ramé-hart instrument co.

World Leader in Surface Science Instruments
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ramé-hart Model 90

Model 90 shown with optional Fiber Optic Illuminator Upgrade

ramé-hart Model 90

ramé-hart Model 90 is available in two variations: The **Model 90 Contact Angle Goniometer CA Edition** with DROPimage CA software and **Model 90 Goniometer / Tensiometer Pro Edition** with DROPimage Pro.

The CA Edition represents the most affordable contact angle goniometer in the ramé-hart lineup. It's also the most affordable contact angle tool available anywhere. Do not let the attractive price dissuade you. This is a competent tool capable of measuring static and dynamic contact angle as well as advancing and receding contact angles. Characterize surfaces easily and precisely using this powerful yet easy-to-use tool.

Both the CA and the Pro Edition are complete turn-key systems. Each include the PC and monitor.

Model 90 Pro Edition includes our DROPimage Pro software – which, in addition to contact angle, will measure surface energy (using eight different methods), surface tension, and interfacial tension with both pendant drops as well as sessile drops.

The Model 90 leveling specimen stage supports a wide variety of samples and supports leveling up to 15% in any direction.

The German-made U3 Series SuperSpeed USB 3.0 camera features a maximum resolution of 1920 x 1080 pixels.

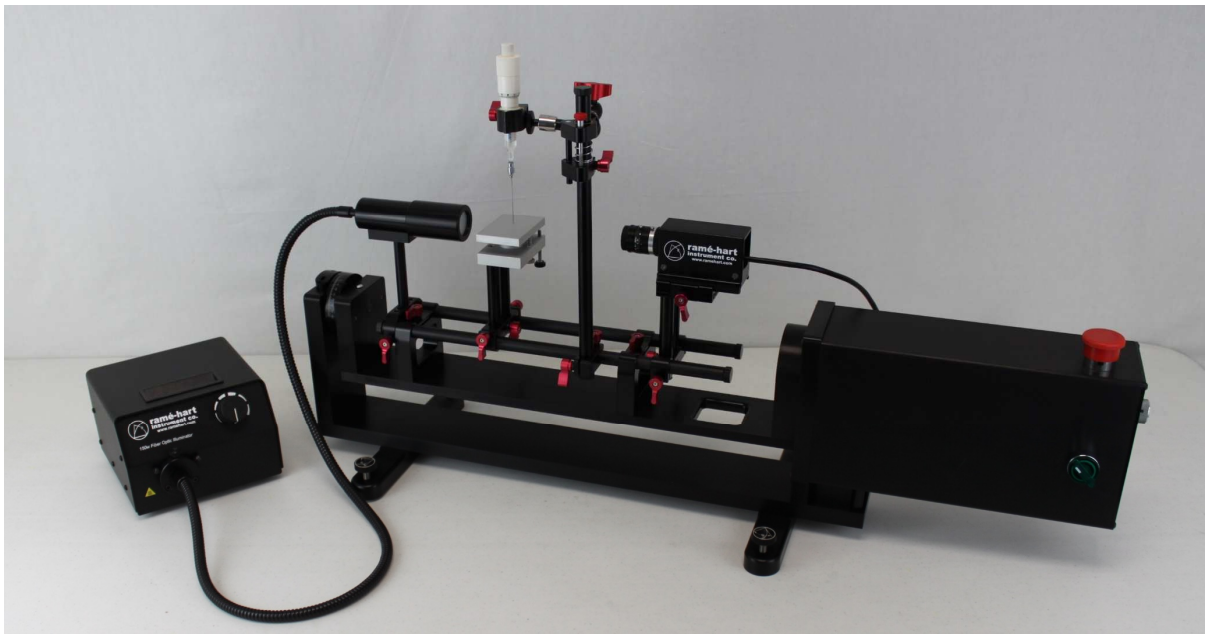
The highly modular and adjustable features make setup and operation a snap. Add a tilting base or dispensing system. Myriad upgrades and accessories are available to customize your instrument from the start or to upgrade later if your needs change.

Never before has it been easier to capture wetting properties via contact angle – not to mention, measure surface energy and surface tension as well. This versatile tool is an invaluable asset for any research and development or quality control application.

Add one to your lab today.

DROPimage CA Software

Model 90 CA Edition includes the proven DROPimage CA software package. This amazingly easy-to-use software includes tools for calibration and measuring contact angle. Measurements are made in real-time and can be viewed visually and in tabular display. Drop dimensions are reported and data can easily be exchanged with other applications. Options include the right line feature which is particularly useful for measuring advancing and receding contact angles. The red line option allows the needle or tip to be filtered out of the image prior to analysis. Contact angle measurements can be made on live or saved images. Never before has it been easier to capture contact angle with DROPimage CA and the Model 90 CA Edition.



Model 90 shown with optional Fiber Optic Illuminator Upgrade and optional Automated Tilting Base

DROPimage Pro Software

Model 90 Pro Edition ships with our powerful DROPimage Pro software package. The Pro addition can do everything that DROPimage CA can do. However, additional tools are available to measure surface energy and surface 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. The Wu Harmonic-Mean Method is ideal for polymer surfaces and also requires two liquids. 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 90 Pro Edition provides a powerful tool for capturing a wide variety of contact angle, surface energy, surface tension, and interfacial tension measurements. For more powerful methods-based experiment design and dynamic time-dependent studies, DROPimage Pro can be upgraded to DROPimage Advanced.

Add a Manual or Automated Tilting Base in order easily measure advancing and receding contact angles. Add the Automated Dispensing System for precise automated drop dispensing.

Hardware Specifications

Specification	Model 90 CA Edition	Model 90 Pro Edition
Camera	German-Made U3 Series	German-Made U3 Series
Camera Interface	SuperSpeed USB 3.0	SuperSpeed USB 3.0
Maximum Camera Resolution (Note 3)	1920 x 1080 pixels	1920 x 1080 pixels
Backlight	LED – Adjustable	LED – Adjustable
Fiber Optic Illuminator Upgrade Available	Yes	Yes
Manual Dispensing via Manual Syringe	Yes	Yes
Software-controlled Automated Dispensing System	Optional	Optional
Power Requirement	110-240VAC	110-240VAC
Power Frequency	50-60Hz	50-60Hz
Instrument Dimensions	40 x 20 x 40 cm (16 x 8 x 16 inch)	40 x 20 x 40 cm (16 x 8 x 16 inch)
Instrument Weight	2.61 kg (5 lb 12 oz)	2.61 kg (5 lb 12 oz)
Windows 11 PC and Monitor	Included	Included

Software Specifications

Specification	Model 90 CA Edition	Model 90 Pro Edition
Software Included with system	DROPimage CA	DROPimage Pro
Static Contact Angle Measurement Range	0-180°	0-180°
Contact Angle Precision	+/-0.1°	+/-0.1°
Continuous Contact Angle Reporting	Yes	Yes
Number of Surface Energy Methods	Note 1	8 (Note 2)
Surface Tension Tool	Note 1	Yes
Surface Tension Measurement Range	Note 1	0.01-2500 mN/m
Surface Tension Accuracy	Note 1	+/-0.01 mN/m

Note 1: Surface Energy and Surface Tension Tools are not included in DROPimage CA. But an upgrade to DROPimage Pro is available which would add these features.
Note 2: 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 3: Recommend camera resolution is 1024 x 768.

Accessories and Upgrades

Accessory	Model 90 CA Edition	Model 90 Pro Edition
Automated Dispensing System, p/n 100-22	Supported	Supported
Manual Tilting Base, p/n 100-25-M	Supported	Supported
Automated Tilting Base, p/n 100-25-A	Supported Note 4	Supported Note 4
Environmental Fixture, p/n 100-14	Supported	Supported
Hot Plate and Temperature Controller, p/n 100-33-HP	Supported	Supported
Heated Environmental Cell, p/n 100-33	Supported	Supported
Peltier Environmental Chamber, p/n 100-30	Supported	Supported
Film Clamps, p/n 100-15	Supported	Supported
Solid Stainless Steel Rails Upgrade, p/n 90-SSRAILS	Supported	Supported
Fiber Optic Illuminator Upgrade, p/n 90-FOI	Supported	Supported
PC and Monitor, p/n 90-PCMON	Included	Included
Microsyringe Extension Post, p/n 90-40CM	Supported Note 5	Supported Note 5
Upgrade to DROPimage Advanced	Supported p/n 900-26	Supported p/n 900-24

Note 4: The Automated Tilting Base requires upgrade to DROPimage Advanced.
Note 5: The Extension Post is required when using the Environmental Fixture, Hot Plate, Heated Environmental Cell, or Peltier Environmental Chamber with Model 90.

What's in the Box

- Note: Both Model 90 CA Edition and Model 90 Pro Edition are complete turn-key systems. The PC and monitor are included. No additional parts are necessary to get up and running.
- 16-inch Model 90 Optical Bench
- U3 Series SuperSpeed German-made Digital Camera
- USB 3.0 Cable for Camera
- Leveling Specimen Stage
- LED Backlight
- USB Cable for LED Illuminator
- Microsyringe Fixture with Fine Vertical Adjustment
- Manual Syringe with 22g Needle
- DROPimage Software
  - DROPimage CA with CA Edition
  - DROPimage Pro with Pro Edition
- Preconfigured PC and Monitor
- User Guide
- Precision Combo Calibration Device
- Thumb Drive with Backup Copy of Drivers and Software
- Level
- Certificate of Quality

ramé-hart Model 90 Goniometer / Tensiometer

Model 90 Pro Edition Contact Angle Goniometer / Tensiometer