

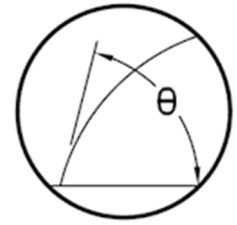
ramé-hart 200 Series

ramé-hart instrument co.

World Leader in Surface Science Instruments

Since 1961

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, U4 Series 520 frames/second 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 U4 Series | German-Made U4 Series | German-Made U4 Series | German-Made U4 Series |
| Camera Speed | 520 frames/sec | 520 frames/sec | 520 frames/sec | 520 frames/sec |
| Camera Interface | SuperSpeed USB 3.0 | SuperSpeed USB 3.0 | SuperSpeed USB 3.0 | SuperSpeed USB 3.0 |
| Camera Resolution | 720 x 540 pixels | 720 x 540 pixels | 720 x 540 pixels | 720 x 540 pixels |
| 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 |
| Titrating 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 |
| U4 Series Performance Package 100-U4-PP | Note 1 | Supported | Supported | Supported |

Note 1: requires upgrade to DROPimage Advanced

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

What's in the Box

- ❖ Note: Models 210, 250, 260, and 290 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
- ❖ 3-Axis Stage
 - Standard Stage with 250 and 290 (supports up to 2 lbs / 0.9 kg)
 - Advanced Stage with 260 (supports up to 20 lbs / 9 kg)
- ❖ Microsyringe Fixture
- ❖ Microsyringe Assembly with 22g Needle
- ❖ DROPimage Software
 - DROPimage Pro with 210
 - DROPimage Advanced with 250, 260, and 290
- ❖ Automated Dispensing System (290 only)
- ❖ Automated Tilting Base (290 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