

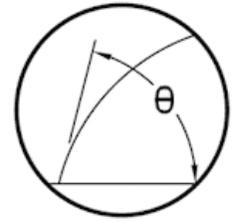
ramé-hart 200 Series

**ramé-hart instrument co.**

World Leader in Surface Science Instruments

Since 1961

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



---

ramé-hart 200 Series  
Goniometer / Tensiometer Instruments

---



*Model 260 Goniometer / Tensiometer*

## ramé-hart 200 Series Goniometer / Tensiometers

---

ramé-hart offers four different models in the 200 Series Goniometer / Tensiometers. All of these models include our standard 16" optical bench, U1 Series USB 3.0 SuperSpeed German-made camera and our powerful fiber optic illuminator for adjustable bright white backlight.

**Model 210** features DROPimage Pro software and is capable of measuring all types of contact angle, surface energy, surface tension, and interfacial tension.

**Model 250** is the same as Model 210 in terms of hardware but includes our DROPimage Advanced software which adds a methods-based experiment design tool that is optimized for dynamic and time-dependent studies.

**Model 260** is the same as Model 250 except for the 3-axis stage which is upgraded to the Advanced 3-axis stage. This allows for support of additional

accessories – most notably the Environmental Chamber 100-07.

**Model 290** is the same as Model 250 with the standard 3-axis specimen stage 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.

These time-proven configurations offer the highest level of performance for the money.

All models in the 200 Series include a PC and Monitor making them complete turn-key solutions – ready to plug-and-play.

## DROPimage Pro Software

---

Model 210 ships with our powerful DROPimage Pro software package and is capable of contact angle, surface energy, surface tension, and interfacial tension.

There are (8) surface energy tools. The van Oss Acid-Base Tool uses three liquids – two polar and one apolar. The Owens-Wendt Geometric-Mean Method uses two pure liquids denoting their dispersive and non-dispersive components and is accessed through the Two-Liquid Surface Energy Tool. The Wu Harmonic-Mean Method is ideal for polymer surfaces and also requires two liquids also. The Work of Adhesion Tool quantifies an index of wettability for a solid/liquid combination. Zisman's Plot Tool summarizes wetting behavior and permits interpolative predictions using a homologous series of liquids. This tool is named after William Zisman, the inventor of the original ramé-hart NRL Contact Angle Goniometer (circa 1960). The Schultz Solid-Liquid-Liquid Tool evaluates surface energy on a solid submerged in a variety of different liquids. This method is ideal for high-energy solids which are difficult to measure using other methods. The Rabel Multi-liquid Tool uses two or more liquids. The Kwok One-liquid Surface Energy Tool evaluates surface energy using a single liquid.

The Surface Tension Tool permits the measurement of both surface tension as well as interfacial tension on pendant and sessile drops. A database of liquids is included and can be added to using the phase editor. Critical drop dimensions and volume are also reported. All results are logged and can be exported to other programs.

DROPimage Pro coupled with Model 210 provides a powerful tool for capturing a wide variety of contact angle, surface energy, surface tension, and interfacial tension measurements. DROPimage Advanced with Models 250, 260, and 290 provides an even more powerful methods-based experiment design tool and dynamic time-dependent studies

## DROPimage Advanced Software

---

Models 250, 260, and 290 all include 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 210	Model 250	Model 260	Model 290
Camera	German-Made U1 Series	German-Made U1 Series	German-Made U1 Series	German-Made U1 Series
Camera Interface	SuperSpeed USB 3.0	SuperSpeed USB 3.0	SuperSpeed USB 3.0	SuperSpeed USB 3.0
Backlight	Fiber Optic Illuminator	Fiber Optic Illuminator	Fiber Optic Illuminator	Fiber Optic Illuminator
Manual Dispensing via Microsyringe Assembly	Yes	Yes	Yes	Yes
Software-controlled Automated Dispensing System	Optional	Optional	Optional	Included
Software-controlled Automated Tilting Base	Optional Note 1	Optional	Optional	Included
Stage	Standard 3-Axis Stage	Standard 3-Axis Stage	Advanced 3-Axis Stage	Standard 3-Axis Stage
Power Requirement	110-240 VAC	110-240 VAC	110-240 VAC	110-240 VAC
Power Frequency	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Instrument Dimensions	489 x 267 x 508mm	489 x 267 x 508mm	489 x 267 x 508mm	927 x 267 x 603mm
Instrument Weight	6.10 kg	6.10 kg	7.40 kg	20.40 kg
Windows 10 PC and Monitor	Included	Included	Included	Included

Note 1: The Automated Tilting Base requires an upgrade to DROPimage Advanced.

## Software Specifications

Specification	Model 210	Model 250 Model 260 Model 290
Software Included with system	DROPimage Pro	DROPimage Advanced
Static Contact Angle Measurement Range	0-180°	0-180°
Contact Angle Accuracy	+/-0.1°	+/-0.1°
Contact Angle Resolution	+/-0.1°	+/-0.01°
Continuous Contact Angle Reporting	Yes	Yes
Number of Surface Energy Tools	8 (Note 1)	8 (Note 1)
Surface Tension and Interfacial Tension	Yes	Yes
Surface Tension Measurement Range	0.01-2500 mN/m	0.01-2500 mN/m
Surface Tension Accuracy	+/-0.01 mN/m	+/-0.01 mN/m
Methods-Base Experiment Design Tool	Optional (Note 2)	Yes
New Experiment Design Wizard	Optional (Note 2)	Yes
Supports Automated Dispensing System	Yes	Yes (Included with 290)
Supports Automated Tilting Base	Optional (Note 2)	Yes (Included with 290)
Supports Oscillator for measuring rheological properties (surface dilatational elasticity/viscosity)	Optional (Note 2)	Yes
Integrated temperature logging	Optional (Note 2)	Yes
Automated Rotating Wafer Support	Optional (Note 2)	Yes
Support for High Speed Camera options	Optional (Note 2)	Yes
Advanced reports and graphing tools	Optional (Note 2)	Yes
Data exchange (textual and graphic) with other Windows programs	Yes	Yes
Number of video windows	1, Live or Static	2, Live and Static
Supported version of Microsoft Windows	7, 8, or 10 (64-bit recommended)	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

Note 2: DROPimage Pro can be upgraded to DROPimage Advanced

## Accessories

Accessory	Model 210	Model 250	Model 260	Model 290
Automated Dispensing System 100-22	Supported	Supported	Supported	Included
Tilting Base 100-25-M/A	Manual	Manual or Automated	Manual or Automated	Automated Included
Environmental Fixture 100-14	Supported	Supported	Supported	Supported
Hot Plate 100-33-HP	Supported	Supported	Supported	Supported
Heated Environmental Cell 100-33	Supported	Supported	Supported	Supported
Overhead Optical Imaging Kit 100-31	Note 1	Supported	Supported	Supported
Peltier Environmental Chamber 100-30	Supported	Supported	Supported	Supported
Oscillator 100-28	Note 1	Supported	Supported	Supported
U2 Series 750 fps Upgrade Kit 100-12-U2	Note 1	Supported	Supported	Supported
Environmental Chamber 100-07	Note 2	Note 2	Supported	Note 2
Elevated Temperature Syringe 100-11	Supported	Supported	Supported	Supported
Film Clamps 100-15	Supported	Supported	Supported	Supported
Rotating Wafer Support 100-21-4	Supported	Supported	Supported	Supported

Note 1: requires upgrade to DROPimage Advanced

Note 2: requires upgrade to Advanced Stage (p/n 100-02-UPG)