	Yes
Supports Automated Dispensing System	Yes (Included with 590)
Supports Automated Tilting Base	Yes (Included with 590)
Supports Oscillator for measuring rheological properties (surface dilatational elasticity/viscosity)	Yes
Integrated temperature logging	Yes
Automated Rotating Wafer Support	Yes
Support for High Speed Camera options	Yes
Advanced reports and graphing tools	Yes
Data exchange (textual and graphic) with other Windows programs	Yes
Number of video windows	2, Live and Static
Supported version of Microsoft Windows	7, 8, or 10 (64-bit recommended)

Note 1: Surface Energy Tools include: van Oss Acid-Base Method, Owens-Wendt Geometric-Mean Method, Wu Harmonic-Mean Method, Work of Adhesion, Zisman's Plot, Schultz Solid-Liquid-Liquid Tool, Rabel Multi-liquid Tool, Kwok One-liquid Surface Energy Tool

## Accessories

Accessory	Model 500	Model 590
Automated Dispensing System 100-22	Supported	Included
Automated Titrating Base 100-25-A	Supported	Included
Environmental Fixture 100-14	Supported	Supported
Environmental Chamber and Temperature Controller 100-07 / 100-50	Supported	Supported
Hot Plate 100-33-HP	Supported	Supported
Heated Environmental Cell 100-33	Supported	Supported
Peltier Environmental Chamber 100-30	Supported	Supported
Advanced Chamber with Temperature Control 100-26-T	Supported	Supported
Advanced Chamber with Temperature and Humidity Control 100-26-TH	Supported	Supported
Elevated Temperature Syringe 100-11	Supported	Supported
High Speed Upgrade Kit 100-12-U2	Supported	Supported
Oscillator 100-28	Supported	Supported
Overhead Optical Imaging Kit 100-31	Supported	Supported
Film Clamps 100-15	Supported	Supported
Rotating Wafer Support 100-21-XX	4, 6, 8, 10 and 12-inch	4, 6, 8, 10 and 12-inch
Rotating Vacuum Chuck Support 100-21-X-VC	6 and 8-inch	6 and 8-inch
U4 Series Performance Package 100-U4-PP	Supported	Supported

## What's in the Box

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- ❖ Note: Models 500 and 590 are complete turn-key systems
- ❖ Premium 16-inch Optical Bench
- ❖ U4 Series 520 fps SuperSpeed Digital Camera
- ❖ FireWire Cable for Camera (USB 3.0)
- ❖ Fiber Optic Illuminator
- ❖ Fiber Bundle
- ❖ Halogen Light Source
- ❖ Shade Assembly
- ❖ Leveling Specimen Stage
- ❖ Advanced 3-Axis Stage
- ❖ Microsyringe Fixture
- ❖ Microsyringe Assembly with 22g Needle
- ❖ DROImage Advanced Software
- ❖ Automated Dispensing System (590 only)
- ❖ Automated Tilting Base (590 only)
- ❖ PC and Monitor with drivers and software installed
- ❖ User Guide
- ❖ Precision Combo Calibration Device
- ❖ Thumb Drive with Backup Copy of Drivers and Software
- ❖ Storage Cover
- ❖ Certificate of Quality

ramé-hart 500 Series



*Model 500 Advanced Goniometer / Tensiometer*