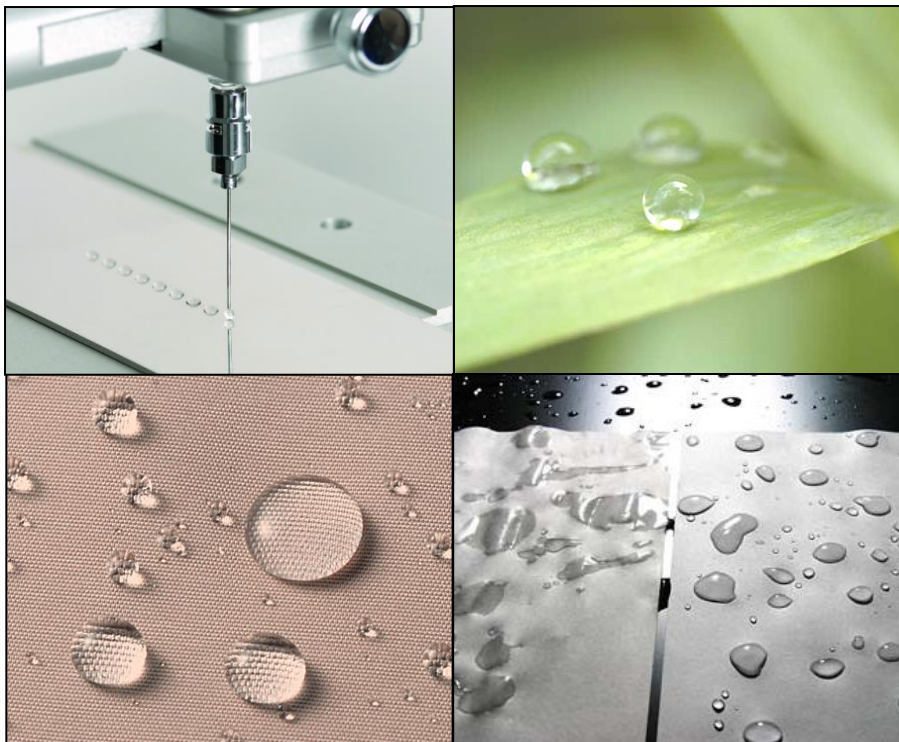


# Lineup of Contact Angle Meters

*Digest Information*



*Static / Dynamic Contact Angle*

*Surface / Interfacial Tension*

*Surface Free Energy*

*Adhesive Energy*

Since Contact Angle is very intuitive and easily understandable as an indicator of “Wettability” between liquid and solid, it has been adopted as a valuation technique in the wide variety of industrial fields. KYOWA is a leading manufacturer of contact angle meters and has lines of models from multi-objective to specific objective in order to meet various application demands from R&D and Q.C.

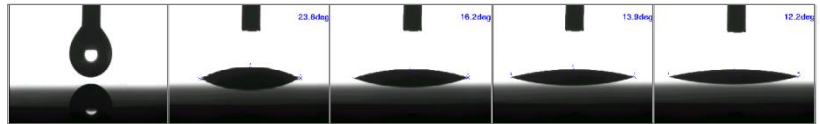
## Partial functions that KYOWA’s contact angle meters perform:

### Sessile drop method – fast image capture

It enables sequential measurements and automatic recognition of droplet deposition. Frame rates is 1,000, 60, or 30 fps depended on model.

#### Application

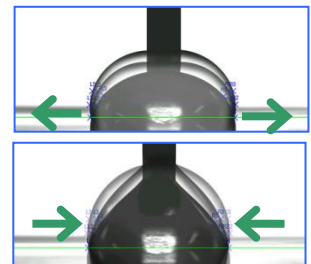
initial spreading, absorbing property, effect of surface active agent



### Extension/contraction method

Advancing/receding angles are measured in response to increasing/decreasing the volume of captive droplet. Automatic dispenser is required for smooth dynamic motion by volume change.

Application coating property, repellency, characterization of hysteresis



### Surface free energy analysis of solids

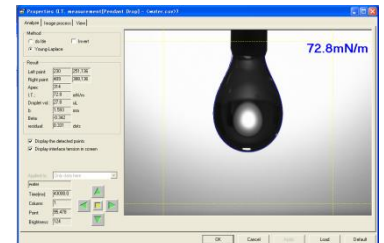
Solid surface free energies and their components are analyzed from the results of contact angle with probe liquids. Geometric mean, Harmonic mean, acid-base, Interaction analysis (Work of adhesion, Interfacial free energy), Young-Dupré, Zisman are available. Optional FE kit, a set of probe liquids and needles, is recommendable.

Application adhesive property, characterizing surface modification, digitalizing hydrophilicity/hydrophobicity

### Surface/interfacial tension of liquids

Pendant drop method is adopted and its advantages compared with conventional Wilhelmy plate and du Noüy ring methods are:

- measurement with small liquid amount (less than 1mL)
  - high temperature control (e.g. molten polymer applications)
  - good for solutions that change surface quickly by exposure in the air
- Optional PD kit, an accessory set for measurement, is required.



### Sliding method

Advancing/Receding Angles are measured while tilting the stage. An angle of a droplet starting sliding (rolling off) is determined as Sliding angle and Adhesive energy between the droplet and the solid surface is analyzed at the same time. Sliding method kit (option) is required.

Application repellency/hydrophobicity, characterization of hysteresis

### Dynamic sliding method

It characterizes speed and acceleration of droplet sliding

Application repellency/hydrophobicity, characterization of hysteresis



 Automatic recognition of droplet deposition

 Live image & Focusing aid

 Droplet volume monitoring

 Threshold level adjustment

 Data chart & variable data

 Movie converter

 Standard droplet sample – Every model includes it for periodical calibration and inspection.

# DropMaster series – multi-objective models


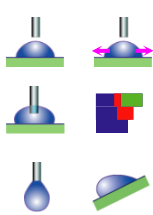

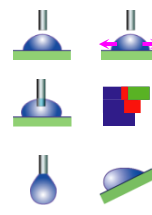
Automatic Contact Angle Meter	
 <p><b>DMo-902</b></p>  <p>Fully automated operation with X-Y mapping function capable</p>	 <p><b>DMo-702</b> <b>DMo-602</b></p>  <p>Fully automated operation by computer control Applicable to wide variety of functions</p>
 <p><b>DMo-502</b></p>  <p>Applicable to variety of functions as much as the DM-702 but saving costs with manual stage</p>	 <p><b>DMs-401</b></p>  <p>Optimal cost performance model with simple basement but applicable to variety of functions</p>
 <p><b>DMe-211Plus</b></p>  <p>Economical model focusing on conventional static contact angle and educational purpose.</p>	<p>Potential functions of each model originally or with options:</p> <ul style="list-style-type: none"> <li> Sessile drop method - static mode</li> <li> Sessile drop method - dynamic mode over time</li> <li> Extension/contraction method</li> <li> Surface free energy analysis</li> <li> Pendant drop method - interfacial tension measure</li> <li> Sliding method</li> <li> Dynamic sliding method</li> </ul>

## Comparison of functions

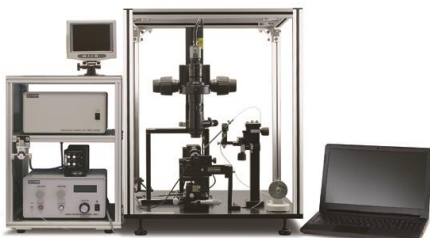
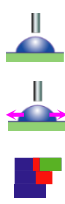

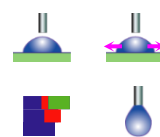
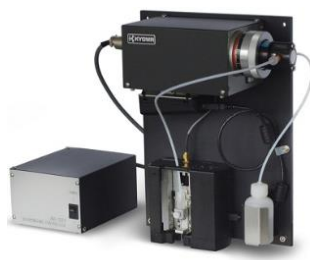


ST: standard OP: option NA: not available ←: same as the left

	DMo-902	DMo-702	DMo-602	DMo-502	DMs-401	DMe-211Plus
Sample stage size	150x150mm	←	←	←	150x100mm	160x100mm
Type of lens	3 step zoom	←	←	←	←	fixed focal
Max. image capture rate	1,000 fps	←	←	←	60 fps OP (1,000 fps)	30 fps
Stage travel	computer control (X, Y)	computer control (X)	manual knob control	←	←	fixed
Droplet deposition	Computer control	←	←	Manual but Auto recognition	←	←
Automatic dispenser	ST	ST	ST	ST	OP	NA
Sliding method	OP	OP	OP	OP	OP	NA
Temp control - stage	NA	OP	OP	OP	OP	NA
Temp control - dispenser	NA	OP	OP	OP	OP	NA
Main body size, weight (W * D * H)mm	297*544*249 about 10kg	297*544*249 about 9kg	←	297*544*249 about 8kg	294*461*288 About 6kg	170*346*283 about 2 kg

## DropMaster series – wafer & disk samples of diameter up to 12 inches

Wafer Cleanliness and Treatment Analyzer	
 <p><b>DMo-902WA</b> <b>DMo-702WA</b></p> 	 <p><b>DMo-502WA</b></p> 
<p>Fully automated operation by computer control *DMo-902WA: X-Y mapping function capable</p>	<p>Stage manual operation model</p>

## Contact Angle Meters – specific objectives

Microscopic Contact Angle Meter	Portable Contact Angle Meter
 <p><b>MCA-4</b></p> 	 <p><b>PCA-11</b></p> 
<p>Using <math>\phi 5\mu\text{m}</math> capillary, super small droplet of tens of <math>\mu\text{m}</math> diameter (tens of Pico liters in volume) can be discharged for micro area measurements.</p>	<p>Hand-held portable type with fully automated measurement can be done by placing the body on sample to be free from sample size restriction.</p>
Flat Panel Contact Angle Meter	DyneMaster Tensiometer
 <p><b>FPD-CP11</b></p> 	 <p><b>DY-500/700</b></p>
<p>It is designed to be equipped on a process Q.C. equipment for large flat panels.</p>	<p>Wilhelmy dynamic contact angle &amp; powder contact angle are measured with the balance system.</p>

Available separate catalogs for each model in detail.

Please contact our sales partner or us directly at +81-48-483-2629 or at [overseas-sales@face-kyowa.co.jp](mailto:overseas-sales@face-kyowa.co.jp).

\* The specifications and designs are subject to change without notice.

2006



<http://www.face-kyowa.com>

Kyowa Interface Science Co., Ltd.

5-4-41 Nobitome, Niiza-City, Saitama 352-0011, Japan

Tel.+81-48-483-2629 Fax.+81-48-483-2702