

Operation Manual  
for  
Automatic Surface Tensionmeter

# DyneMaster

DY-300

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1.




# Safety Precautions

This instruction manual uses the following marks and symbols to arouse your precautions for safety and correct use of this instrument to prevent bodily injury or property damage. Please refer to the intensions of these marks and symbols before reading this manual.









## Mark

	Incorrect handling disregardful of this precaution mark, may lead to bodily injury or property damage.
---	--

## Verbal signs

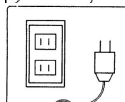
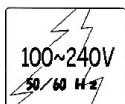
These verbal signs indicate the different levels of likely danger that may lead to bodily injury or property damage. They are usually accompanied by corresponding marks.	
	Possibility of imminent danger that can result in death or serious injury.
	Possibility of danger that can result in death or serious injury.
	Possibility of incurring minor moderate bodily injury or property damage.

## Symbols

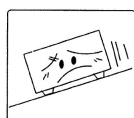
These symbols indicate specific safety precautions to prevent bodily injury or property damage.	
	Possibility of incurring bodily injury such as wounds.
	Possibility of fuming, inflammation or ignition.
	Possibility of electric shocks.
	Possibility of heat hazards such as burns.
	Unplug the power cord for safety purposes.
	Connect earth cable for safety purposes.
	General precautions against the possibility of bodily injury, property damage or malfunctions of the instrument.
	Techniques and measures on the measurement operation for stepping up accuracy and efficiency.



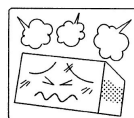
CAUTION



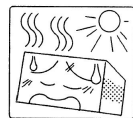
- Be sure to use the input voltage as specified. The AC adapter provided as standard accessory is applicable to AC 100 to 240V.
- When the instrument is kept unused for the long time, turn off the power switches and unplug from the power source.
- At the event to turn the power on again after turning off, keep at least 10 seconds before turning on.
- Be sure to handle liquid samples after recognizing well their property. Do not use liquid sample of strong acid or alkaline, which make the instrument corrode.
- Do not cover the ventilators. Covering them may cause heating and damaging of instrument.
- When abnormality in sound or smell, or smoke is found, turn off the power and unplug at once, and contact us or our representative.
- When abnormal results are obtained, save the data as far as possible and contact us or our representative.
- Avoid the following environmental conditions for installation of the instrument in order to prevent malfunctions or damage. And any places near the source of corrosive gas or inconvenient for operation are also unsuitable.



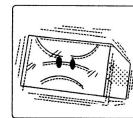
slope



excessive  
dust



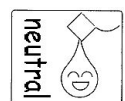
extreme  
temperatu  
re change



unstable  
or  
heavy  
vibration



high  
humidity



- Clean the instrument and its peripheral instrument by a wiper wetted with water or neutral detergent after squeezed enough. Do not use solvents like thinner for cleaning because they must let the material and coating of instruments damaged.

# Introduction

Thank you for purchasing  **KYOWA** automatic surface tensionmeter DY-300.

This manual describes the hardware, software and operation of DY-300.

Before using DY-300, please read through this manual carefully to understand its functionalities.  
Please keep this manual with DY-300.

## 3. DY-300

DY-300 is even easier to use having the features of Kyowa automatic surface tensionmeter CBVP-Z that has been continuously enjoyed. DY-300 integrates the latest hardware and software technologies and Kyowa's extensive know-how accumulated through experiences as a specialist of measuring instruments for surface and interfacial properties.

### 3. 1. Features



- A wide range of measurements is available with one unit.
- The Wilhelmy method (plate method) is adopted for standard measurements of surface and interfacial tensions.
- Operation is available in full automatic, automatic, and manual modes.
- Measured values and charts are displayed in real time.
- Measurements are easily performed through DYNALYZER.
- Correction calculations are automatically performed.
- A new operator can easily proceed with an operation following a movie operation guide.

4.

# Components and functionalities

## 4. 1. Components and functionalities

### 4. 1. 1. Front



**Level:**  
Checks the level of DY-300.

**Cover:**  
Blocks airflow from the air conditioning.

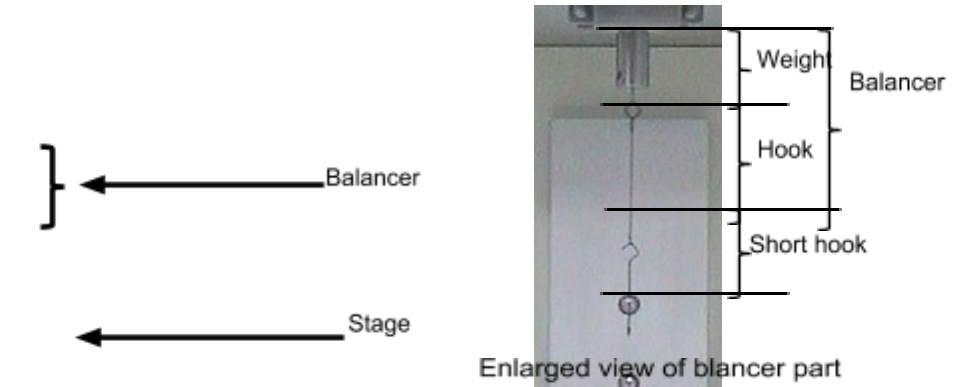
**Horizontal adjustment leg:**  
Two legs are provided at the bottom of DY-300 for horizontal adjustment. Adjust the horizontal position checking the level at the top. Refer to the examples below.



### 4. 1. 2.



## Inside the cover



### Stage:

Place a petri dish or a vessel containing a liquid sample.

Ascending and descending movements of the stage are controlled from DYNALYZER.

### Balancer:

Combination of a weight and a hook. It is connected to the balance built in DY-300 and a short hook and a probe are hooked to it. Do not apply an excessive load such as by pulling it with bare hands.

### Short hook:

A hook to connect the balancer with a probe. It is packaged separately.

Measurement method		With/without a short hook	With/without a short hook for jacket type stage system
Wilhelmy method	Surface tension measurement	○	×
	Interfacial tension measurement	○	×
du Noüy method	Surface tension measurement	○	×
	Interfacial tension measurement	○	×
Lamella length measurement		○	×
Liquid density measurement		×	-
Sedimentation measurement		×	-

### Probe:

It is an important part to obtain surface and interfacial tensions. Two platinum plates are provided in DY-300 as a standard. Platinum plates are used in the Wilhelmy method (plate method).

Probes used in measurements are as follows.

\*Option

Measurement method	Wilhelmy method	du Noüy method	Lamella length measurement	Liquid density measurement	Sedimentation measurement
Probe	Platinum plate Glass plate* Teflon plate*	Platinum ring*	Platinum ring*	Pycnometer*	Sedimentation probe*

4. 1. 3.

## Side

Customer ID label

Serial No.

Customer ID

Power switch

Power switch:

Power on/off on the main body of DY-300.

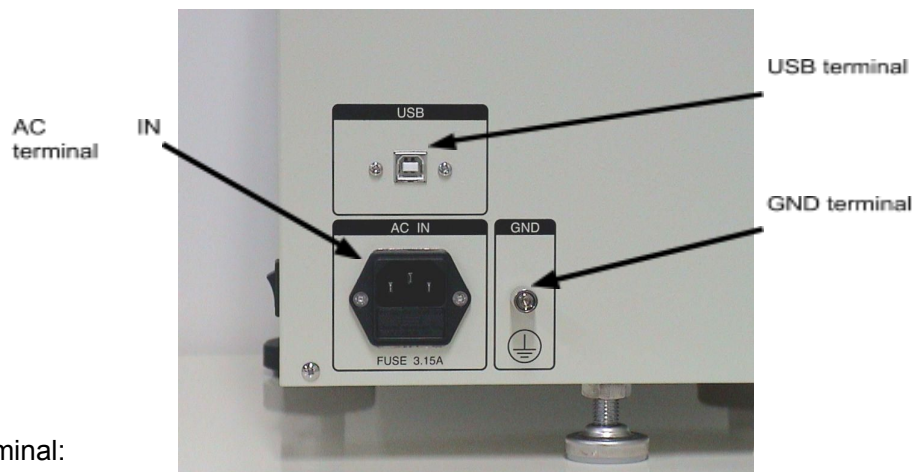
If DY-300 is powered on when the stage is not positioned at the bottom (origin), the stage descends to the origin (zero return).

Customer ID label:

Customer ID label shows a number for managing the product and customer information.

Serial No. is a DY-300 production number. Customer ID is a number for managing the customer information. Please provide the customer ID when you make inquiries.

### 4. 1. 4. Back (connection)



USB terminal:

Connects to a PC through a USB cable.

AC IN terminal:

Connects to an outlet through a power cord.

GND terminal:

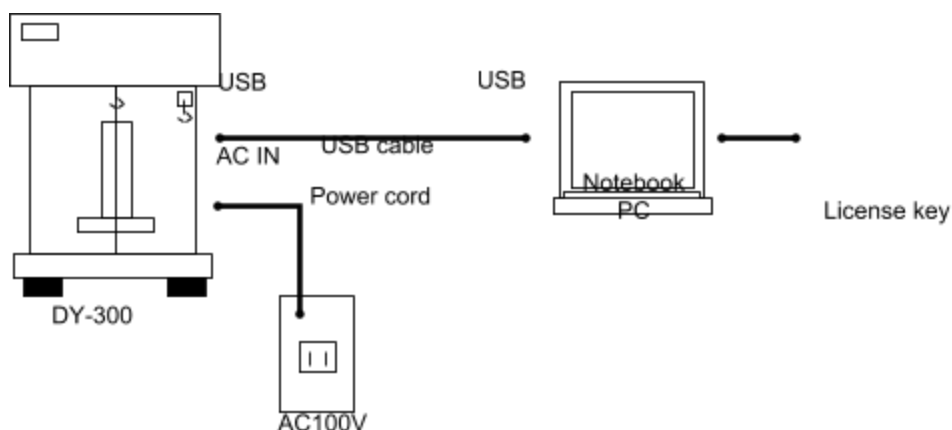
Earth terminal. Usually, the instrument is grounded via the earth terminal of the plug, so that connection is not necessary.

5.

# Connections and adjustment

## 5. 1. Connecting and starting DY-300

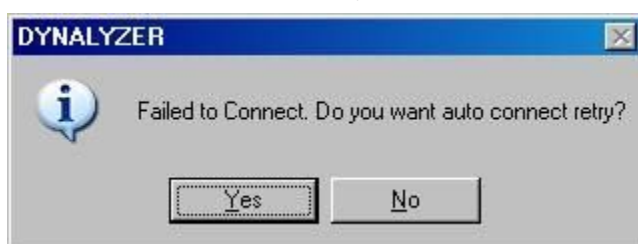
- (1) Connect DY-300 and a PC using a USB cable as shown below.



- (2) Set the license key to the USB port of your PC.
- (3) Power on DY-300.
- (4) Start DYNALYZER after 30 seconds. Communication is automatically established.
- (5) Before a calibration and measurement, let DY-300 stand for 30 minutes or more after it is turned on (warm-up operation).

When the connection failed;

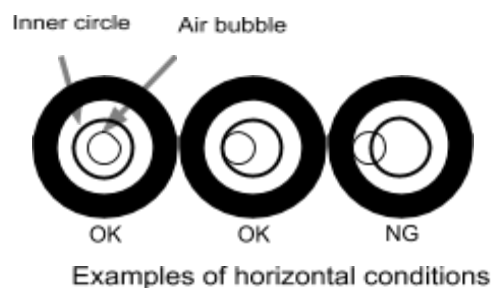
If a message "Failed to Connect. Do you want auto connect retry?" appears, check if the power is on and cables are connected correctly, and then click the [Yes] button. Wait for several tens of seconds and confirm the display "Connect" in the lower right of the window.



## 5. 2.

## Leveling the body

(1) Check the level.



(2) Adjust the horizontal position by turning the horizontal adjustment legs while checking the level.

After opening the package, level DY-300.

Check the level at the top of DY-300. If no air bubble is found in the inner circle, adjust the horizontal position by turning the horizontal adjustment legs.

### 5. 3. Mounting the balancer

Balancer



The balancer is separately packaged. Remove the package and mount it to the connection located in the upper side, inside the cover. Do not apply an excessive load when mounting.



When connecting a PC and USB cable

Connect DY-300 and a PC directly with a USB cable. Do not connect them via a USB hub.

When disconnecting a USB cable

Before disconnecting the USB cable, exit DYNALYZER and turn off DY-300.

When connecting a USB cable again

After connecting the USB cable and PC, allow the OS to recognize it first and then establish the communication.

Customer name and license information of available add-in software are stored in the software license key. Please note that if it is lost or damaged, DYNALYZER cannot perform measurements and analyses.

6.

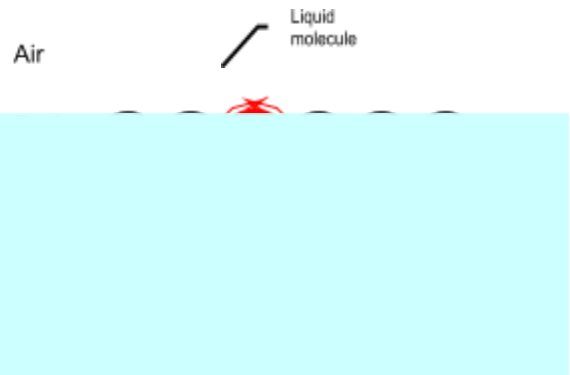
# Measurement principles

## 6. 1. Surface tension

Molecules in liquids move in a random pattern relatively. They have a tendency to keep the surface area as small as possible and when an external force such as gravity can be ignored, they become sphere-shaped.

Look at a liquid in contact with air at the molecular level.

By focusing on a single molecule in the bulk, “intermolecular forces” can be recognized between the molecule and other molecules. Accordingly, molecular attraction is compensated. This keeps the molecules in the bulk in a stable condition. On the other hand, when focusing on a molecule on the surface (in a strict sense, “interface” between the liquid and air), there are intermolecular forces in the bulk as well as against air molecules. Because of the extremely high density of the bulk molecules, the molecule on the surface is constantly attracted to the inside (bulk side). In consequence, it appears as if there is a tensile force that contracts the surface. This is called “surface tension” (strictly, interfacial tension).



## 6. 2. Wilhelmy method (plate method or vertical plate method)

When a thin probe such as a platinum plate contacts the surface of a liquid sample vertically, the liquid sample climbs along the probe (meniscus). By the surface tension in the meniscus around the probe, the probe is attracted into the liquid sample. Then, the balance, a weight sensor, senses the force acting on the probe (measuring force), and the surface tension is determined by the following formula.

$$\gamma = \frac{F \cos \theta}{L}$$

$\gamma$ : Surface tension (mN/m)  
 $F$ : Measuring force (force acting on the probe mN)  
 $L$ : Boundary length of the probe (m)  
 $\theta$ : Contact angle between the probe and liquid sample

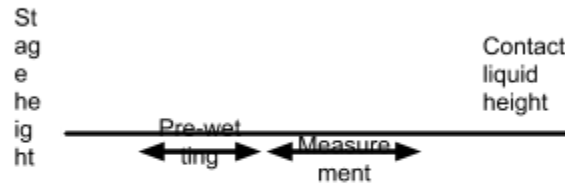
Most liquids wet the platinum plate sufficiently, so it is assumable that the contact angle  $\theta$  is  $0^\circ$ , i.e.,  $\cos \theta$  is 1. This is expressed by the following formula.

$$\gamma = \frac{F}{L}$$

For the case that wetting is not enough, wet the plate surface by a liquid sample just before a surface tension measurement. This process is called “pre-wetting”. Pre-wetting process facilitates the contact between a probe and liquid sample for easier wetting as well as brings the liquid-probe contact angle close to  $0^\circ$  as much as possible.

If wetting is not enough even after a pre-wetting, i.e., when the contact angle is other than  $0^\circ$ , the measurement result shows a smaller value as it is equivalent to  $\cos \theta$ .

When a measurement is performed after a pre-wetting, the stage moves as shown below.



### 6. 3. du Noüy method (ring) Elapsed time

The du Noüy method is a representative method for surface tension measurements applying a detaching method. It is adopted by JIS K2241.

In the du Noüy method, a ring probe is used to attach and detach a liquid sample. Firstly, a ring hanged parallel to the liquid surface is sunk to the liquid. Then, the ring is gradually drawn apart from the surface in the vertical direction. In this process, the surface tension of the liquid membrane that is hanged by the ring generates a force on the ring. This force changes as the ring is drawn farther. Using the maximum value of this force, a surface tension is determined by the following formula.



$\gamma$ : Surface tension (mN/m)  
 $F$ : Measuring force (force acting on the probe mN)  
 $R$ : Center diameter of the ring  
 $C$ : Correction factor

$C$  in the formula is a correction factor and a constant corresponds to the ring size and liquid sample density. It is determined by the following formula. This is a factor to correct the effects by the tension direction and liquid membrane shape. In DY-300, they are automatically corrected by the Zuidema-Waters formula.

$$(C - a)^2 = \frac{4b}{\pi^2} \times \frac{1}{R^2} \times \frac{F}{4\pi\rho} + c$$

Correction factors

$a$ : 0.7250 (constant)  
 $b$ : 0.09075m-1s<sup>2</sup> (constant)  
 $c$ : 0.04534-1.659r/R  
 (constant)  
 $r$ : Radius of the ring wire rod  
 $R$ : Radius of the ring (center diameter)  
 $\rho$ : Density of the liquid sample



Measuring force (force acting on the ring)

Maximum value F →

#### 6. 4. Lamella length

Drawing distance of the liquid membrane

Lamella means thin plate, thin layer, and thin membrane in general. It is used as liquid membrane in this manual.

Lamella length is an index to show how long a liquid membrane of a viscous liquid extends. A liquid membrane and coated film having a longer lamella are more durable.

Using a ring probe, a lamella length measurement is conducted by the same steps as in the surface tension measurement by the du Noüy method. A membrane length is calculated by the variation of the liquid surface height in the duration from when the force acting on the ring reaches to the maximum until the liquid membrane is separated off.

Measuring force (force acting on the ring)

Lamella length



#### 6. 5.

Drawing distance of the liquid membrane

## Liquid density measurement

In a liquid density measurement, DY-300 weighs a sample and pure water in equal volume with a pycnometer and calculates the sample's specific gravity from the ratio between the weights.

As a feature, DY-300 is available for measurements of liquid samples other than high viscosity samples and calculates a specific gravity and density with relatively high accuracy.

$$St / t_0 =$$

$$\left\{ \frac{W_3 - W_1}{W_2 - W_1} (St - \rho) + \rho \right\} \frac{1}{St_0}$$

St/t0: Specific gravity

W1: Weight of an empty pycnometer in air (g)

W2: Weight of a pycnometer filled with pure water at t°C in air (g)

W3: Weight of a pycnometer filled with a liquid sample at t°C in air (g)

St: Specific gravity of pure water at t°C.

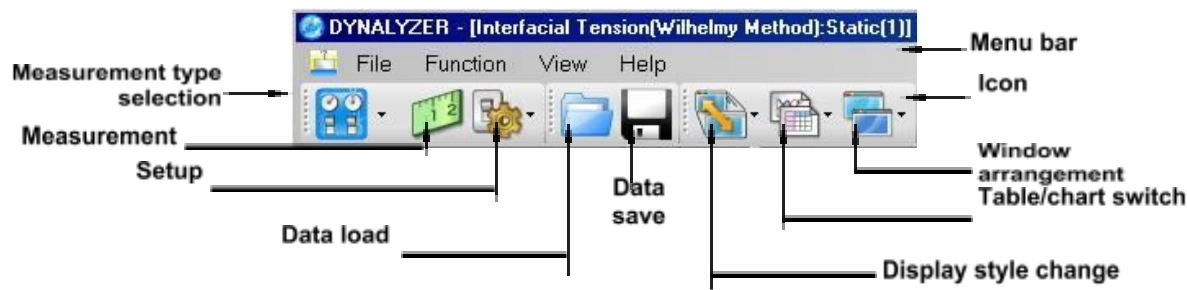
ρ: Specific gravity of air during the measurement

St0: Specific gravity at t0, a reference pure water temperature



7.

# Basic operation of DYNALYZER

## 7. 1. Icons



## 7. 2. [File (F)] menu

- [Load Data(L)]  Opens a saved file.
- [Save Data(S)]  Saves measurement tables, charts, settings and so on. Data is saved in the CSV format.







If data is edited and saved on a spreadsheet, Kyowa does not guarantee its readability to DYNALYZER afterwards.

When saving edited data on a spreadsheet, make sure to change the file name instead of overwriting.





- [Print (P)]  
Prints out displayed information (charts and tables) except for controllers such as the [Measurement] tab and current settings.
- [Close (C)]  
Exits DYNALYZER.

## 7. 3. [Function (C)] menu

- [Select Measurement (M)]   
Point the cursor on the [Select Measurement (M)] to display measurement types shown below. Select a measurement type. Measurement types available in DY-300 are as follows.
  - (1) Surface tension measurement (Wilhelmy method)
  - (2) Interfacial tension measurement (Wilhelmy method)
  - (3) Surface tension measurement (du Noüy method)
  - (4) Interfacial tension measurement (du Noüy method)
  - (5) Lamella length measurement
  - (6) Liquid density measurement

- [Start Measurement (M)]  Starts a measurement on an active window.
- [Setup (S)]  Configures measurement settings.  
  
[Measurement Setup (M)]: Set up measurement conditions.  
[System Setup (S)]: Configure system settings for calibration and display.
- [Calibration (C)]  Performs a calibration. Make sure to calibrate DY-300 for a precise measurement. (See “Calibration” (P.) for details.)
- [Add-in Manager (A)] Checks information of available add-in software.

#### 7. 4. **[View (V)] menu**

- [Change View Style (C)]  Changes the display mode.  
  
[Full Mode (F)]: Displays all the measurement and setting condition tabs on the left screen, a chart, and table.  
[Wide Mode (W)]: Displays a chart and table in large size.  
[Controller Mode (C)]: Displays a controller only. Controllers include [Measurement], [Ope.], and other tabs. Click the [Change View Style] icon  in the [Measurement] tab or other tabs to return to the full mode.
- [Switch chart/Grid (S)]  Switches a table and chart.  
  
[Show Chart (P)]: Checked on the left when displaying a chart.  
[Show Grid (I)]: Checked on the left when displaying a table.
- [Window Arrange (W)]  Arranges windows.  
  
[Horizontal (H)]: Displays measurement sheets one above the other.  
[Vertical (V)]: Displays measurement sheets next to each other.  
[Cascade (C)]: Displays measurement sheets overlapping one another.
- (Open windows are shown.) Displays the name of the window currently opened. By selecting it, the left side of the window name is checked and the window is activated and shown on top of other windows.

#### 7. 5. **[Help (H)] menu**

- [Version (V)] Displays software version information.

#### 7. 6.

## [Measurement selection] window

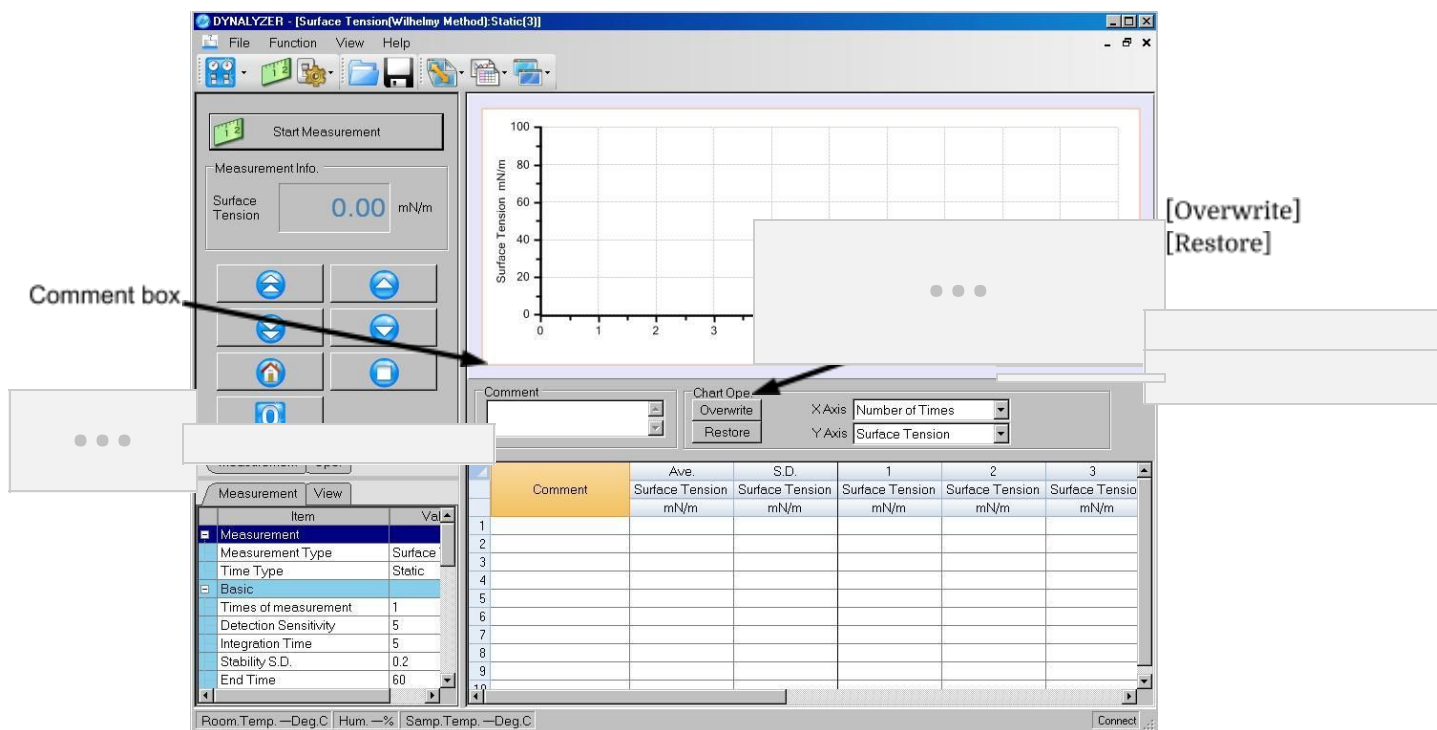
This is the first window displayed after DYNALYZER is started. Click a desired measurement button to display a corresponding measurement sheet. Click the [Play Movie] button to view a movie describing measurements.



### 7.7. Measurement sheet

In this section, details of the measurement sheet are described.

As an example, a measurement sheet for static surface and interfacial tensions is used to describe common items.



Comment box:

Click inside the box to enter text.

Enter information on the measurement.

Comment cell:

Click inside the cell to enter text.

Enter a measurement sample and plate number.

[Overwrite] button:

Overwrites repeatedly measured values to compare them. Click the [Overwrite] button to display check boxes on the left side of the chart. Check a desired chart number. Up to 10 data can be compared vertically.

[Restore] button:

Restores the size of a chart after enlarging it. To enlarge a chart, right-click the area around it and drag it. It can be enlarged to an arbitrary size.

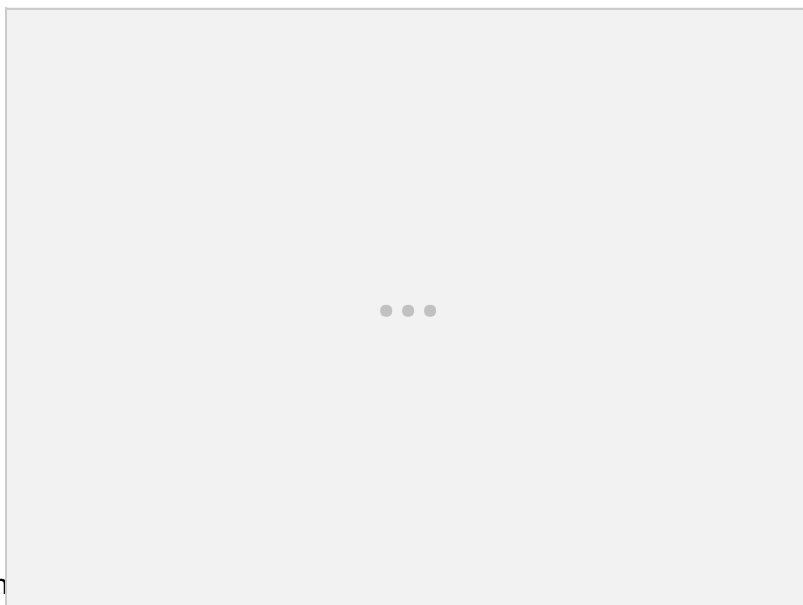
X-axis setting list box:

Changes the X-axis parameter on the chart. Displayed parameter type varies depending on the measurement type.

Y-axis setting list box:

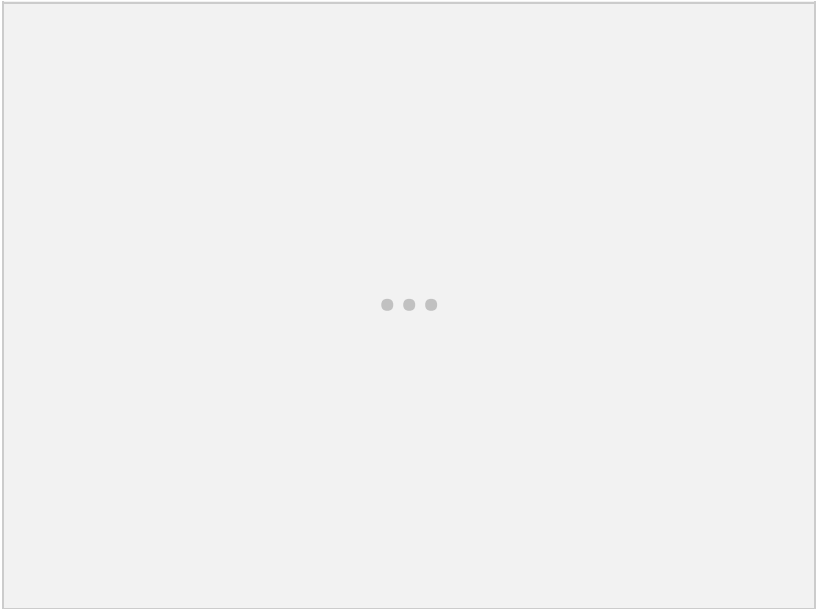
Changes the Y-axis parameter on the chart. Displayed parameter type varies depending on the measurement type.

For a static measurement



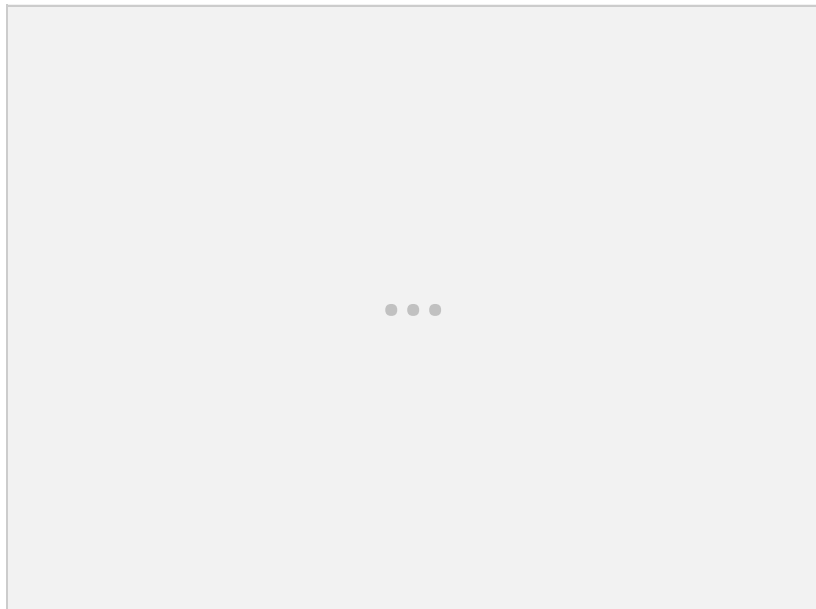
In , and surface tensions are displayed. [Ave.] is an average of the data displayed in a row. [S.D.] is a standard deviation of the data displayed in a row. Measurement data of the surface tension is stored laterally over measurements. Up to 10 measurements can be stored in a row.

For a time-based measurement



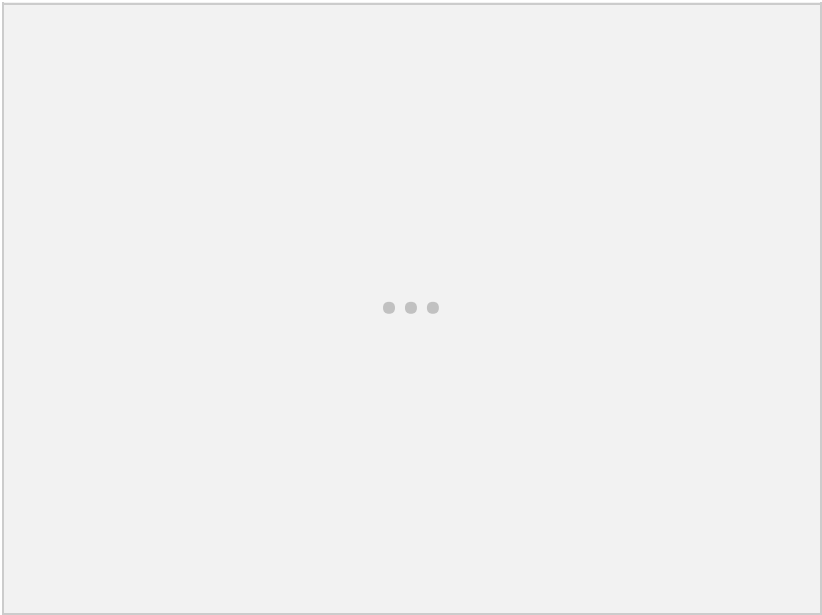
Standard deviations, and surface tensions are displayed. [Ave.] is an average of the data displayed in a row. [S.D.] is a standard deviation of the data displayed in a row. Measurement data of the surface tension is stored vertically over time. Up to 86400s of time can be stored in a column.

For a lamella length measurement



Standard deviations, and lamella lengths are displayed. [Ave.] is an average of the data displayed in a row. [S.D.] is a standard deviation of the data displayed in a row. Measurement data of the Lamella Length is stored laterally over measurements. Up to 10 measurements can be stored in a row.

For a liquid density measurement

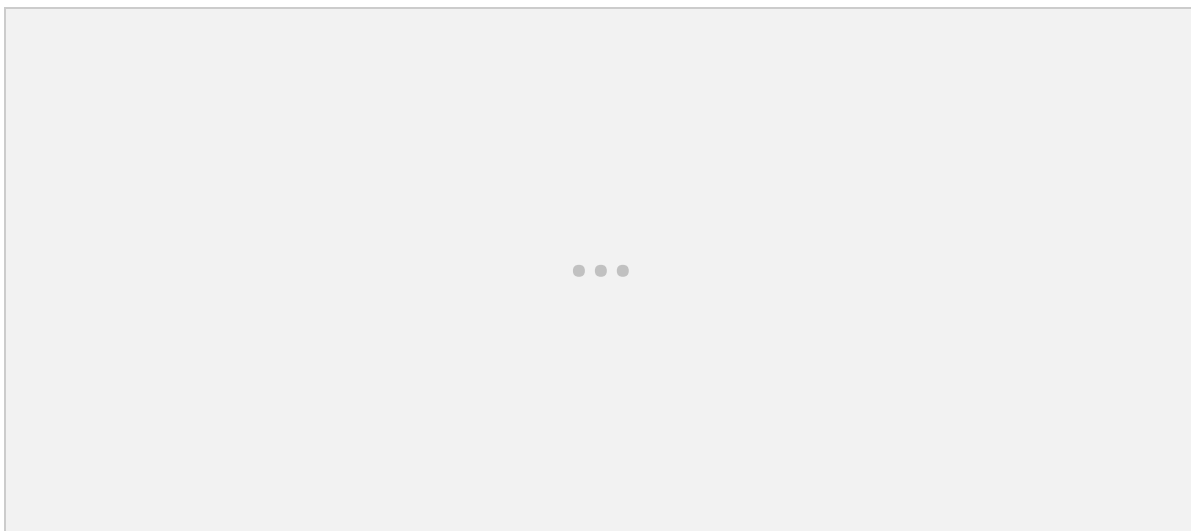


In a measurement sheet of liquid density, average values, standard deviations, and densities are displayed. [Ave.] is an average of the data displayed in a row. [S.D.] is a standard deviation of the data displayed in a row. Measurement data of the density is stored laterally over measurements. Up to 10 measurements can be stored in a row.



#### [Measurement] tab

It is a controller that accommodates buttons related to hardware operations in measuring.



[Start Measurement] button:

Click to perform a measurement.

Result monitor:

Displays a measurement value.

[Stage Up (High)] button:

Click to raise the stage at high speed. The stage ascends during the button is pressed.

The speed can be adjusted from the [Stage Act.] of the [Device] tab in the [System Setup].

[Stage Down (High)] button:

Click to lower the stage at high speed. The stage descends during the button is pressed.

The speed can be adjusted from the [Stage Act.] of the [Device] tab in the [System Setup].

[Stage Up (Low)] button:

Click to raise the stage at low speed. The stage ascends during the button is pressed.

The speed can be adjusted from the [Stage Act.] of the [Device] tab in the [System

Setup].

[Stage Down (Low)] button:

Click to lower the stage at low speed. The stage descends during the button is pressed.

The speed can be adjusted from the [Stage Act.] of the [Device] tab in the [System Setup].

[Home] button:

Moves the stage back to a specified position. Set the standby position considering the contact liquid level to perform the measurement efficiently.

[Zero Adj.] button:

Click to display the force or weight acting on the balance as "0". It is used in automatic and manual measurements.

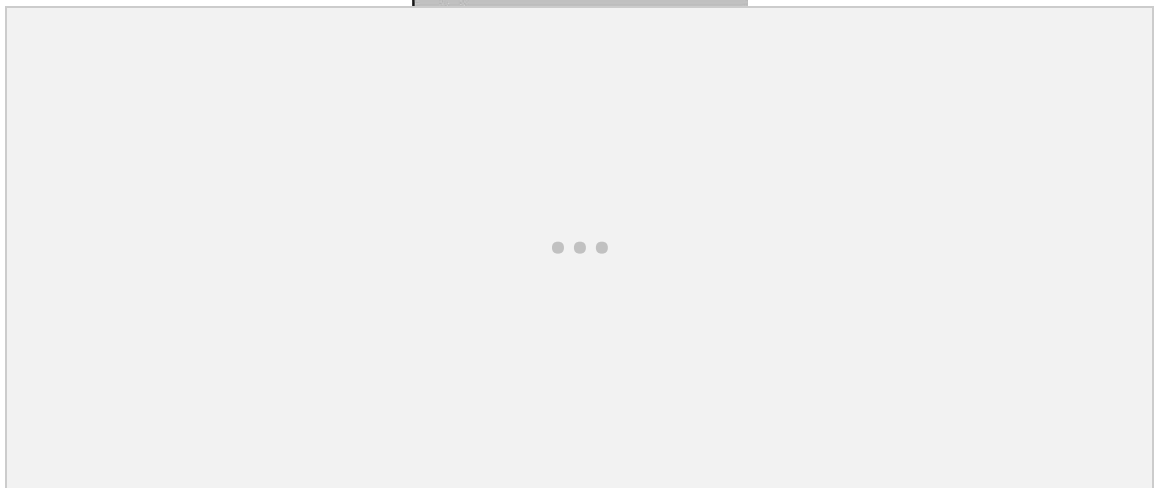
[Stop] button:

Click to stop the stage in an emergency.

#### [Measurement] tab

It is a controller that accommodates buttons related to hardware operations.

You can perform a balance calibration, zero adjustment, and setup of a stage standby position.



Displays the force acting on a probe as weight.

[Zero Adj.] button:

Same as the [Zero Adj.] button in the [Ope.] tab.

[Calibration] button:

Click this button to perform a calibration again.

Stage position monitor:

Displays the current stage position.

Standby position setup box:

Displays the stage standby position.

Enter a value between 1 and 49mm to set a stage standby position.

[Stage Up (High)] button:

Same as the [Stage Up (High)] button in the [Measurement] tab.

[Stage Down (High)] button:

Same as the [Stage Down (High)] button in the [Measurement] tab.

[Stage Up (Low)] button:

Same as the [Stage Up (Low)] button in the [Measurement] tab.

[Stage Down (Low)] button:

Same as the [Stage Down (Low)] button in the [Measurement] tab.

[Home] button:

Same as the [Home] button in the [Measurement] tab.

[Home Setting] button:

Click to set a stage standby position. The current stage position can be set as a standby position.

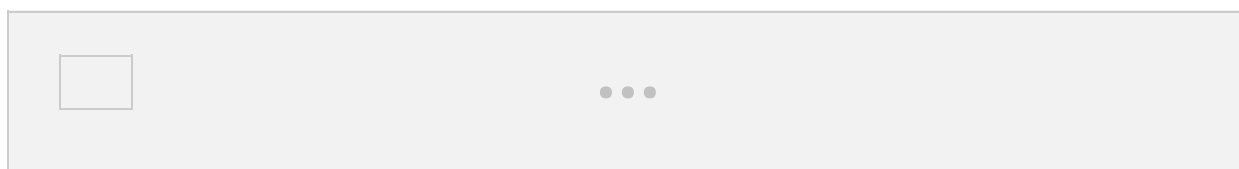
[Stop] button:

Same as the [Stop] button in the [Measurement] tab.

#### Information of measurement and operation settings

Measurement		View
	Item	Val
[-]	Measurement	
	Measurement Type	Surface
	Time Type	Static
[-]	Basic	
	Times of measurement	1
	Detection Sensitivity	5
	Integration Time	5
	Stability S.D.	0.2
	End Time	60


Information display is the setup information of the currently active measurement sheet.



7. 8.

## Data management


### Saving measurement data

Click  the toolbar or select the [Save Data(S)...] in the [File(F)] menu to open the [Save Data] dialog box.

Enter a folder and file names to save the data. Click the [OK] button to save the measurement data.

The measurement data is saved in the CSV (Comma Separated Value) format, which can be loaded into a general spreadsheet. If data is edited and saved on a spreadsheet, Kyowa does not guarantee its readability to DYNALYZER afterwards. When saving edited data on a spreadsheet, make sure to change the file name instead of overwriting.

### Loading measurement data

Click  the toolbar or select the [Load Data (L)...] in the [File(F)] menu. Specify a file name and click the [OK] button to load measurement data.

### Copying measurement data

The data copy function allows the currently displayed table data to be copied on the OS clipboard. By this, data can be pasted directly without pasting it on a file of a general spreadsheet once.

Right-click on a measurement sheet and select the [Copy] to open a copy window. Select a copying method and click the [OK] button to copy the data to the clipboard.

[Copy data including title]

Copies data including comments and top two rows of the table (display items such as the column index, contact angle, and liquid volume).

[Copy data only]

Copies data only without comments and top two rows of the table.

### Deleting measurement data

To delete measurement data, specify the desired cell range and select the [Delete] by right-click.

Confirm the data before deletion because it cannot be restored once deleted.

8.

# Calibration

Calibration must be preformed for a precise measurement. DY-300 allows for absolute calibration with balance weights and relative calibration with liquid samples.

In general, opt for an absolute calibration.

You may attempt a relative calibration in case you cannot perform a measurement properly due to the wetting problem of a liquid sample.

...

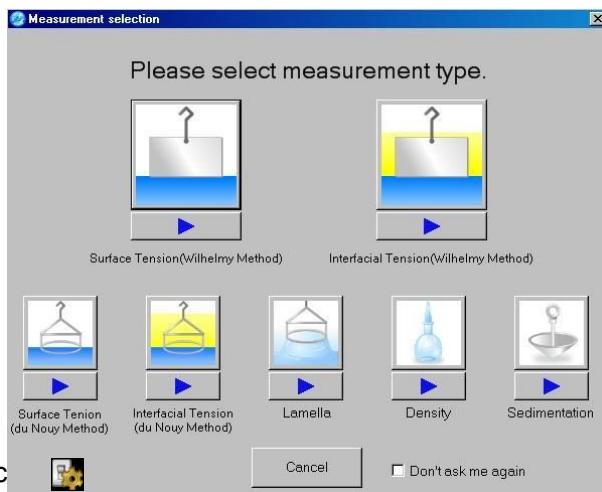
## 8. 1. Absolute calibration procedure

Absolute calibration procedure using a platinum plate is described in this section.



...

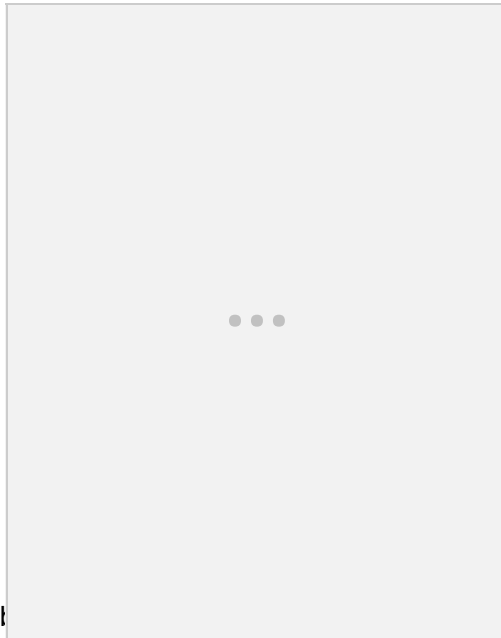
- (1) When the [Measurement selection] window is displayed, click the measurement type button of your choice or the [Cancel] button. Absolute calibration does not depend on the measurement type.



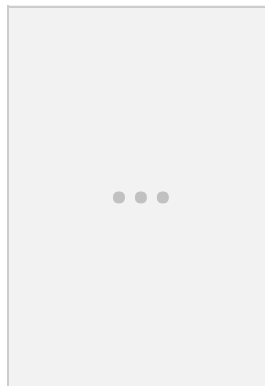
- (2) Click the [Setup] icon.

...

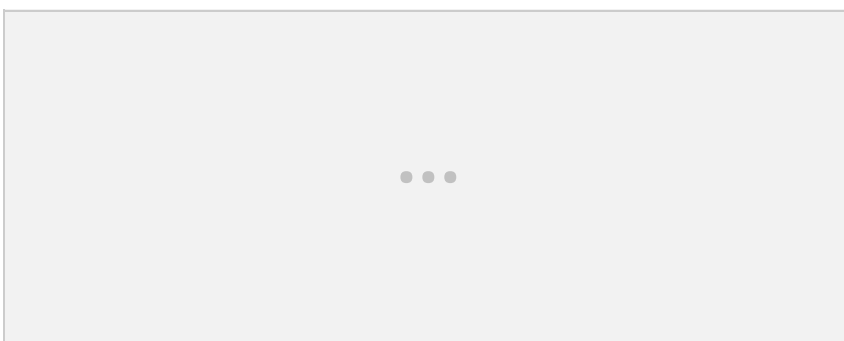
(3) Enter a value "0.400" (g) in the [Weight] box in the [Calibration] of the [Device] tab. Click the [OK] button. For the optional balance weight, 100g, enter "100.000" (g).



(4) Click the [Calibration] button at the bottom of the measurement sheet.



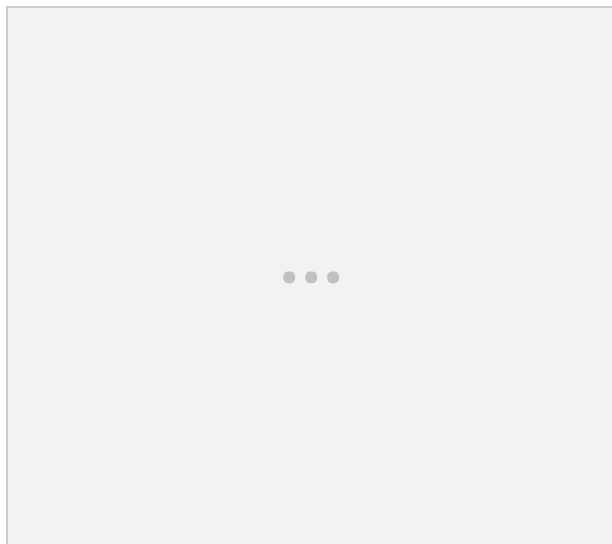
- (5) The [Calibration Start] window opens.  
In the [Abs./Relative Type], select the [Abs. Calib.]. Proceed with the operation following the [Calibration Guide].  
Click the [Calibration Start] button to adjust the zero point.  
Click the [Play Movie] button to view a movie describing absolute calibration.



(6) The [Abs.&Int. Calib. Exec] window opens.

Confirm the weight is stable at "0.000" g. Using tweezers, hook the balance weight to the plate (or the hanging tray). Confirm the status monitor shows "Stable" and click the [OK] button.

If the weight is not "0.000" g before hanging the balance weight, click the [Cancel] button and remove the plate (or the hanging tray) and hook it again. Confirm the status monitor shows "Stable" in the [Calibration Start] window. Then, repeat the steps from (5).



- (7) The [Calibration Finished] dialog box appears and the calibration is complete. Click the [OK] button. Close the calibration window to finish the operation. If the calibration failed, it may be because a balance weight was not hooked. Repeat the steps from (5).

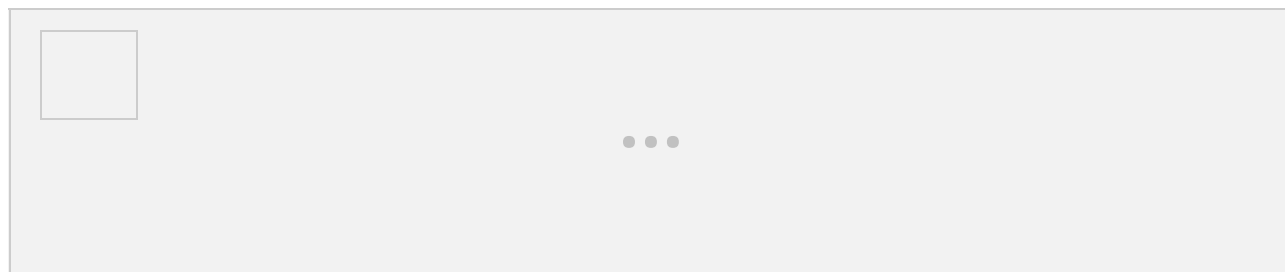


8. 2.



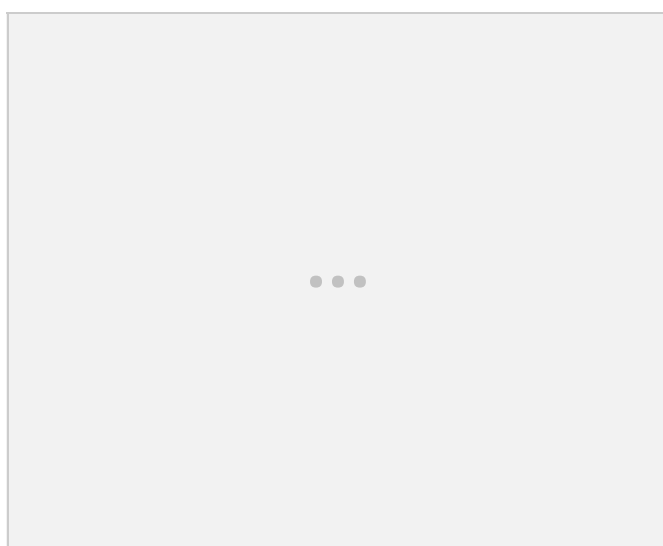
## Relative calibration procedure

Relative calibration is only available for a surface and interfacial tension measurements by the Wilhelmy method and du Noüy method.



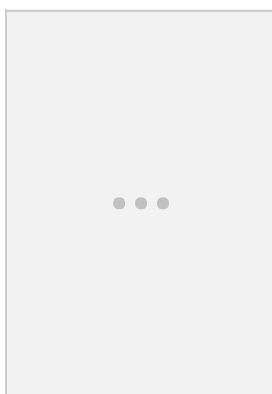
- (1) When the [Select Measurement] window is displayed, select a measurement type and click the button.

A surface tension measurement by the Wilhelmy method is used as an example here.



- (2) Select the measurement [Calibration] button.

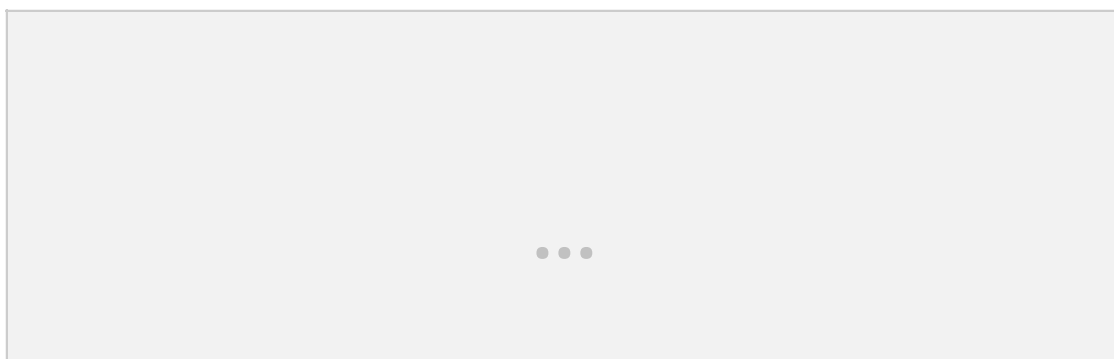
[Ope.] tab in the sheet. Click the



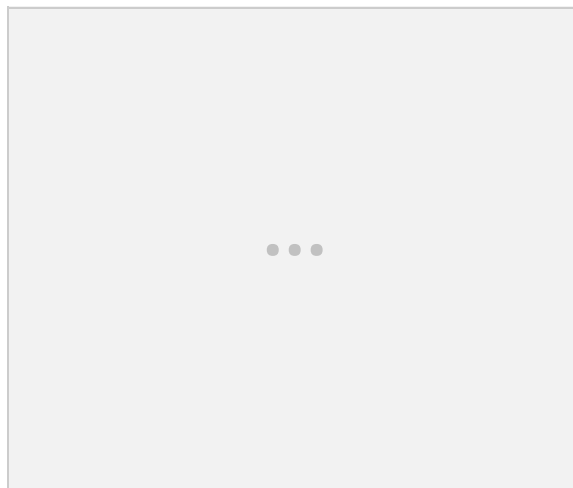
- (3) The [Calibration Start] window opens.

In the [Abs./Relative Type], select the [Relative. Calib.].

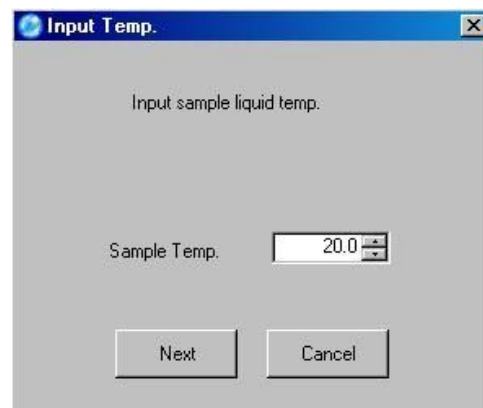
Proceed with the operation following the [Calibration Guide]. Click the [Calibration Start] button to adjust the zero point.



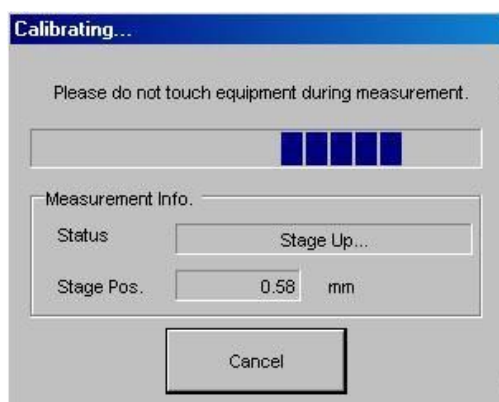
- (4) The [Relative. Calib.] window opens.  
Confirm the status monitor shows “Stable” and click the [OK] button.



- (5) Enter the temperature of the sample in the petri dish used for the relative calibration. Click the [Next] button. the liquid



(6) The relative calibration is started. During the calibration, keep the instrument away from vibration. In the [Now calibrating] window, only the [Cancel] button is available.



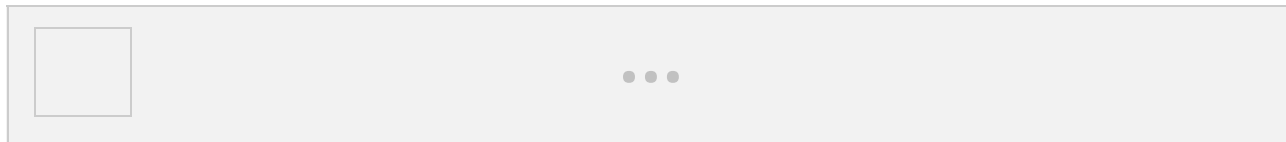
- (7) The [Calibration Finished] dialog box appears. Click the [OK] button to finish the operation.
- (8) If the calibration failed, the surface tension measurement may not have been performed properly. Repeat the steps from (3).



9.

# Measurement

Basic operation of DY-300 is described in this section. Full mode screen is used as an example here. Usually, a measurement is performed using a platinum plate, etc., with a short hook set at the DY-300 detecting element. However, remove the short hook for a measurement using a jacket or heater type stage system.



## 9. 1. Preparation

Prepare the following items for a measurement.

- Liquid sample to be measured
- Petri dish, Vessel
- Short hook
- Tweezers
- Alcohol lamp, lighter
- Cleaning solvent (acetone, ethanol, IPA, etc., corresponding to the liquid sample)
- Cleaning wipe
- Liquid waste bin



...

## Calculation method for static surface and interfacial tension measurements

In a static surface and interfacial tension measurements, DYNALYZER displays a measurement result figured out by averaging raw data over a specified integration time. This section describes how to integrate raw data.

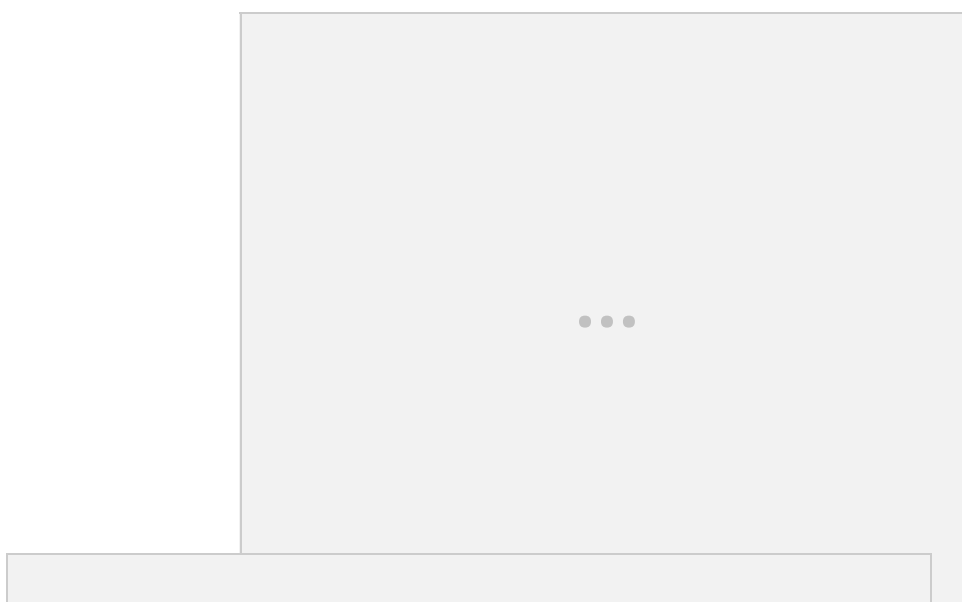
See "Detailed setup of measurements" (P.) for parameter setup.

Three parameters below are used in the calculation.

- Integration time
- Standard deviation of stability
- Measurement end time

DYNALYZER averages raw data in the specified integration time when their standard deviation falls below the standard deviation of stability.

The process is described below taking the following condition as an example; 5 seconds as an integration time, 0.2mN/m as a standard deviation of stability, and 10 seconds as a measurement end time.



Calculate and evaluate a standard deviation in 5 seconds immediately after a pre-wetting (time interval A). If this value exceeds the standard deviation of stability, DYNALYZER does not calculate an average of the time interval A and continues the measurement. Then, it sequentially calculates and evaluates a standard deviation in 5 seconds (e.g., time interval B).

When any standard deviation in 5 seconds falls below the standard deviation of stability (time interval C), DYNALYZER ends the measurement and displays the average in the time interval C as a result. If the standard deviation in the time interval C still exceeds the standard deviation of stability, DYNALYZER continues the measurement. When it reaches the specified measurement end time (10 seconds), it terminates the measurement forcibly and displays the average in the time interval D (5 seconds) as a result.

9. 3.

## Procedures for surface tension and lamella length measurements

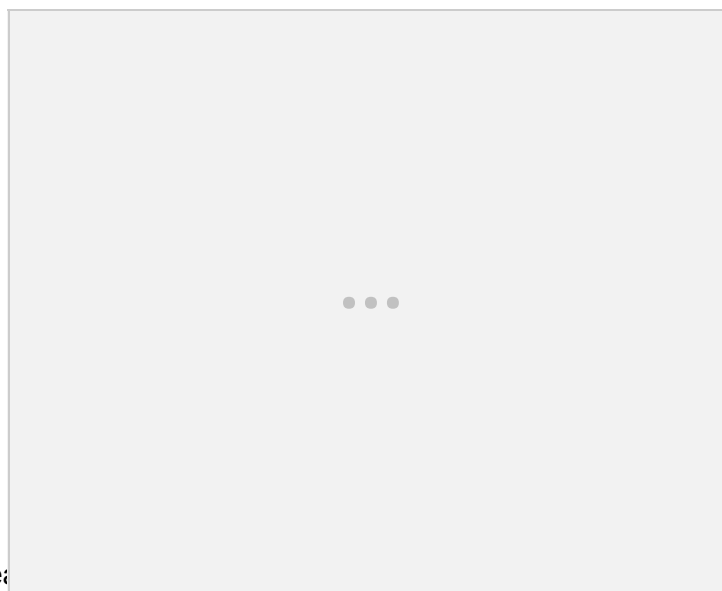
A plate is used in a surface tension measurement by the Wilhelmy method. In the du Noüy method, a platinum ring is used. Three operation modes, full automatic, automatic, and manual, are available in DYNALYZER. The measurement method can be selected according to the liquid sample and probe used in the measurement.

### Wilhelmy method

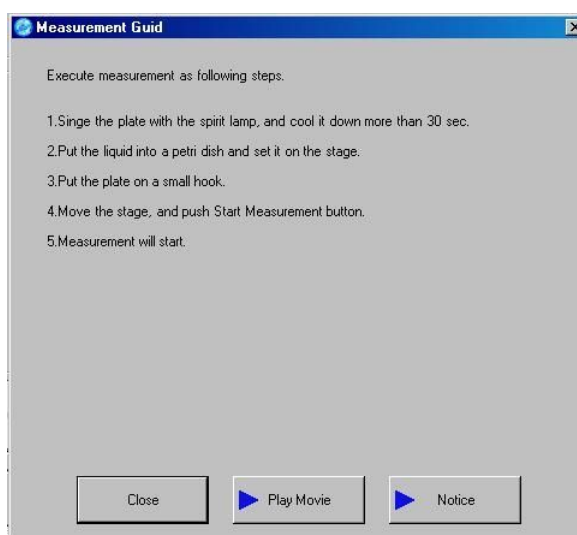
Three operation modes are described below taking a static surface tension measurement by the Wilhelmy method as an example.

#### Full automatic measurement

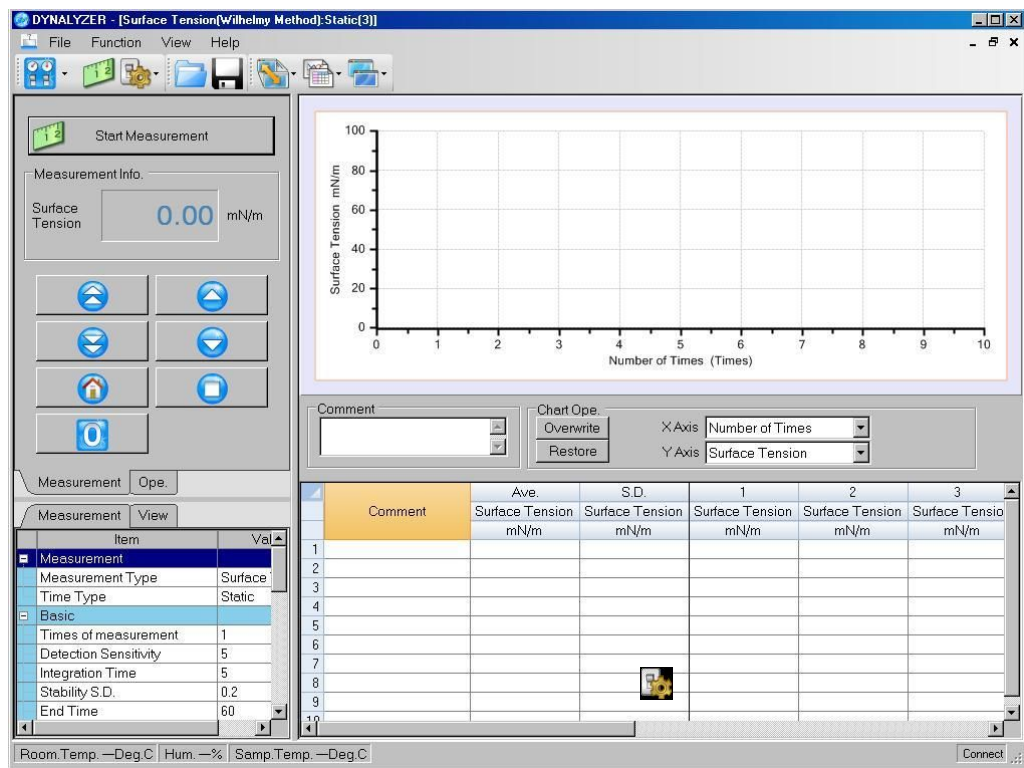
- (1) Click the [Interfacial Tension] button in the [Select Measurement] window.



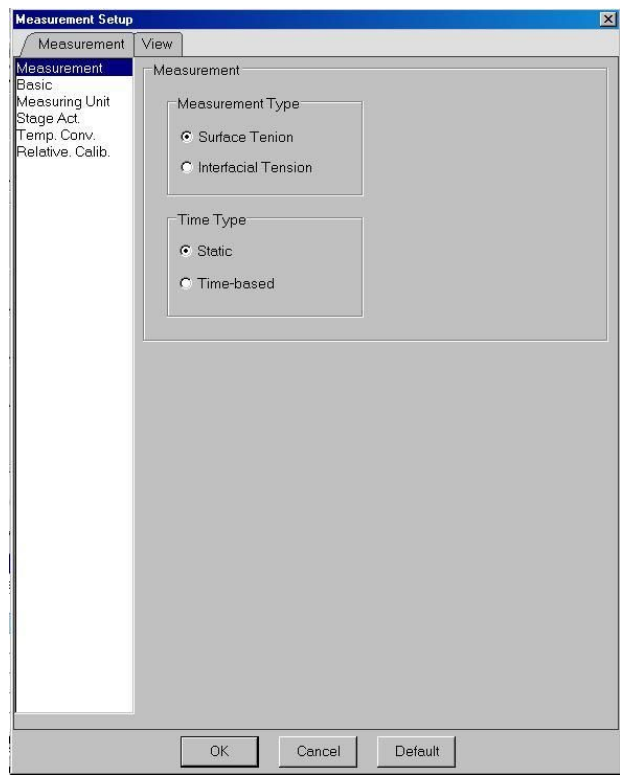
- (2) The [Measurement Guide] window closes and a measurement sheet is displayed. Click the [Play Movie] button to view a movie describing measurement steps.



(3) A surface tension measurement sheet is displayed.

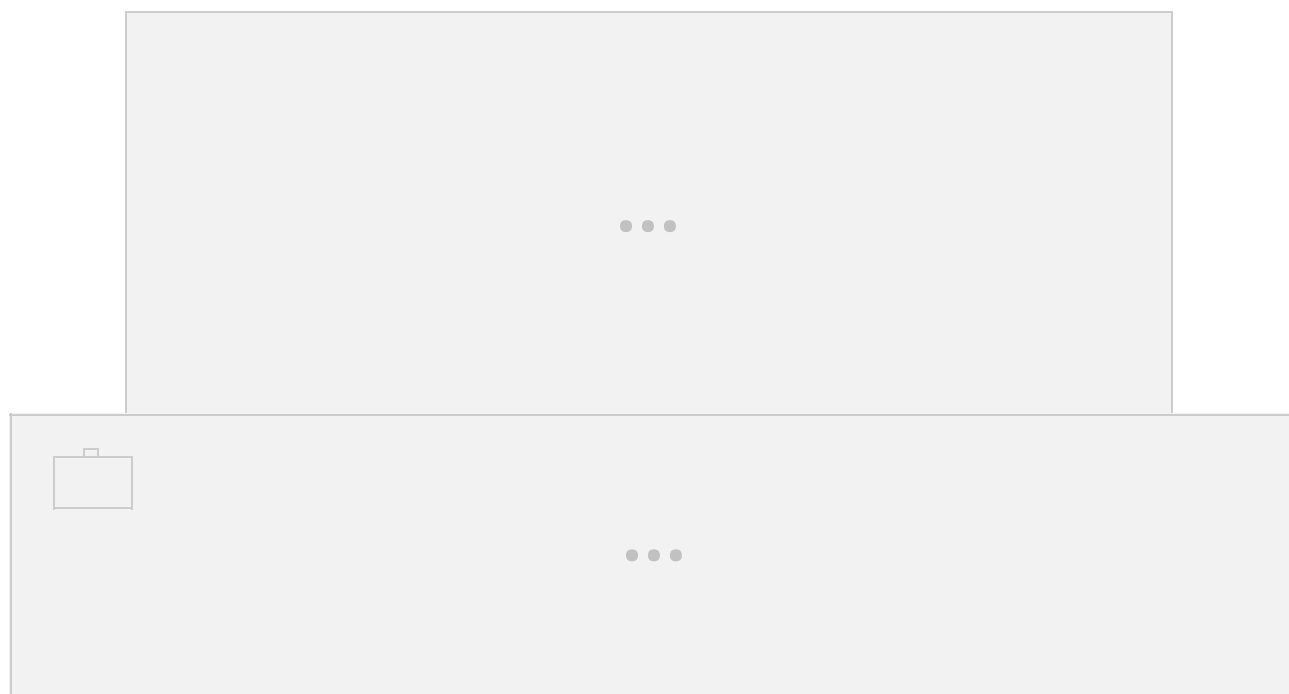


Surface tension measurement: [Measurement Setup] window



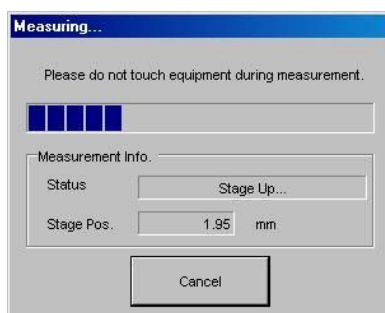


- (4) Glow clean a probe with an alcohol lamp. Cool it down for 30 seconds or more. Pour a liquid sample up to 10mm from the bottom of a petri dish. If glow cleaning is not available, clean the probe with a cleaning solvent appropriate for the liquid sample using an ultrasonic cleaner or other instruments. Dry it thoroughly.
- (5) Set a short hook at the DY-300 detecting element (not required for a jacket or heater type stage system).
- (6) Place the petri dish containing the liquid sample on the stage.
- (7) Set the cooled probe at the short hook. Move the stage to bring the liquid surface close to the probe.




- (8) Click the [Start Measurement] button in the [Measurement] tab to start the measurement.

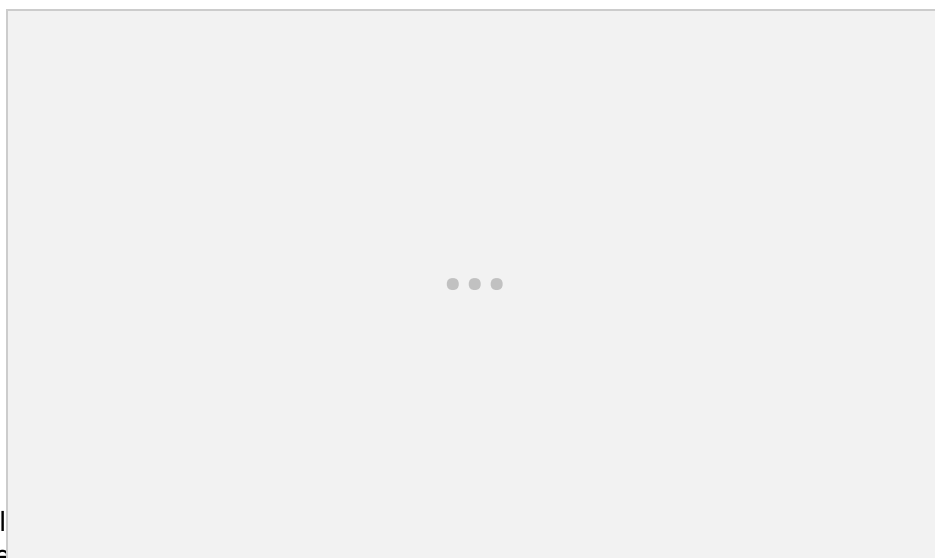
- (9) The [Measuring] window is displayed during the measurement. In the [Measuring] window, only the [Cancel] button is available. The [Measuring] window closes and the measurement is complete. The measurement result is shown in a chart and table.



## Automatic measurement

In an automatic measurement, an operator performs a pre-wetting manually. This mode is used when the surface tension of a liquid sample is too low to perform a full automatic measurement.


- (1) Click the [Interfacial Tension] button in the [Select Measurement] window.
- (2) Read the [Measurement Guid] and click the [Close] button.
- (3) Click the [Setup] icon  and select the [Measurement Setup]. Select the [Basic] in the left column of the [Measurement] tab.
- (4) Select the [Auto] in the [Act Method]. In the automatic operation mode, the continuous measurement is not available.

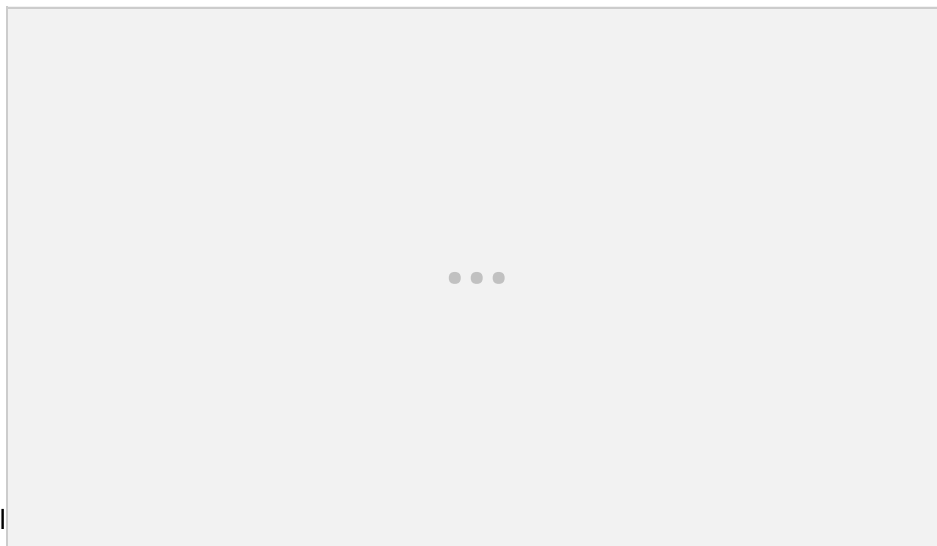


- (5) Glow clean the probe with the liquid sample used for the measurement. Handle the probe with tweezers.
- (6) Place the liquid sample on the stage and set the probe in the step (5) at the short hook.
- (7) Click the [Start Measurement] button to start the measurement.
- (8) The [Measuring] window is displayed during the measurement. In the [Measuring] window, only the [Cancel] button is available. The [Measuring] window closes and the measurement is complete. The measurement result is shown in a chart and table.

## Manual measurement

In a manual measurement, an operator performs all operations manually from pre-wetting, stage operation, to measurement start/end. This mode is used for a test measurement or when a full automatic or automatic measurement cannot be performed due to extremely high viscosity of a sample or other reasons.

- (1) Click the [Interfacial Tension] button in the [Select Measurement] window.
- (2) Read the [Measurement Guid] and click the [Close] button.
- (3) Click the [Setup] icon  and select the [Measurement Setup]. Select the [Basic] in the left column of the [Measurement] tab.
- (4) Select the [Manual] in the [Act Method]. In the manual operation mode, items, [Detection Sensitivity], [Integration Time], [Stability S.D.], and [End Time], are hidden. [Stage Act.] is not displayed, either.



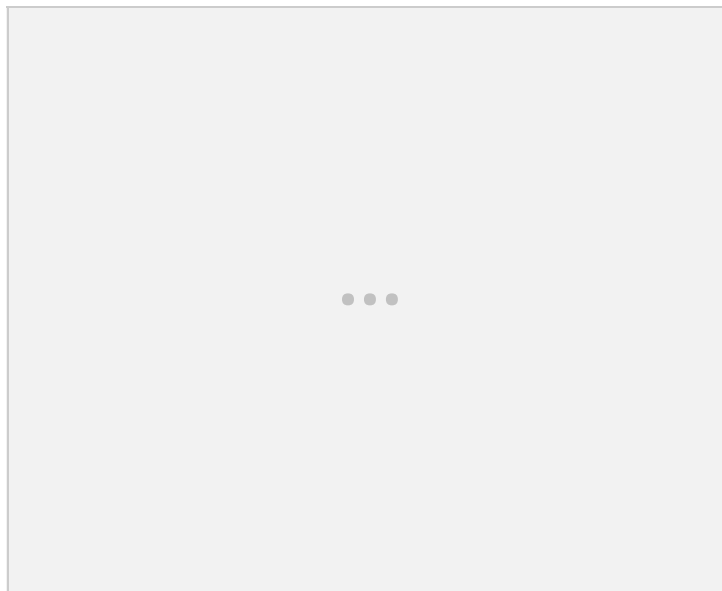
- (5) Glow clean the probe with the liquid sample used for the measurement. Handle the probe with tweezers.
- (6) Place the liquid sample on the stage and set the probe in the step (5) at the short hook.
- (7) Click the [Stage Up(High/Low)] buttons to bring the probe into contact with the surface of the liquid sample.
- (8) Click the [Start Measurement] button to start the measurement.
- (9) Data acquisition is performed. After a desired measurement duration, click the [Close] button in the [Measuring] window to finish the measurement.

## Procedures of surface tension and lamella length measurements by the du Noüy method

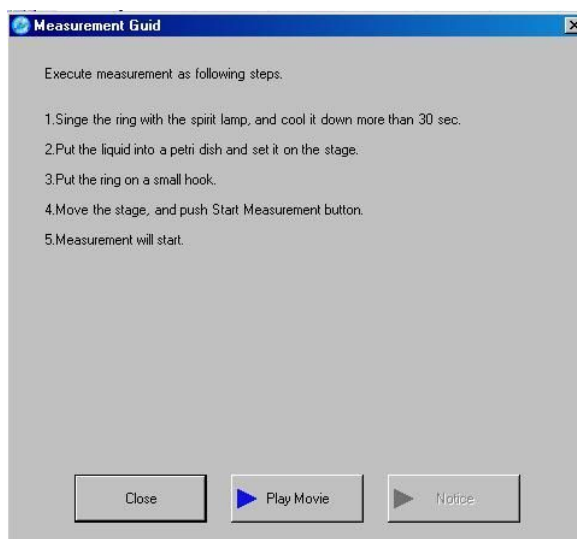
Three operation modes are described below taking a static surface tension measurement by the du Noüy method as an example.

### Full automatic measurement

- (1) Click the [Interfacial Tension] (or [Lamella]) button in the [Select Measurement] window.



- (2) The [Measurement Guid] window opens. Read the contents and click the [Close] button. The [Measurement Guid] window closes and a measurement sheet is displayed. Click the [Play Movie] button to view a movie describing measurement steps.



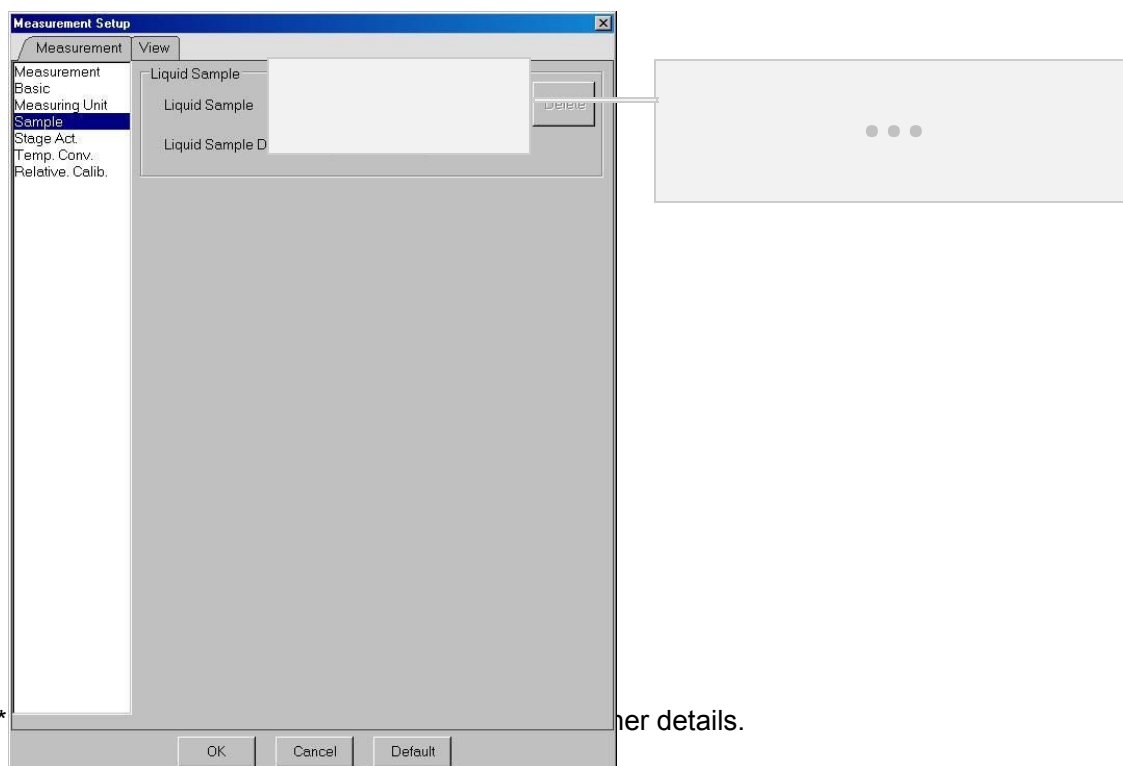
(3) A surface tension measurement (or lamella length measurement) sheet is displayed.

(4)

measuring wire rod

and ring in the boxes.

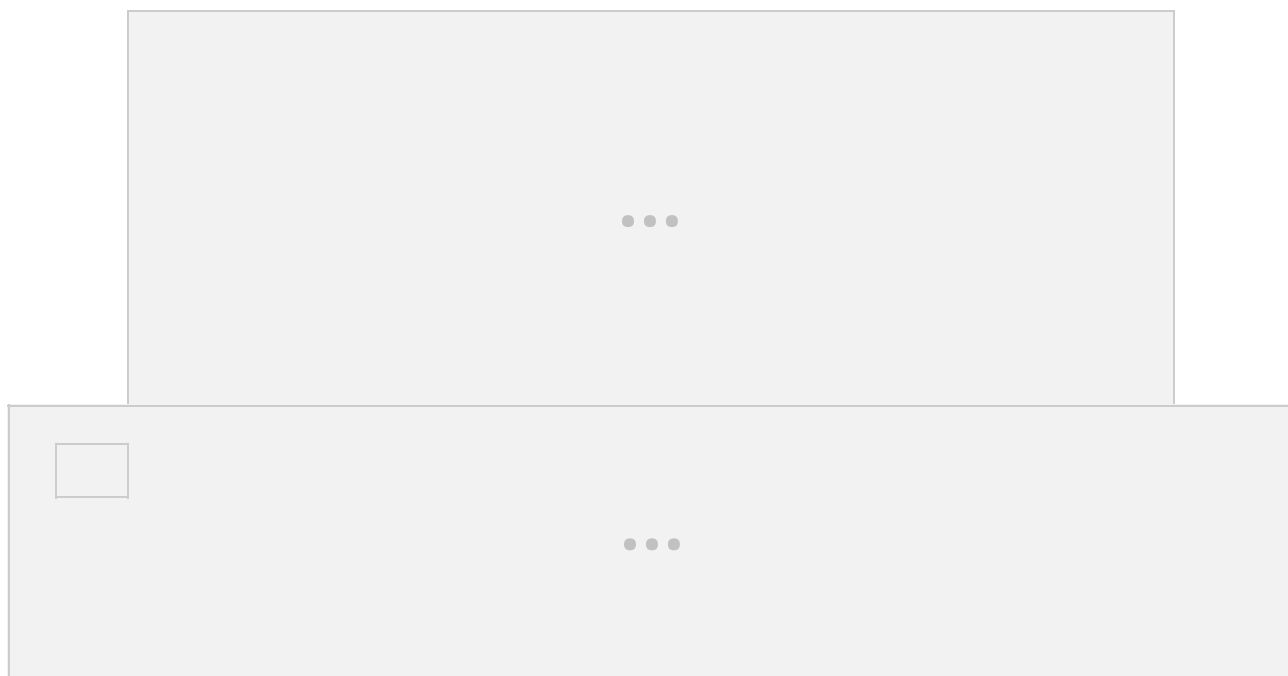
- (5) Select the [Sample] in the same column. Specify a liquid sample density in the box.



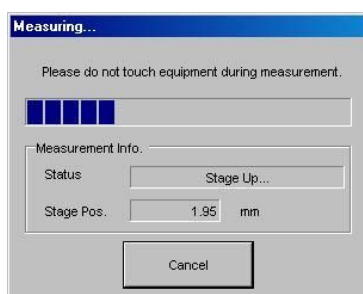
Surface tension measurement: [Measurement Setup] window



- (6) Glow clean a probe with an alcohol lamp. Cool it down for 30 seconds or more. Pour a liquid sample up to 10mm from the bottom of a petri dish. If glow cleaning is not available, clean the probe with a cleaning solvent appropriate for the liquid sample using an ultrasonic cleaner or other instruments. Dry it thoroughly.
- (7) Set a short hook at the DY-300 detecting element (not required for a jacket type thermostat bath or heater type stage system).
- (8) Place the petri dish containing the liquid sample on the stage.
- (9) Set the cooled probe at the short hook. Move the stage to bring the liquid surface close to the probe.




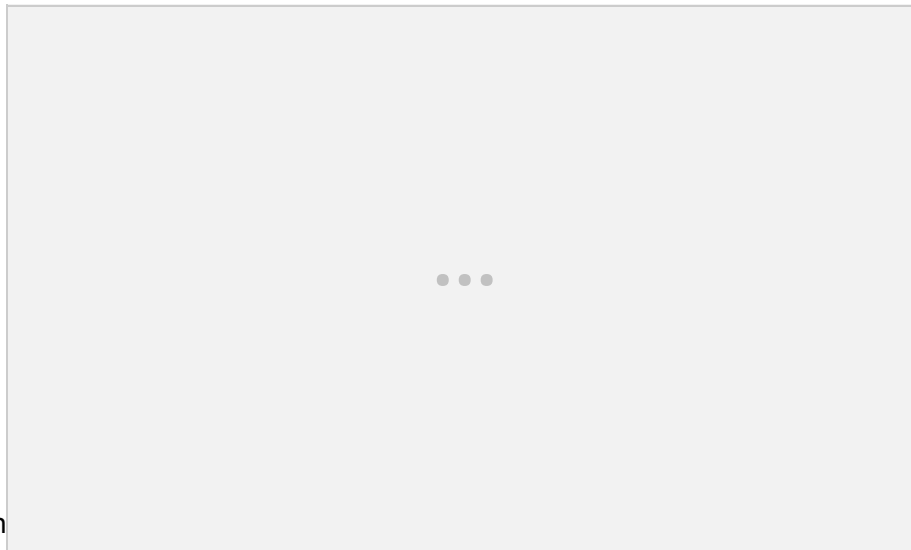
- (10) Click the [Start Measurement] button in the [Measurement] tab to start the measurement.
- (11) The [Measuring] window is displayed during the measurement. In the [Measuring] window, only the [Cancel] button is available. The [Measuring] window closes and the measurement is complete. The measurement result is shown in a chart and table.



## Automatic measurement

In an automatic measurement, an operator performs a pre-wetting manually. This mode is used when the surface tension of a liquid sample is too low to perform a full automatic measurement.

- (1) Click the [Surface Tension (du Noüy Method)] button in the [Select Measurement] window.
- (2) Read the [Measurement Guid] and click the [Close] button.
- (3) Click the [Setup] icon  and select the [Measurement] tab. Select the [Basic] in the left column of the [Measurement Setup] window.
- (4) Select the [Auto] in the [Act Method]. In the automatic operation mode, the continuous measurement is not available.




- (5) Select the [Sample] and specify a liquid sample density.
- (6) Select the [Sample] and specify a liquid sample density.
- (7) Glow clean and cool down a probe. Perform a pre-wetting by wetting the probe to 5mm with the liquid sample used for the measurement. Handle the probe with tweezers.
- (8) Place the liquid sample on the stage and set the probe in the step (7) at the short hook.
- (9) Click the [Start Measurement] button to start the measurement.
- (10) The [Measuring] window is displayed during the measurement. In the [Measuring] window, only the [Cancel] button is available. The [Measuring] window closes and the measurement is complete. The measurement result is shown in a chart and table.

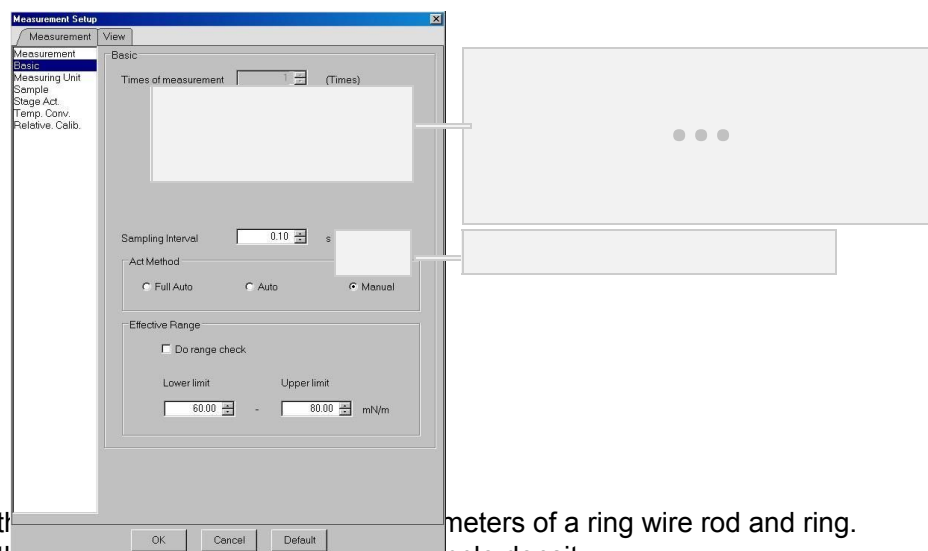


## Manual measurement

In a manual measurement, an operator performs all operations manually from pre-wetting, stage operation, to measurement start/end.

This mode is used for a test measurement or when a full automatic or automatic measurement cannot be performed due to extremely high viscosity of a sample or other reasons.

- (1) Click the [Interfacial Tension] button in the [Select Measurement] window.
- (2) Read the [Measurement Guid] and click the [Close] button.
- (3) Click the [Setup] icon  and select the [Measurement] tab. Select the [Basic] in the left column of the [Measurement Setup] window.
- (4) Select the [Manual] in the [Act Method]. In the manual operation mode, items, [Detection Sensitivity], [Integration Time], [Stability S.D.], [End Time], are hidden. [Stage Act.] is not displayed, either.



- (5) Select the [Sample] and specify a liquid sample density.
- (6) Select the [Sample] and specify a liquid sample density.
- (7) Glow clean and cool down a probe. Perform a pre-wetting by wetting the probe to 5mm with the liquid sample used for the measurement. Handle the probe with tweezers.
- (8) Place the liquid sample on the stage and set the probe in the step (7) at the short hook.
- (9) Click the [Stage Up(High/Low)] buttons to bring the probe into contact with the surface of the liquid sample.
- (10) Click the [Start Measurement] button to start the measurement.
- (11) The stage descends to perform the measurement.
- (12) The [Measuring] window is displayed during the measurement. The stage can be adjusted during the measurement.
- (13) The [Measuring] window closes and the measurement is complete. The measurement result is shown in a chart and table.

9. 4.

## Procedure for interfacial tension measurement

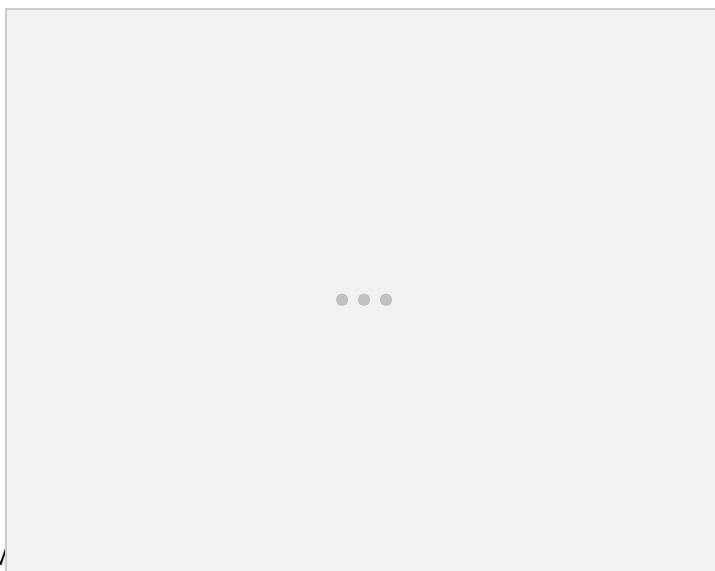
A plate is used in an interfacial tension measurement by the Wilhelmy method. In the du Noüy method, a platinum ring is used. Two operation modes, automatic and manual, are available in DYNALYZER. The measurement method can be selected according to the liquid sample and probe used in the measurement.

### Wilhelmy method

The two operation modes are described below taking a static interfacial tension measurement by the Wilhelmy method as an example.

#### Full automatic measurement

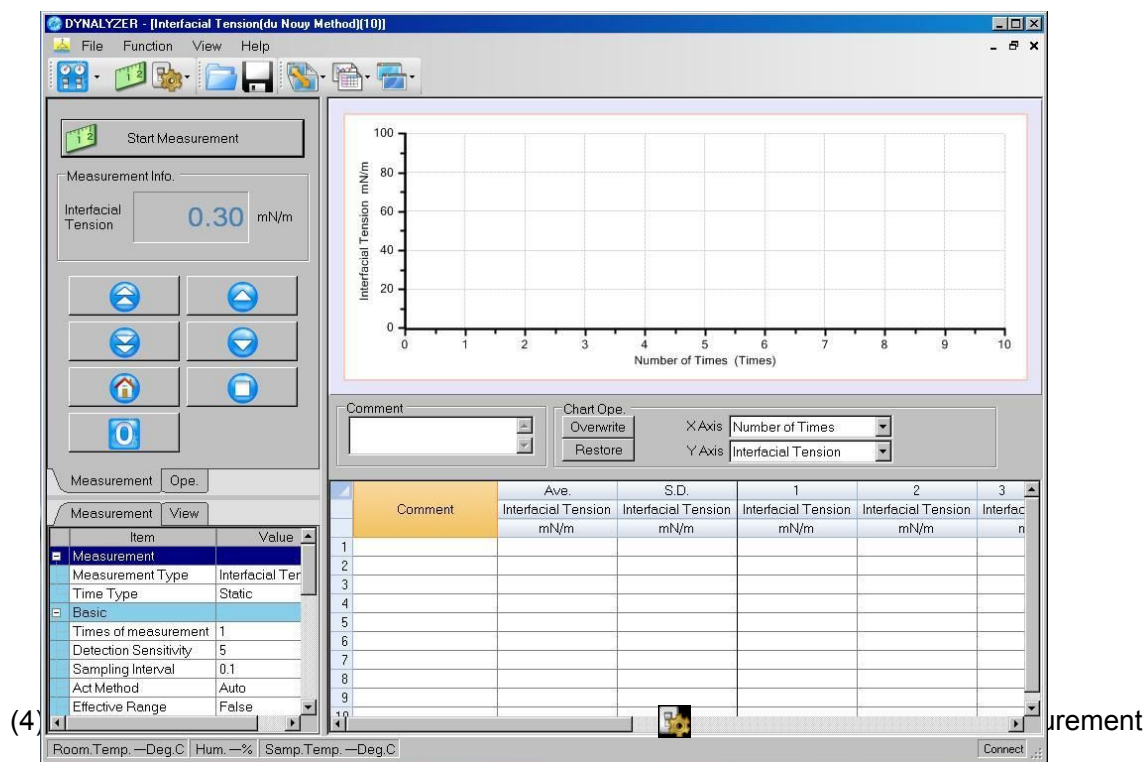
- (1) Click the [Interfacial Tension] button in the [Select Measurement] window. You can choose either the Wilhelmy method or the du Noüy method. Here, a description is provided mainly based on the Wilhelmy method.



- (2) The [Measurement Guide] window closes and a measurement sheet is displayed. Click the [Close] button. The [Measurement Guide] window closes and a measurement sheet is displayed. Click the [Play Movie] button to view a movie describing measurement steps.



(3) An interfacial tension measurement sheet is displayed.



See “Detailed setup of measurements” (P.) for measurement condition setup.

Interfacial tension measurement: [Measurement Setup] window

**Measurement Setup**

Measurement Type

☐ Surface Tension

☒ Interfacial Tension

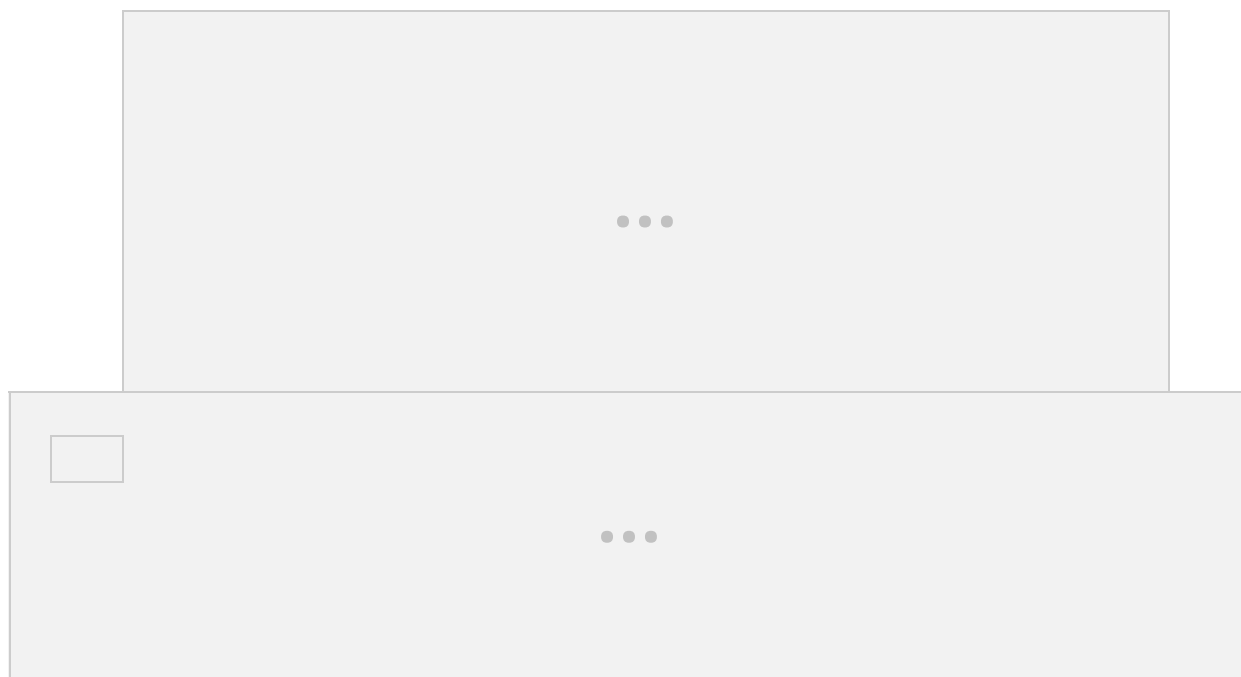
Time Type

☒ Static

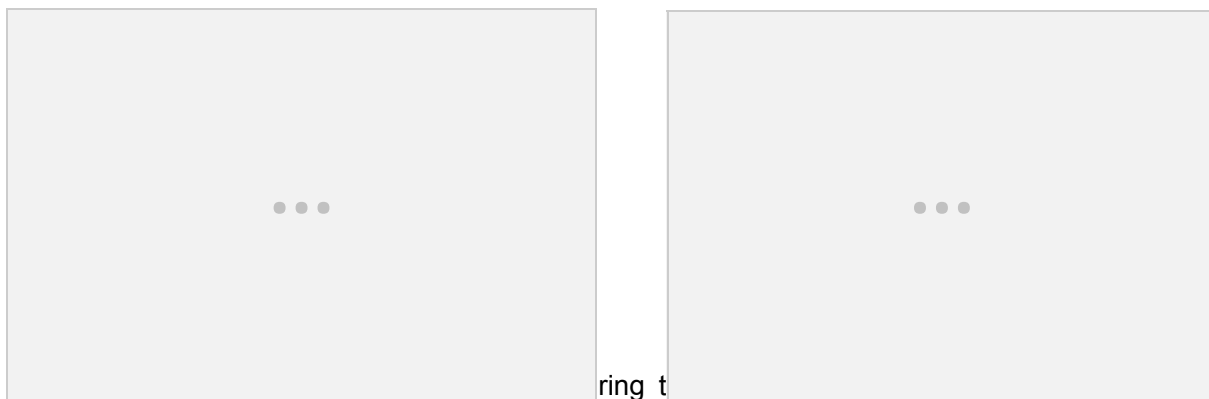
☐ Time-based

OK Cancel Default

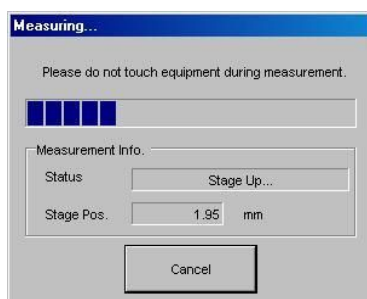
- (5) Glow clean a probe and cool it down for 30 seconds or more. While cooling down the probe, pour a lower layer liquid sample into a petri dish to pre-wet a platinum plate.
- (6) Prepare a measurement sample in a vessel. Pour a lower layer liquid sample up to 10mm from the bottom and an upper layer liquid sample to the depth of 15mm on top of it.
- (7) Lower the stage by the stage controller in the [Ope.] tab. Set the vessel containing the lower and upper layer liquid samples. Move the stage to the position where the platinum plate or ring is completely immersed in the upper layer liquid sample (See “Precaution in the interfacial tension measurement by the du Noüy method” (P.) for a precaution in the du Noüy method).
- (8) Bring the probe into contact with the lower layer liquid sample in the petri dish, prepared in the step (5). Wet the probe up to 5mm from the bottom.
- (9) Set the platinum plate at the DY-300 detecting element. Move the stage to bring the interface close to the probe.



(10) Click the [Zero Adj.] button and confirm that the result monitor shows “0.300” mN/m. This is a correction value of the liquid attached when the probe is wetted with the lower layer liquid sample. Click the [Start Measurement] button in the [Measurement] tab.




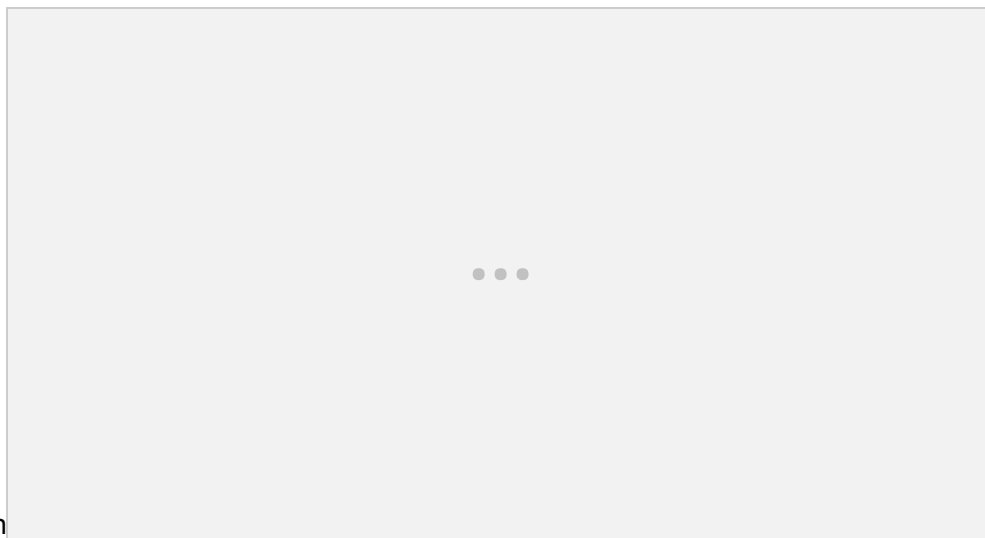
ring t  
window, only the [Cancel] button is available during a full automatic or automatic measurement. The [Measuring] window closes and the measurement is complete. The measurement result is shown in a chart and table.



## Manual measurement

In a manual measurement, an operator performs all operations manually from pre-wetting, stage operation, to measurement start/end. This mode is used for a test measurement or when a full automatic or automatic measurement cannot be performed due to extremely high viscosity of a sample or other reasons.

- (1) Click the [Interfacial Tension] button in the [Select Measurement] window.
- (2) Read the [Measurement Guid] and click the [Close] button.
- (3) Click the [Setup] icon  and select the [Measurement] tab. Select the [Basic] in the left column of the [Measurement Setup] window.



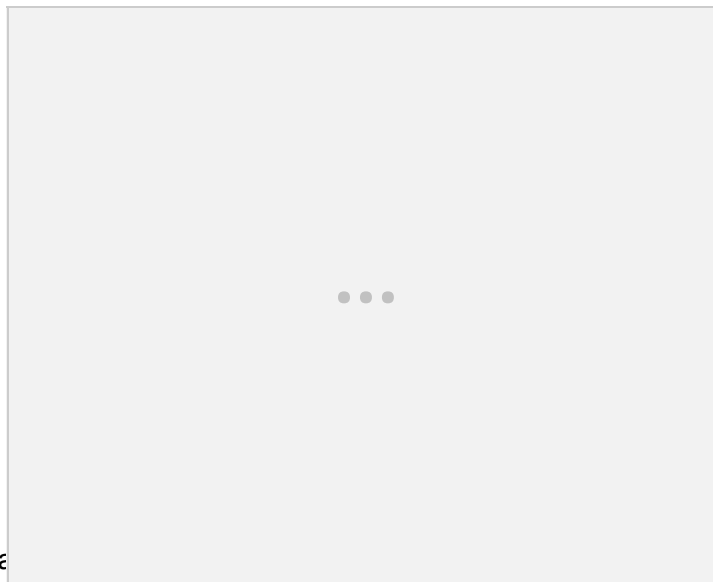
- (4) Select the [Sensitivity], [Integration Time], [Stability S.D.], and [End Time], are hidden. [Stage Act.] is not displayed, either.
- (5) Glow clean and cool down a probe. Perform a pre-wetting by wetting the probe to 5mm with the liquid sample used for the measurement. Handle the probe with tweezers.
- (6) Place the liquid sample on the stage and set the probe in the step (5) at the short hook.
- (7) Click the [Start Measurement] button to start the measurement.
- (8) Click the [Stage Up(High/Low)] buttons to bring the probe into contact with the surface of the liquid sample. Data acquisition is performed. After a desired measurement duration, click the [Close] button in the [Measuring] window to finish the measurement.

du Noüy method

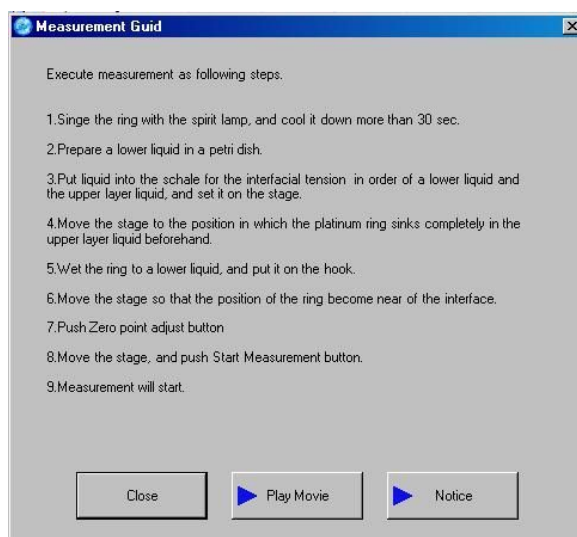
Two operation modes are described below taking an interfacial tension measurement by the du Noüy method as an example.

#### Automatic measurement

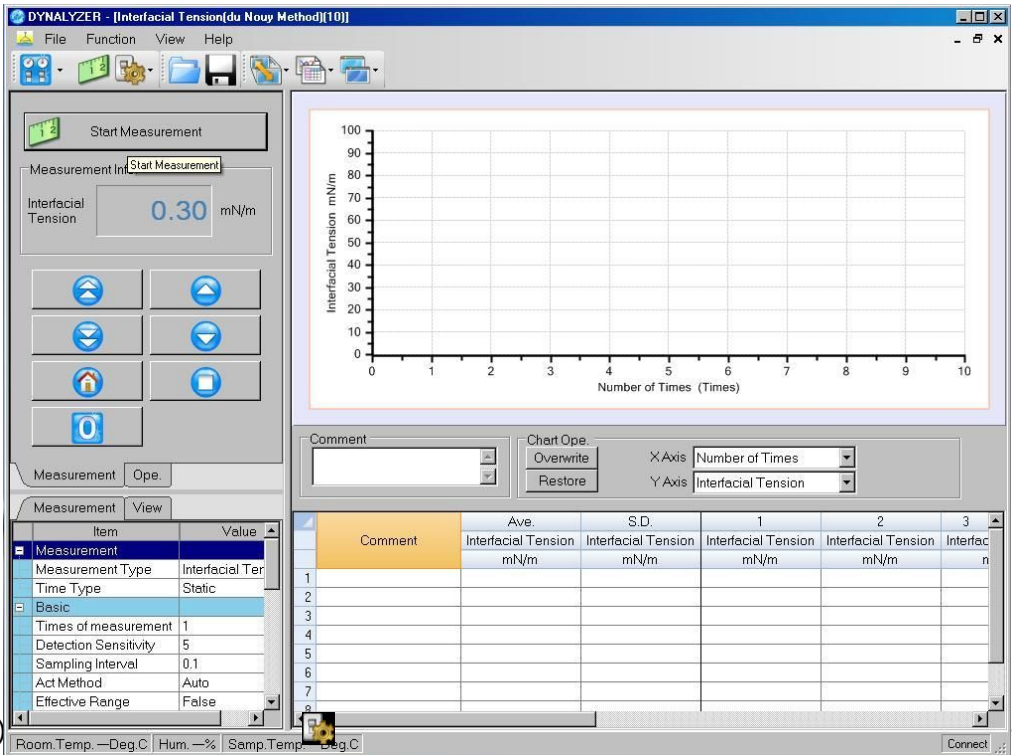
- (1) Click the [Interfacial Tension (du Noüy Method)] [Interfacial Tension (du Noüy Method)] button in the [Select Measurement] window.



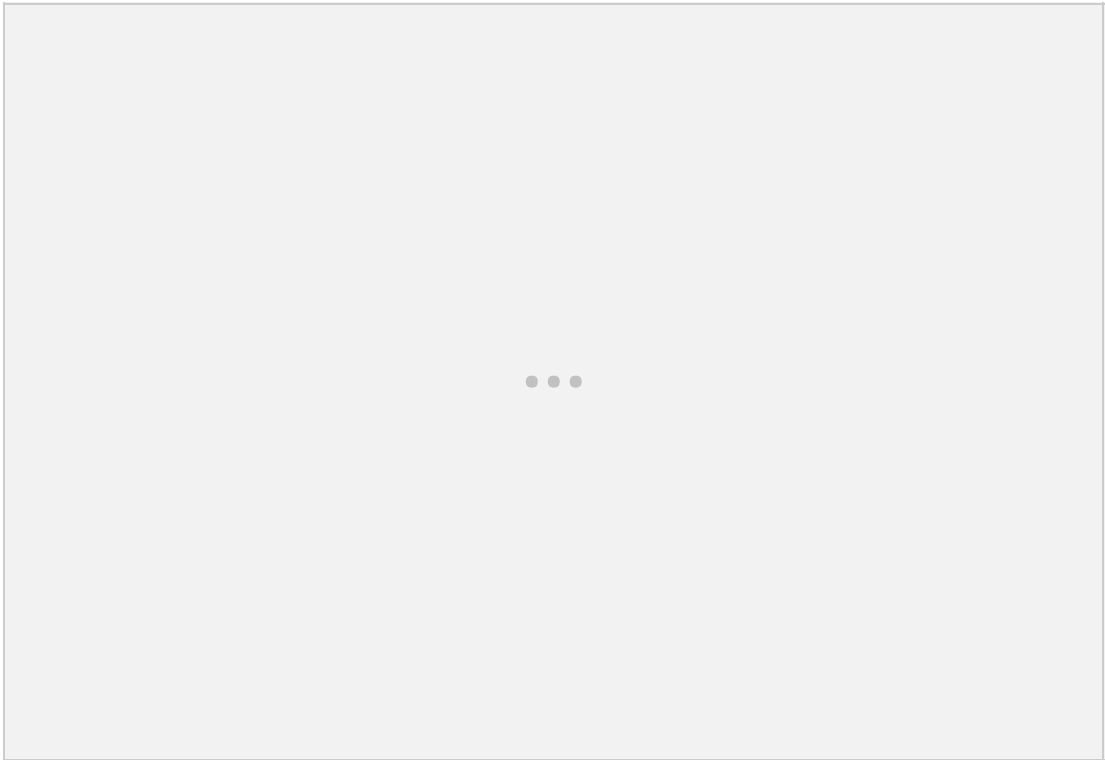
- (2) The [Measurement Guide] window closes and a measurement sheet is displayed. Click the [Close] button. The [Measurement Guide] window closes and a measurement sheet is displayed. Click the [Play Movie] button to view a movie describing measurement steps.



(3) An interfacial tension measurement sheet is displayed.

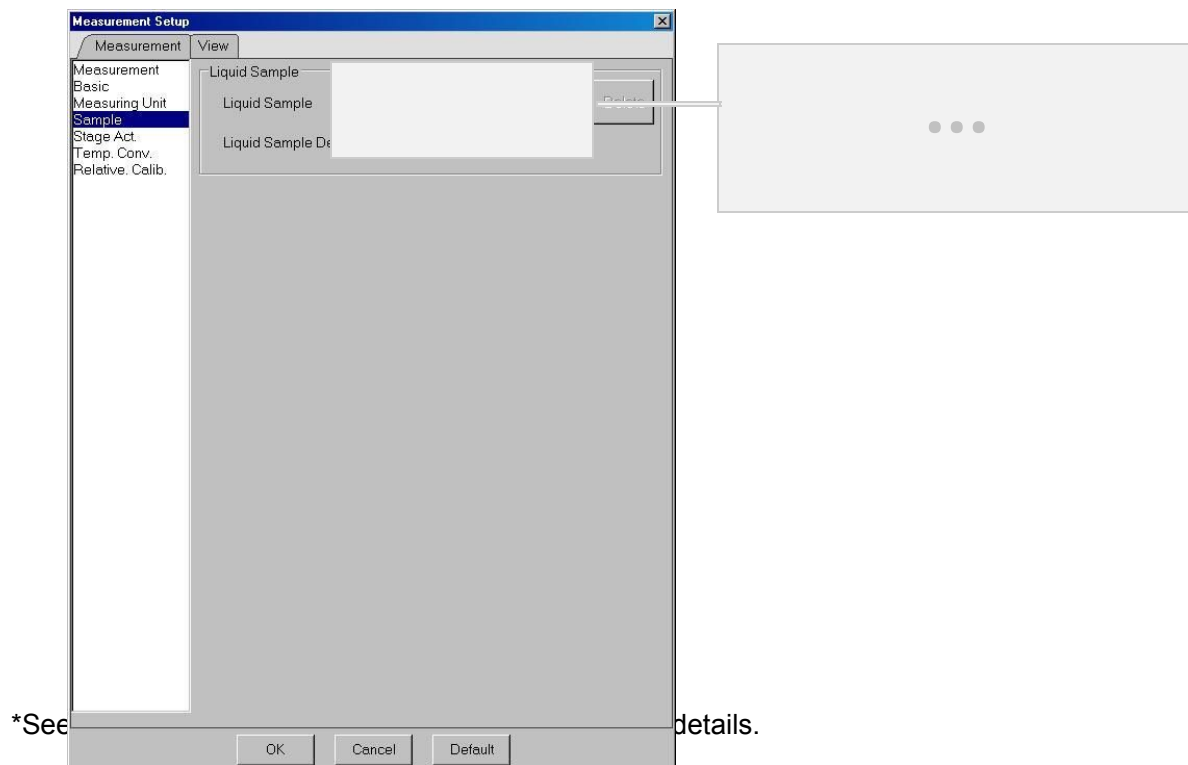


(4) Only in the left column of the [measurement] tab. Specify diameters of a ring wire rod and ring in the boxes.





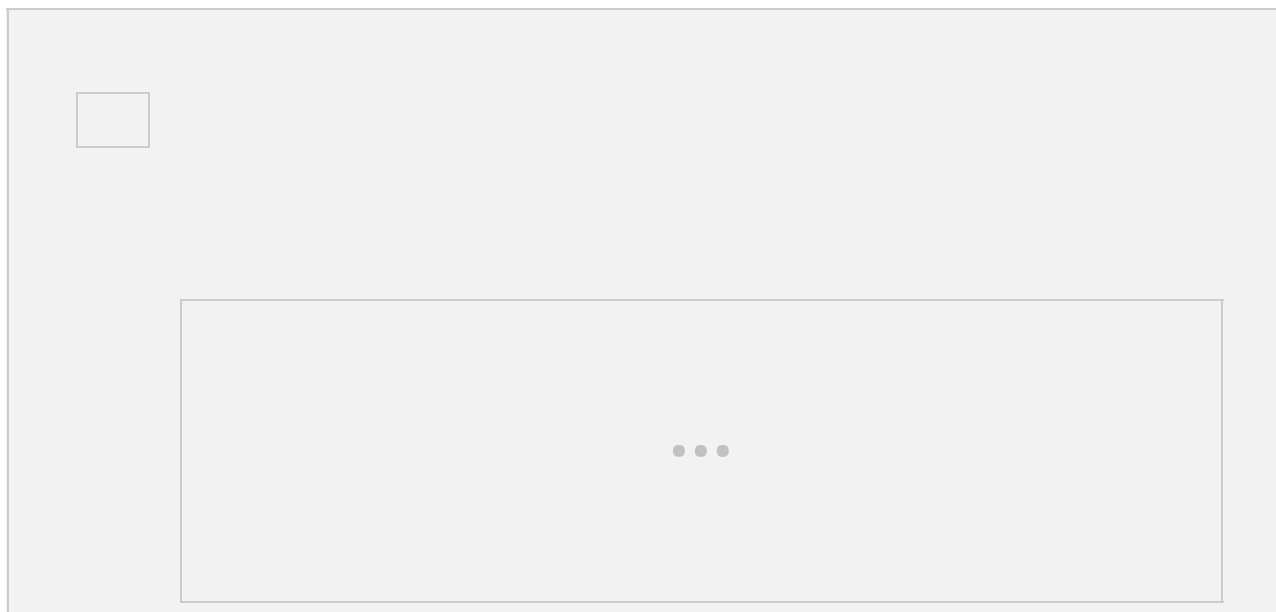
- (5) Select the [Sample] in the same column. Specify a density difference between the upper and lower layer liquid samples in the box.



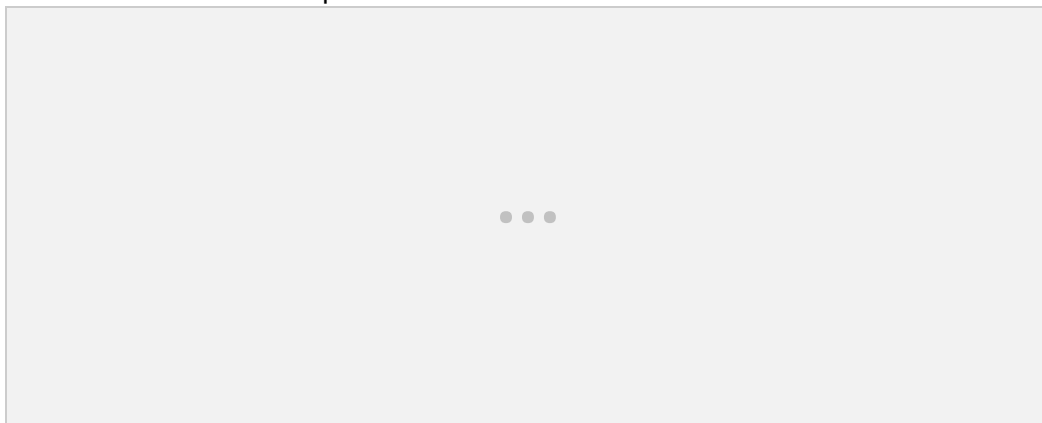
Interfacial tension measurement: [Measurement Setup] window

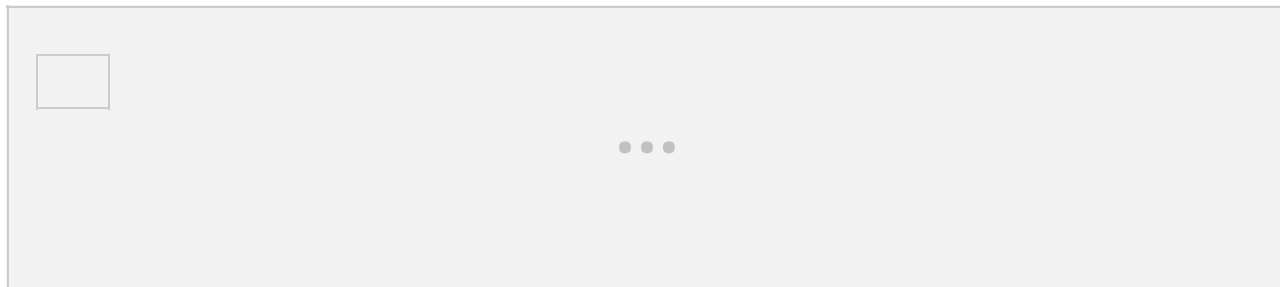


- (6) Glow clean a probe and cool it down for 30 seconds or more. While cooling down the probe, pour a lower layer liquid sample into a petri dish to pre-wet a platinum ring.
- (7) Prepare a measurement sample in a vessel. Pour a lower layer liquid sample up to 10mm from the bottom and an upper layer liquid sample to the depth of 5 to 10mm on top of it. The depth of the upper layer liquid sample must be 15mm or below. Otherwise, the measurement will not yield a correct result. For details, see the MEMO below.

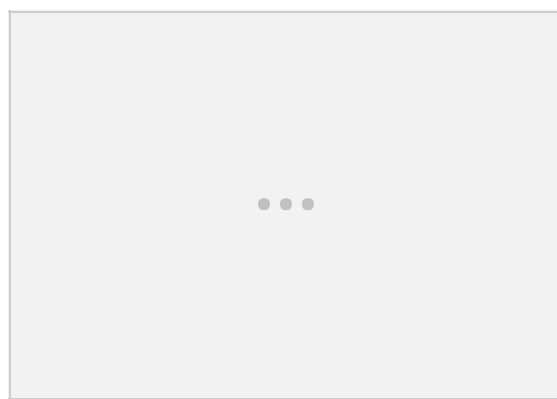
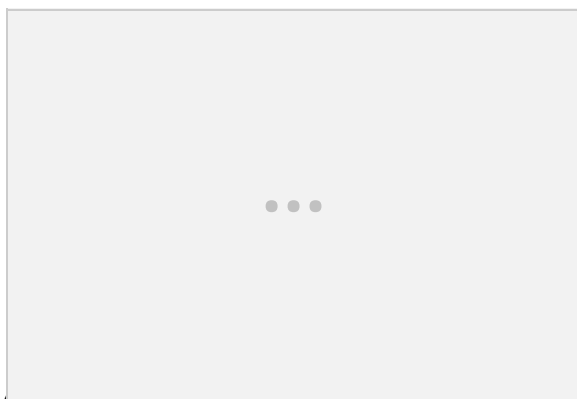


- (8) Lower the stage by the stage controller in the [Ope.] tab. Set the vessel containing the lower and upper layer liquid samples. Move the stage to the position where the platinum ring is completely immersed in the upper layer liquid sample (See “**Precaution in the interfacial tension measurement by the Du Noüy method**” (P.) for precautions in the du Noüy method).
- (9) Bring the probe into contact with the lower layer liquid sample in the petri dish, prepared in the step (6). Wet the probe up to 5mm from the bottom.
- (10) Hook the platinum ring at the DY-300 detecting element. Move the stage to bring the interface close to the probe.

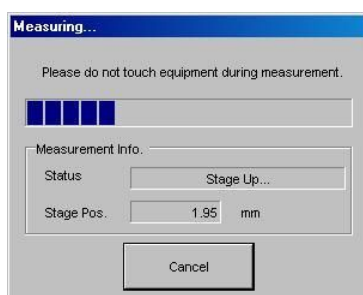




- (13) Click the [Zero Adj.] button and confirm that the result monitor shows “0.300” mN/m. This is a correction value of the liquid attached when the probe is wetted with the lower layer liquid sample. Click the [Start Measurement] button in the [Measurement] tab.




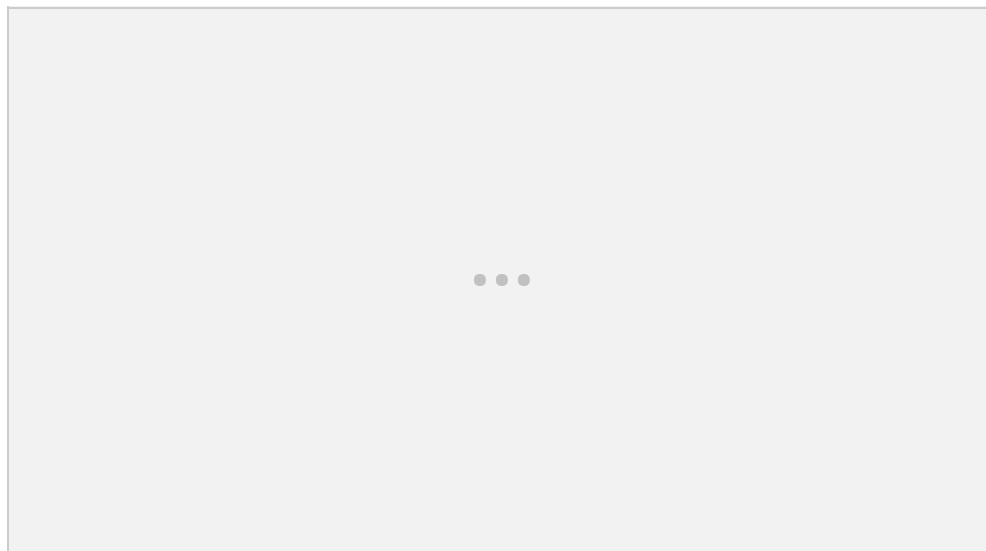
- (14) The [measuring] window is displayed during the measurement. In the [measuring] window, only the [Cancel] button is available during a full automatic or automatic measurement. The [Measuring] window closes and the measurement is complete. The measurement result is shown in a chart and table.



## Manual measurement

In a manual measurement, an operator performs all operations manually from pre-wetting, stage operation, to measurement start/end. This mode is used for a test measurement or when a full automatic or automatic measurement cannot be performed due to extremely high viscosity of a sample or other reasons.

- (1) Click the [Interfacial Tension] button in the [Select Measurement] window.
- (2) Read the [Measurement Guid] and click the [Close] button.
- (3) Click the [Setup] icon  and select the [Measurement] tab. Select the [Basic] in the left column of the [Measurement Setup] window.
- (4) Select the [Manual] in the [Act Method]. In the manual operation mode, items, [Detection Sensitivity], [Integration Time], and [Stability S.D.], are hidden.



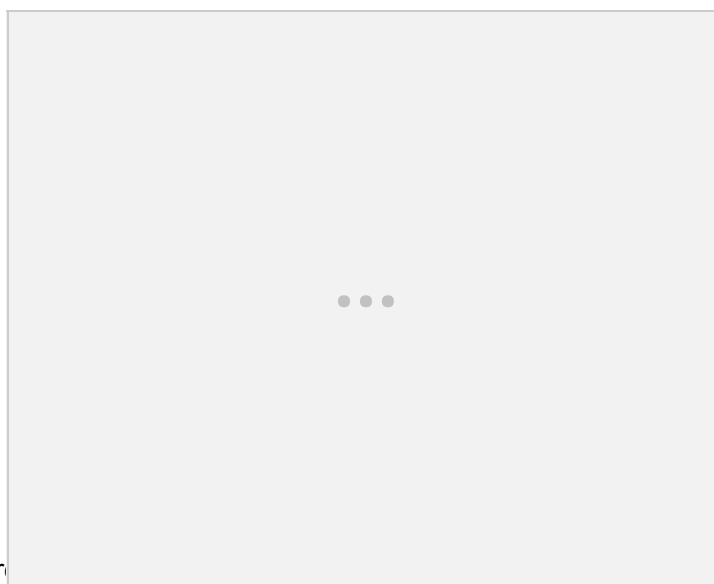
- (5) Select the [Sample] and specify a liquid sample density.
- (6) Pour a lower layer liquid sample into a petri dish to pre-wet a probe.
- (7) Prepare a measurement sample in a vessel. Pour a lower layer liquid sample up to 10mm from the bottom and an upper layer liquid sample to the depth of 5 to 10mm on top of it. The depth of the upper layer liquid sample must be 15mm or below. Otherwise, the measurement will not yield a correct result.
- (8) Glow clean and cool down a platinum ring. Perform a pre-wetting by wetting the ring to 5mm with the liquid sample used for the measurement. Handle the probe with tweezers.
- (9) Click the [Stage Up(High/Low)] buttons to move the stage to the position where the probe is immersed in the upper layer liquid sample.
- (10) Place the liquid sample on the stage and set the probe at the short hook. Confirm that the probe is immersed in the upper layer liquid sample.
- (11) Click the [Zero Adj.] button and "0.3" mN/m is displayed.
- (12) Bring the platinum ring into contact with the interface of the measurement samples.
- (13) Click the [Start Measurement] button to start the measurement.
- (14) The stage descends to perform the measurement.
- (15) The [Measuring] window is displayed during the measurement. The stage can be adjusted during the measurement. The [Measuring] window closes and the measurement is complete. The measurement result is shown in a chart and table.

9. 5.

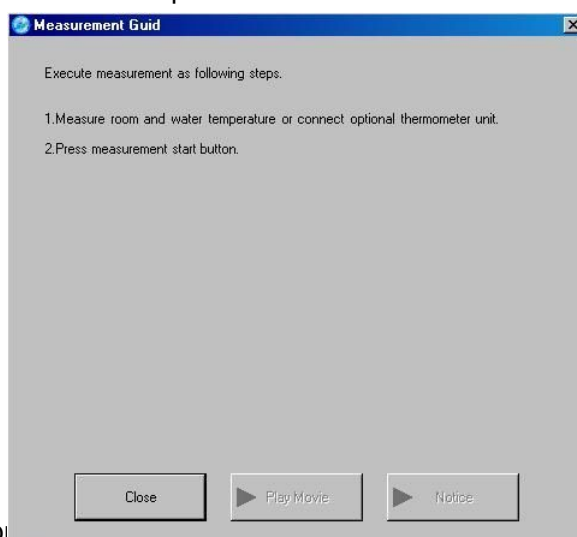
## Procedure for liquid density measurement

In a liquid density measurement, DYNALYZER employs a measurement method with a pycnometer. This measurement uses a liquid sample for obtaining a density as well as pure water as a reference for a density calculation. Use a liquid sample and water at the same temperature. This measurement method complies with JISZ8804.

- (1) Click the [Density] button in the [Select Measurement] window.

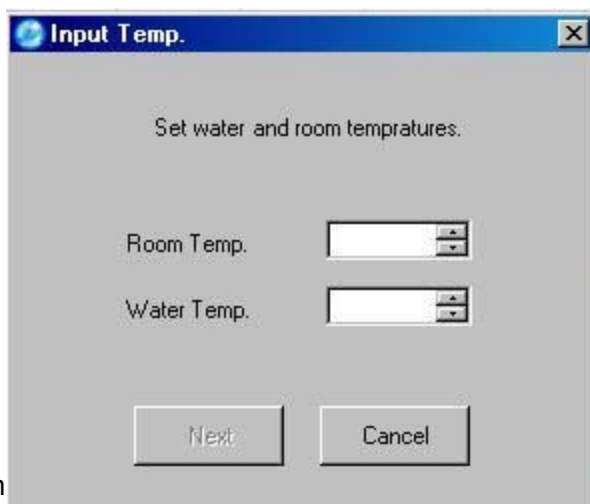


- (2) The [Measure] button is displayed. Proceed with the measurement following the steps. Click the [Close] button. The [Measurement Guid] window closes and the measurement window is displayed. To view a movie, click the [Play Movie] button in each measurement step window.



- (3) Click the [Close] button to close the [Measurement Guid] window. Click the [Start Measurement] button to start the measurement.

(4) Click the [Start Measurement] button and proceed with the measurement following the step-by-step instruction. Measure the ambient and pure water temperatures. Enter the values in the boxes. Click the [Next] button.

A dialog box titled "Input Temp." with a blue header bar containing a globe icon and a close button. The main area is light gray and contains the text "Set water and room temperatures." Below this, there are two labels: "Room Temp." and "Water Temp.", each followed by a white input box with a small up/down arrow on the right. At the bottom, there are two buttons: "Next" and "Cancel".

Input Temp.


Set water and room temperatures.

Room Temp.

Water Temp.

Next Cancel

- (5) Clean a pycnometer at the detecting element. Make sure the pycnometer hanging string and the pycnometer are coupled securely. Hook it to the detecting element softly. Confirm the value is stable in the result monitor. Click the [Next] button.

A dialog box titled "Measurement Step 1" with a blue header bar containing a globe icon and a close button. The main area is light gray and contains the text "Put an empty pycnometer on a hook, and press 'Next' Button." Below this, there are three buttons: "Next", "Cancel", and "Play Movie" (which has a blue play button icon to its left).

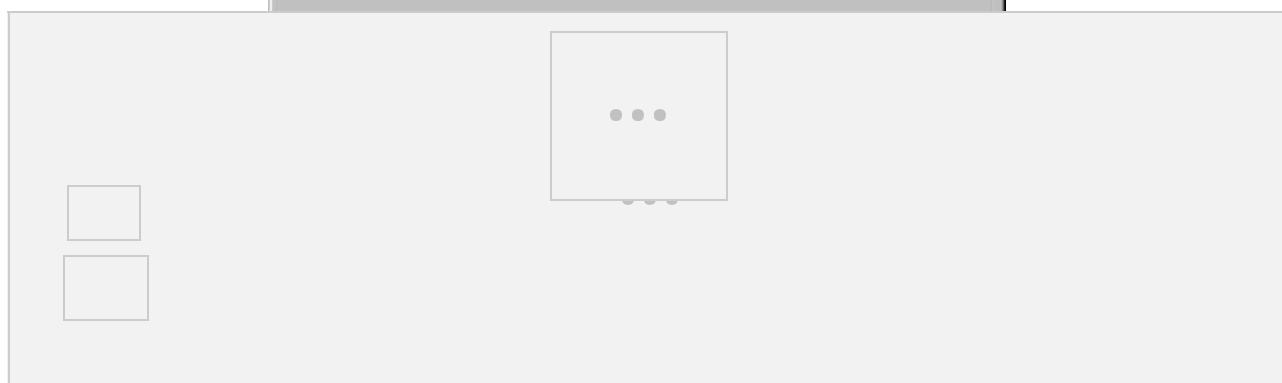
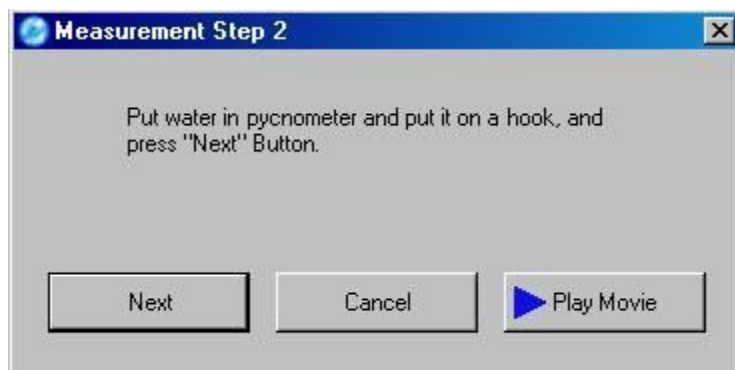
Measurement Step 1

Put an empty pycnometer on a hook, and press "Next" Button.

Next Cancel Play Movie



(6) Remove the empty pycnometer from the detecting element softly. Remove the hanging string from the pycnometer. Fill the pycnometer with pure water up to the brim. Close the lid. Wipe off the spilt water and clean the surface of the pycnometer. Attach the hanging string to the pycnometer and hook it to the detecting element softly. Confirm the weight is stable in the result monitor. Click the [Next] button.



(7) Remove the pycnometer filled with water from the detecting element softly. Drain the water and dry it thoroughly. Remove the hanging string from the dried pycnometer. Fill it with a sample liquid in the same manner as the pure water. Wipe off the spilt liquid sample and clean the surface of the pycnometer. Attach the hanging string to the pycnometer and hook it to the detecting element softly. Confirm the weight is stable in the result monitor. Click the [Next] button.



(8) The result of the liquid density measurement is shown in the result monitor, chart, and table.

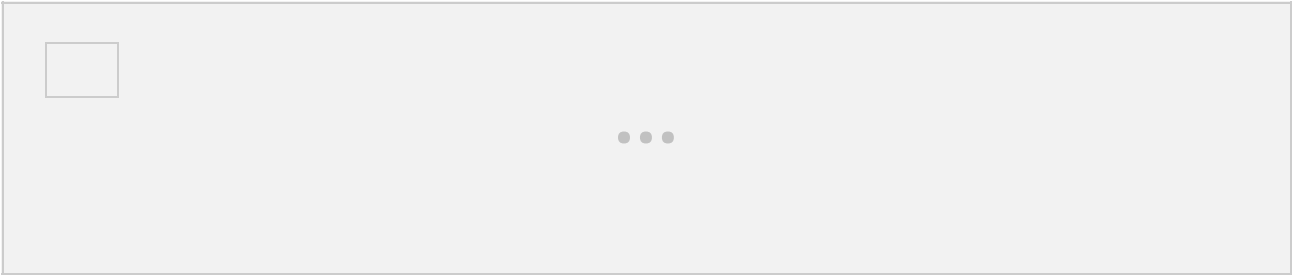
10.

# Detailed setup of measurements

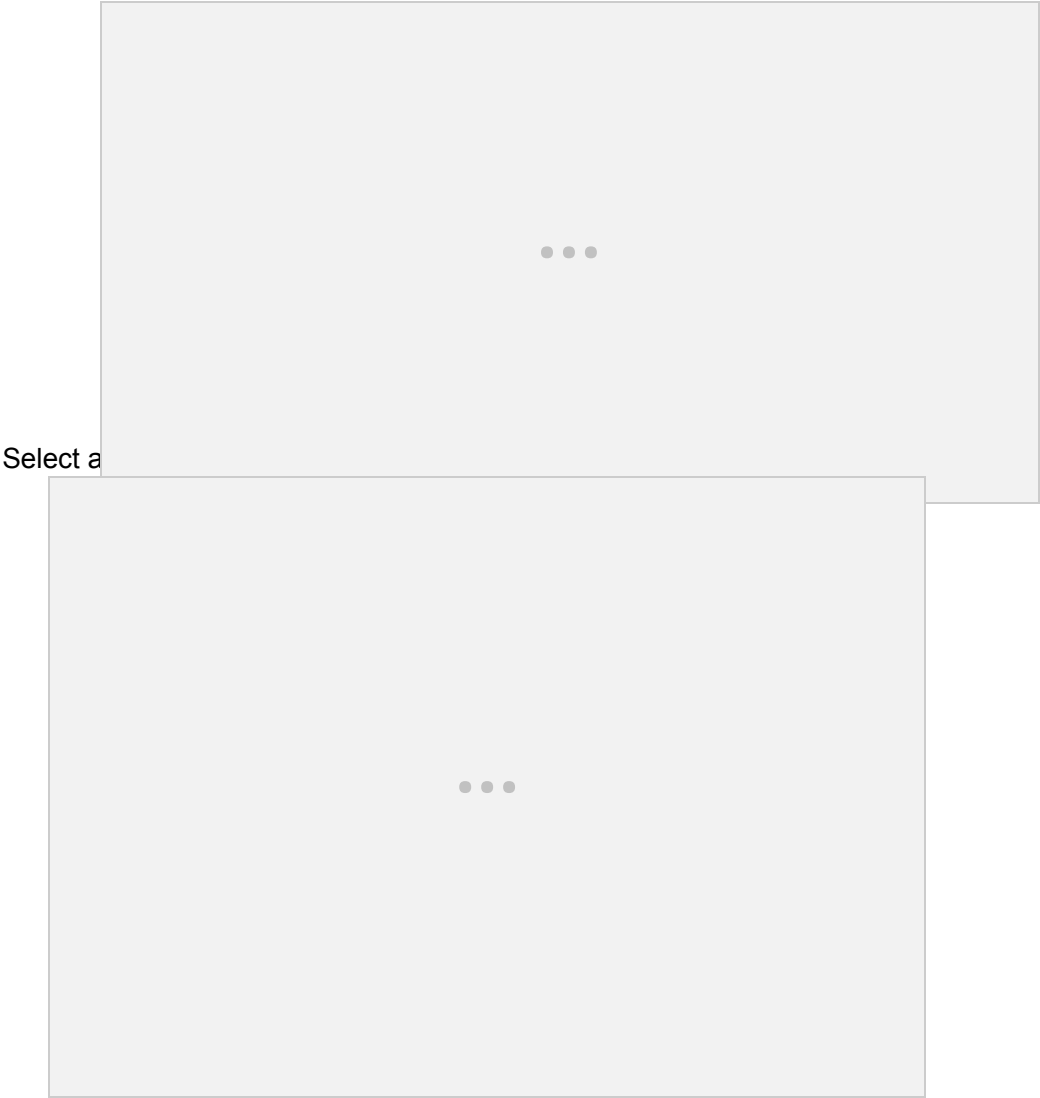
You can perform most measurements with DYNALYZER's default settings. Measurements in various conditions are also available by changing these settings. This section describes the items and setting procedures of the conditions.

Change the settings at [Measurement Setup] ([Measurement], [Basic], [Measuring Unit], [Sample], [Stage Act.], [Temp. Conv.], [Relative. Calib.]) and [System Setup] ([Device], [Communication], [View]) as necessary.

Click the [Default] button to reset the changed settings to the default.




<How to call the detailed setting screen>





### [Measurement] tab

You can specify items relating to measurement method and result. Click the [Setup] icon  to select the [Measurement Setup]. Select an item in the left column of the [Measurement Setup] window.

### Measurement

In a surface and interfacial tension measurements by the Wilhelmy method, you can perform a time-based measurement as well as a static measurement.

Name	Function
Measurement Type	The measurement type of the current measurement sheet is selected. The measurement sheet changes in accordance with the change of the measurement type.
Time Type	A static measurement and a time-based measurement are available. A time-based measurement is available with a platinum plate. In a surface and interfacial tension measurements and a lamella length measurement with a platinum ring, only a static measurement is available.

Available combinations at each measurement and duration type are shown below.

○: Available ×: Not available

Measurement	Time Type	Probe type	
		Platinum plate	Platinum ring
Surface Tension	Static	○	○
	Time-based	○	×
Interfacial Tension	Static	○	○
	Time-based	○	×
Lamella	Static	×	○
	Time-based	×	×

## Basic

When a contact liquid detection is difficult in a measurement such as using a sample with low interfacial tension, you can change the sensitivity value of the contact liquid. You can also switch the operation mode to manual operation when measuring a sample with high viscosity.

Items in the [Basic] may be hidden or unavailable depending on the measurement method.

Name	Function
Times of measurement	Specifies the number of measurements you perform continuously after a probe is glow cleaned once. This is an easy method but for a more reliable result, we recommend you glow clean the probe after every measurement instead of performing continuous measurements.
Detection Sensitivity	Specifies a surface tension that detects the contact between the probe and liquid surface. Specify a value smaller than the default when a contact liquid detection is difficult due to a sample with low interfacial tension or with high viscosity.
Integration Time	This is an integration time of raw data in a static surface and interfacial tension measurements by the Wilhelmy method. A measurement result is given by averaging the data in the integration time. Also, the stability of the raw data is determined in this duration.
Stability S.D.	Specifies a reference value to judge the raw data's stability in a static surface and interfacial tension measurements by the Wilhelmy method. A measurement result is given by averaging the raw data in the integration time when their standard deviation falls below the standard deviation of stability.
End time	In a static measurement, specifies a time to forcibly terminate the measurement when the data is judged unstable in the integration time. Specifies a time from a measurement start to end in a time-based measurement.
Sampling interval	Specifies a time interval to collect data.
Act Method	Checks the [Full Auto] to perform a series of a zero adjustment, liquid contacting, pre-wetting, and measurement automatically. Check the [Auto] to perform only a zero adjustment and pre-wetting manually. Check the [Manual] to perform all the process manually.
Effective Range	Checks to judge acceptability in quality control. By setting an upper and lower limits, the value exceeding the tolerance is displayed in red.

### Measuring Unit

You can specify the probe size.

Name	Function
Plate Width	Specifies a width of a platinum plate, glass plate (option), or Teflon plate (option). The default (23.85mm) is applicable for a Kyowa platinum plate, glass plate, and Teflon plate.
Plate Thickness	Specifies a thickness of a platinum plate, glass plate (option), or Teflon plate (option). The default (0.15mm) is applicable for a Kyowa platinum plate. Set at 0.3mm for a Kyowa glass plate or Teflon plate.
Ring wire diameter	For a platinum ring (option), specify the diameter of the ring wire rod shown on the platinum ring case.
Ring diameter	For a platinum ring (option), specify the diameter of the ring shown on the platinum ring case.

In a liquid density measurement, the [Measuring Unit] is not displayed in the left column of the [Measurement] tab.

### Stage Act.

You can specify the stage operation in a measurement. Default settings will suffice for general measurements.

Point the mouse pointer on the entry area to display the maximum and minimum values available for each item.

Name	Function
Stage Up Speed	Specifies an ascent speed of the stage in a measurement.
Stage Down Speed	Specifies a descent speed of the stage in a measurement.
Pre-Wet Stage Up Speed	Specifies an ascent speed of the stage in a pre-wetting in a full automatic measurement. It is hidden in an automatic and manual measurements and an interfacial tension measurement.
Pre-Wet Stage Down Speed	Specifies a descent speed of the stage in a pre-wetting in a full automatic measurement. It is hidden in an automatic and manual measurements and an interfacial tension measurement.
Pre-Wet Distance	Specifies an immersion depth of the probe in a pre-wetting in a full automatic measurement. It is hidden in an automatic and manual measurements and an interfacial tension measurement.
Pre-Wet Time	Specifies a stop time in a pre-wetting immersion depth in a full automatic measurement. It is hidden in an automatic and manual measurements and an interfacial tension measurement.
Descend Distance	Specifies a distance that the stage automatically descends after a measurement with reference to the stage position at liquid contacting. The shorter the distance is, the more the measurement time can be saved. However, if the distance is too short, the hooked probe may contact with the liquid surface by vibration in setting at the short hook.

### Temp. Conv.

You can convert the measurement values of a surface and interfacial tension measurements to those at a specified temperature. A surface thermometer (option) is required for a temperature conversion. Also, a temperature correction factor of the liquid sample's surface tension must be known.

Name	Function
Temperature	Specifies a conversion temperature.
Temperature coef.	Specifies a temperature correction factor of the liquid sample. A temperature correction factor is a unique value for each liquid sample. Enter a literature value, etc.

### Relative. Calib.

You can specify properties of a liquid sample (calibration liquid) as a reference for a relative calibration.


Check the [Use Relative. Calib.] to perform a measurement with a relative calibration. A measurement with a relative calibration cannot be preformed just by specifying the [Relative. Calib.] in the [Calibration] of the [Function] menu.

Name	Function
[Use Relative. Calib.] check box	Select to perform a measurement with a relative calibration using a liquid sample (calibration liquid) which surface tension is known and does not change over time.
Surface Tension	Specifies a surface tension of a calibration liquid.
Temperature	Specifies a temperature of a calibration liquid.
Temperature coef.	Specifies a temperature correction factor of a calibration liquid. A temperature correction factor is a unique value for each liquid sample. Enter a literature value, etc.

Relative calibration setup is not displayed in a liquid density measurement.

## [View] tab

You can specify items relating to the display method of charts and tables, for example, the display method of chart axes and addition of table items.

Click the [Setup] icon  to select the [Measurement Setup]. Select an item in the left column of the [View] tab.

### Chart Axis

You can specify chart axes in a measurement sheet.

Name	Function
X Axis Min.	Specifies the minimum value of the X-axis in a chart.
[Auto Adjust] check box	Adjust the minimum value of the X-axis automatically based on the displayed values.
X Axis Max.	Specifies the maximum value of the X-axis in a chart.
[Auto Adjust] check box	Adjusts the maximum value of the X-axis automatically based on the displayed values.
[Log View] check box	Displays a chart in logarithmic scale.
Y Axis Min.	Specifies the minimum value of the Y-axis in a chart.
[Auto Adjust] check box	Adjusts the minimum value of the Y-axis automatically based on the displayed values.
Y Axis Max.	Specifies the maximum value of the Y-axis in a chart.
[Auto Adjust] check box	Adjusts the maximum value of the Y-axis automatically based on the displayed values.
[Log View] check box	Displays a chart in logarithmic scale.

## Output

You can add and delete display items in a table of a measurement sheet. Available output items vary depending on each measurement. DYNALYZER stores all other items that are not selected to display. A CSV file you store measurement data to has all items in it.

For a surface and interfacial tension measurements and a lamella length measurement Result items can be added in a measurement sheet. To display, click the [Setup] icon and select the [System Setup]. Then, select the [View] tab. Select the check box of a desired item to display in the table of the measurement sheet.

Name	Function
Surface Tension	Displays a surface tension measurement value.
Surface Tension (Temp.)	Displays a surface tension converted to the one at a specified temperature using a surface tension measurement value and sample temperature. (See “Surface tension” (P.) for details.)
Force	Displays a force acts on a probe. (See “Measurement principles” (P.) for details.)
Weight	Convert a measuring force to a weight.
Stage Pos.	Displays a stage position in a measurement.
Sample Temp.	Displays a sample temperature during a measurement by connecting an optional surface thermometer. Without the thermometer, the sample temperature shows “0.0” in the measurement sheet.
Room Temp.	Displays an ambient temperature during a measurement by connecting an optional environmental thermo-hygrometer. Without the environmental thermo-hygrometer, the sample temperature shows “0.0” in the measurement sheet.
Room Hum.	Displays an ambient humidity during a measurement by connecting an optional environmental thermo-hygrometer. Without the environmental thermo-hygrometer, the sample temperature shows “0.0” in the measurement sheet.
Start Time	Displays a measurement start time.
End time	Displays a measurement end time.


For a liquid density measurement

Items differ from those of a surface and interfacial tension measurements.

Name	Function
Density	Displays a liquid density measurement value.
Specific Gravity	Displays a specific gravity with reference to the pure water density at 4°C.
Sample Temp.	Displays a pure water temperature specified in a liquid density measurement.
Room Temp.	Displays an ambient temperature specified in a liquid density measurement.
Room Hum.	Displays an ambient humidity during a measurement by connecting an optional environmental thermo-hygrometer. Without the environmental thermo-hygrometer, the sample temperature shows “0.0” in the measurement sheet.
Start Time	Displays a measurement start time.
End time	Displays a measurement end time.

### <System Setup>

You can specify hardware, communications, and DYNALYZER window display.

Click the [Setup] icon  to select the [System Setup]. Select a tab in the upper side of the [System Setup] window.

#### [Device] tab

You can perform hardware control setup. You can specify a stage speed operated by the stage controller and a weight of a balance weight for an external calibration. Point the mouse pointer on the entry area to display the maximum and minimum values available for each item.

Name	Function
Home	Specifies a stage standby position before a measurement. It corresponds to the standby position setting in the [Ope.] tab in the measurement window.
Home move speed	Specifies a moving speed of the stage when it returns to the standby position.
Speed (High)	Specifies a moving speed (high) of the stage.
Speed (Low)	Specifies a moving speed (low) of the stage.
Go to Origin	Perform a zero return by lowering the stage to the origin at the bottom.
Weight	Specifies an external calibration weight for an absolute calibration. Specify when a weight other than the default is used for the calibration.
[Reset External Calib.] button	Resets the settings to the factory default.

### [Communication] tab

You must check the communication status again when DY-300 and your PC are disconnected or the communication is unstable during a measurement. By checking and specifying the communication setup, the connection can be restored without restarting the software.

The [Connect] button is not available during the communication. The [Connect] button becomes available when the communication is disconnected or not established yet.

Name	Function
Stage	Displays and set up the communication with the stage. Status: Display connected /disconnected status. [Connect] button: Set disconnected status back to connected status.
Balance	Displays and set up the communication with the built-in balance. Status: Display connected /disconnected status. [Connect] button: Set disconnected status back to connected status.
Thermometer	Displays and set up the communication with a liquid sample thermometer. Status: Display connected /disconnected status. [Connect] button: Set disconnected status back to connected status.
Thermo-hygrometer for environment	Select when environmental thermo-hygrometer is set.

### [View] tab

You can specify display settings of DYNALYZER windows. Display style and the display/hide setting of the [Measurement Guid] window are specified.

Name	Function
[Show measurement menu at start up] check box	Uncheck to hide the [Measurement selection] window displayed just after starting the DYNALYZER.
[Show chart] check box	Specifies the status when a measurement sheet is open. In the default, a chart and table are displayed. Uncheck to hide the chart.
[Show Grid] check box	Specifies the status when a measurement sheet is open. In the default, a chart and table are displayed. Uncheck to hide the table.
View Style	Specifies the status when a measurement sheet is open. In the default, the display style is in the full mode. Select the wide mode or controller mode from the ▼ button in the right.
[Show measurement step] check box	Uncheck to hide the [Measurement Guid] window.



# Handling of probes

## 11. 1. Platinum plate and ring

Do not handle a platinum plate and ring with bare hands. Grasp the hook by tweezers.

When you glow clean a platinum plate or ring by an alcohol lamp, handle them carefully to avoid a burn.

For samples with high viscosity, clean the probe with a wiper first and then rinse it with organic solvents before glow cleaning.

For samples with relatively low viscosity but added with inorganic salt, rinse the probe with a proper cleaning solvent and glow clean. When the sample contains a silicone in particular, if the probe is glow cleaned without rinsing, the silica converted from the silicone is bonded to the probe, which cannot be removed.

Keep them in the attached case when they are not used.

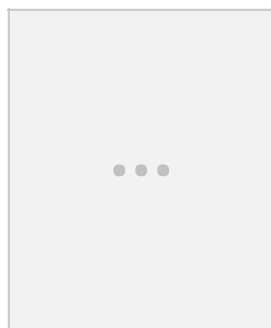
### Maintenance of a platinum ring

Use an optional platinum ring corrector for maintaining a platinum ring.

The platinum ring corrector allows for correcting the platinum ring shape and measuring its diameter.

### How to use a platinum ring corrector (shape correction)

- (1) Set a platinum ring in a platinum ring corrector. Hold the platinum ring upside down and insert the hook straight to the corrector.



- (2) Evenly press down the ring part. Make sure not to apply an excessive force to avoid damage to the ring part.

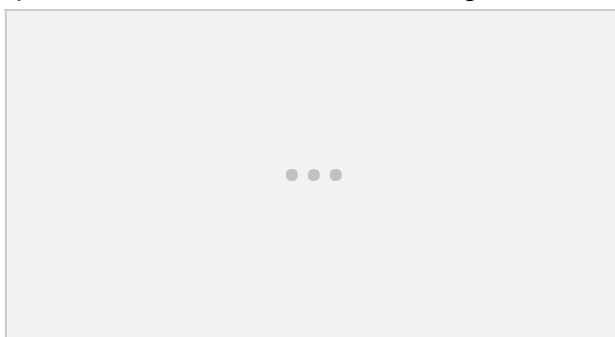


- (3) Remove the platinum ring from the corrector and check if the ring part is circular. Also, hang it to DY-300 to check if the ring part is horizontal to the liquid surface. If it is not horizontal, adjust the hook angle so that it becomes horizontal.

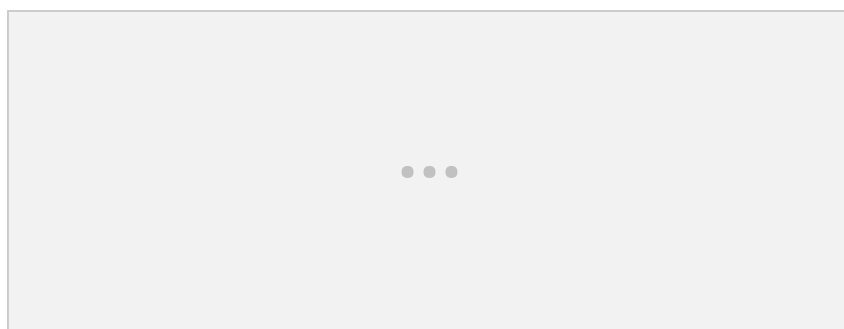
### How to measure the ring diameter

- (1) Set a platinum ring in a platinum ring corrector.

Hold the platinum ring upside down and insert the hook straight to the corrector.

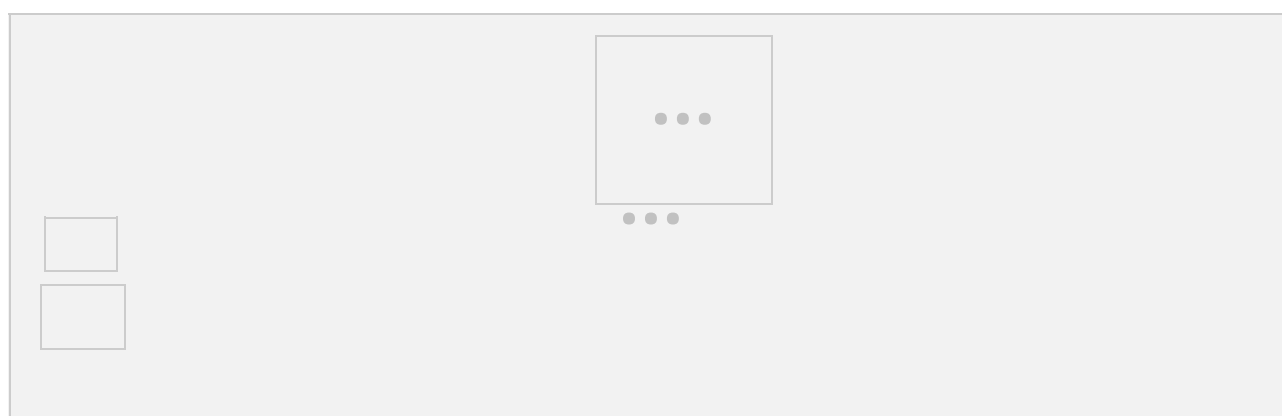
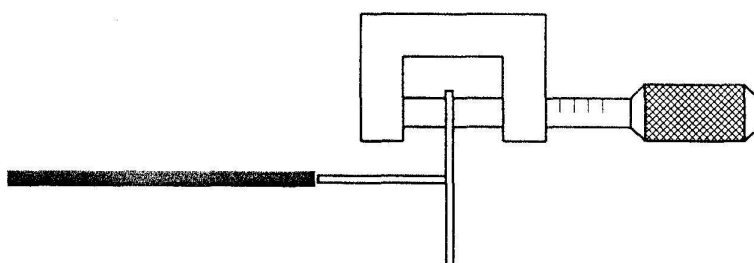


- (2) Using a micrometer, measure the several parts of the platinum ring in the corrector and figure out the average.



### How to measure the diameter of a ring wire rod

- (1) Measure the ring part of a platinum ring by a micrometer.



carefully not to damage the ring part.

11. 2.

## **Pycnometer**

Handle a glass-made pycnometer with care. Clean the pycnometer thoroughly with a cleaning solvent appropriate for a sample, and then dry it. Do not use it if there is any chip on the contact portion and the lid.

## 12. **Daily maintenance**

For early detection of failures and collection of reliable data, perform the following inspections before using the instrument.

DY-300:

- Checks if the switch lamp is lit when the power switch is turned on.
- Checks if DY-300 is set on the level.

Stage:

- Checks if ascending and descending movements of the stage are controlled smoothly from DYNALYZER.
- Checks if the stage descends to the bottom (zero return) when DY-300 is turned on.

Balancer:

- Checks if the balancer is fixed securely. Do not apply an excessive load when checking.

Balance:

- In an absolute calibration, hook the plate only and click the [Zero Adj.] button. Check if the weight monitor shows 0.000g. Then, hook balance weights of 0.4g (200mg x 2) to the plate and check if the weight monitor shows 0.400g.

Probe:

- Checks the probe (plate or ring) for deformation or damage.
- Checks the probe for stain.

13.

# Options

A variety of options are offered for DY-300 as below.


Optional tool	Description
Platinum ring	Use for a surface and interfacial tension measurements by the du Noüy method and the lamella length measurement.
Platinum ring corrector	Use to adjust the platinum ring shape.
Liquid density measurement kit	A pycnometer and its hanging string are included. Use to measure a liquid density.
Jacket type stage set	It is a system to control a liquid sample temperature. A surface thermometer and a hot/cold water circulator, 4VT, are required additionally.
Heater type stage system	It is a combination of a stage system and controller to control a liquid sample surface temperature.
Surface thermometer	Use to measure a liquid sample surface temperature. Connect to a PC to retrieve data.
Environmental thermo-hygrometer	Use to measure an ambient temperature and humidity. Connect to a PC to retrieve data.
Hot/cold water circulator, 4VT	Controls the circulating water temperature in the jacket type stage system.

For more information on options, please contact Kyowa sales division.

14.

# Frequently Asked Question

## 14. 1. Hardware


- Power is not turned on.  
The power cord may be unplugged. Check if it is connected to an outlet. Check the power tap switch as well if applicable. Please contact us if the power is still not turned on after checking the above although the cord is properly connected.
- DY-300 or peripheral instruments including a PC are not turned on.  
Checks the connection switch. Check the power tap switch as well if applicable. Please contact Kyowa sales support division if the power is still not turned on after checking the above although the cord is properly connected.
- The stage does not move.  
The stage may be positioned at either the top or bottom. Click the [Setup]  on and select the [System Setup], [Device] tab, and then [Go to Origin] button. The stage performs a zero return and the position is reset.
- I pulled the detecting element hook strongly.  
The detecting element is designed in a way that a measurement is not affected by a strong force to a certain level. However, make sure to perform a calibration again before a measurement because the calibration value may be out of alignment.  
If the detecting element is damaged, a measurement may not be performed properly. Please contact Kyowa sales division for a repair or replacement.
- I dropped a probe.  
If a platinum plate or ring became stained, glow clean it. If a platinum ring is bent or deformed, it can be fixed by an optional corrector. If the probe is extremely bent or the platinum plate is damaged, we recommend replacement. Please contact Kyowa sales division.
- A calibration balance weight became stained.  
If a balance weight became stained by touching it with bare hands, clean it with ethanol using an ultrasonic cleaner and dry it thoroughly. Calibrate the balance weight as necessary.
- I dropped a calibration balance weight.  
If a calibration balance weight was dropped and damaged, calibrate the balance weight. Please contact Kyowa.

## 14. 2.

## Software

- The weight or measurement value display does not change even after applying a load to the probe.

DY-300 and the PC may be disconnected. Check the followings.

1. Check if DY-300 is securely connected with the PC through a USB cable.
2. Check if DY-300 is powered on.
3. Check if you can operate the stage through the controller.
4. Click the [Setup] icon  and select the [System Setup]. Check the [Connect] buttons of the stage and balance in the [Communication] tab.

- It is connected but a measurement does not start.

Check if the license key is set on the PC. Measurements cannot be performed without the license key.

- Data was lost when I changed measurement settings.

Make sure to display a new measurement sheet when you change measurement settings. Save the existing sheet every time you change the settings. Otherwise, data will be lost.

14. 3.

## Measurement

- How much sample liquid do I need to prepare?

For a static surface tension measurement, prepare it up to four-fifths level of a petri dish. In an interfacial tension measurement by the Wilhelmy method, pour a lower layer liquid sample up to 10mm from the bottom of a vessel and an upper layer liquid sample to the depth of 15mm on top of it. The preparation process of an interfacial tension measurement by the du Noüy method is same as that of the Wilhelmy method, however, the depth of the upper layer liquid sample must be 15mm or less. Otherwise, the horizontal column of the platinum ring contacts the upper layer liquid sample, which leads to an erroneous measurement.

- I cannot obtain an expected result.

Check the followings.

1. The liquid sample may be contaminated or deteriorated. If the storage method of a liquid sample is not appropriate or too much time has passed since it was poured into a petri dish, the liquid property may change. In particular, the surface tension of a liquid that is prone to change over time such as an aqueous surfactant solution may change from moment to moment.
2. The petri dish (or vessel) may be contaminated. Clean the inside and outside of the petri dish (or vessel) completely with a cleanser. Rinse it thoroughly. Wipe off the water outside the petri dish (or vessel) completely. Do not wipe off the water inside the petri dish (or vessel). Wash it with a measuring liquid sample.
3. Probe cleaning may not be sufficient. Properly clean the probe such as by glow cleaning.
4. The calibration method may not be appropriate. Setting of the external calibration weight or the weight of the used balance weights may be wrong. If the instrument was kept unused for a long time or was moved, the instrument properties may be changed. Calibrate it again.
5. Check the liquid sample temperature used in the measurement. A surface and interfacial tensions vary depending on sample temperatures. A probe may not be wetted by a liquid sample sufficiently due to the deterioration of the probe or liquid sample properties. Attempt measures such as replacing the probe, extending the pre-wetting depth, or performing a relative calibration.

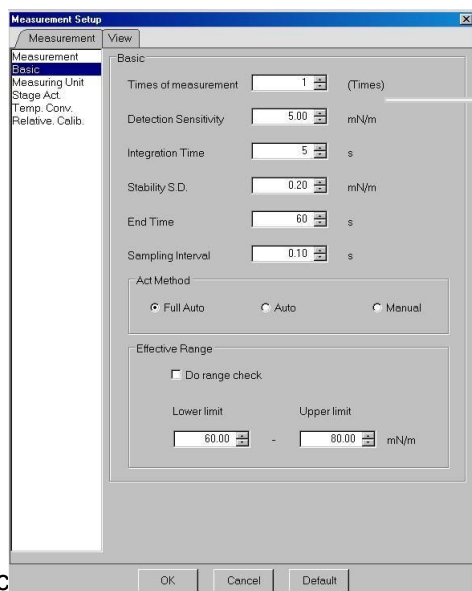
- Variation of measurement values is too large.

Check the followings.

1. The instrument may be affected by the airflow from the air conditioning. Close the cover of DY-300 during a measurement.
2. The instrument may be affected by ambient vibrations. Set DY-300 on a secure test bench. Use a vibration isolation bench as necessary.
3. In a liquid such as an aqueous surfactant solution, the surface tension varies depending on the absorption status of surfactant molecules. The absorption status of a low density aqueous solution, in particular, varies widely according to the length of duration from when it is poured to a vessel to when it is measured. Thus, the measurement result turns out to have a wide variation.



- The stage does not stop when the plate comes into contact with a liquid sample.  
In a measurement of a liquid sample with low interfacial tension, DY-300 may not detect that the plate is in contact with the liquid. Lower the sensitivity value of the contact liquid.




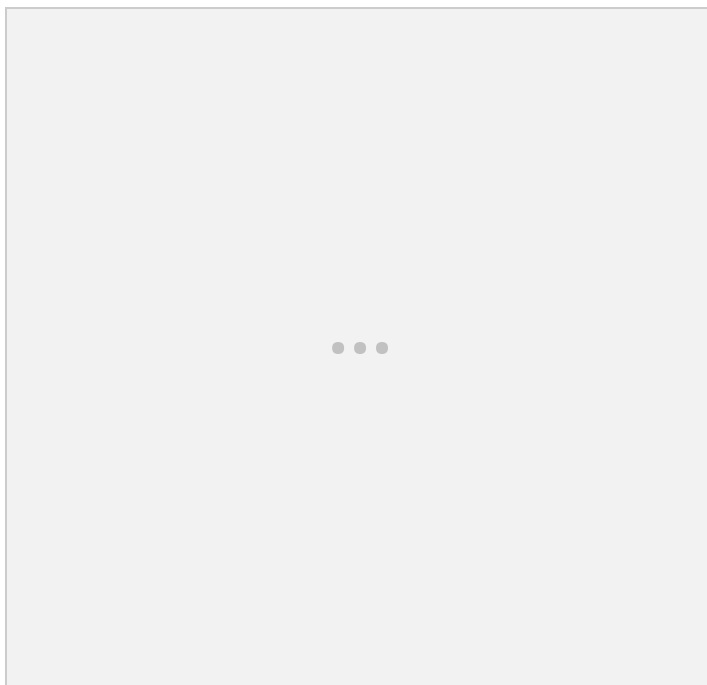
Most samples contact the platinum plate. However, some samples may be difficult to be measured due to their wetting problem. Please contact Kyowa customer support for optional probes or advice for other measuring methods.

- The plate repels the sample.  
The plate surface may be stained. Glow clean the plate with an alcohol lamp again, and then start the measurement. The plate may repel liquids with very high surface tension, such as an aqueous solution of inorganic salt.

- I need a time-based measurement.


In a surface and interfacial tension measurements with a platinum plate, a time-based measurement is available as well as a static measurement.

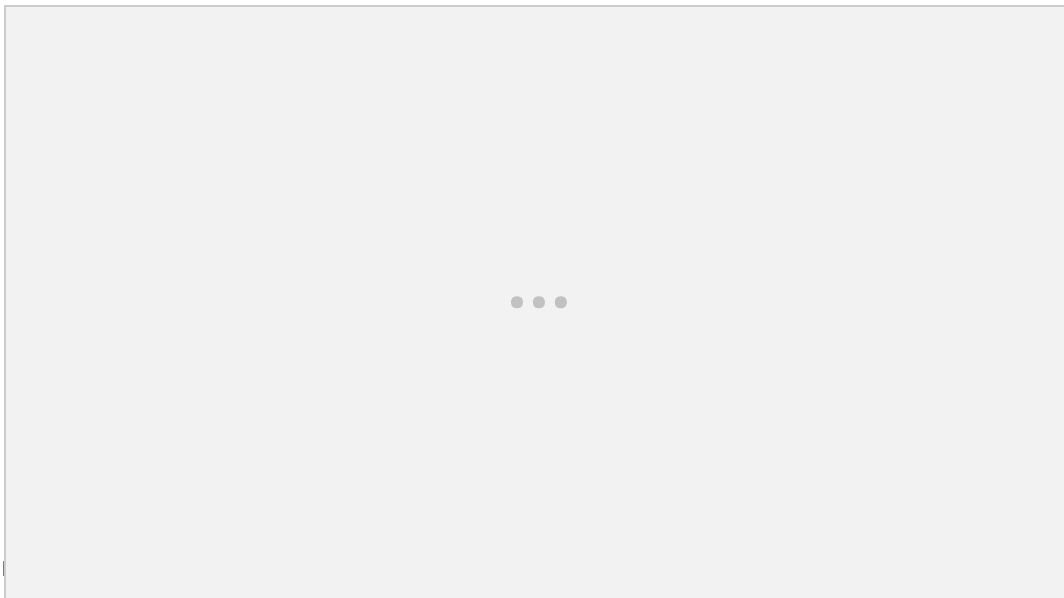
- (1) Click the [Setup] icon  and select the [Measurement Setup].
- (2) Click the [Measurement] in the left column of the [Measurement] tab.
- (3) Select the [Time-based] in the [Time Type].
- (4) Select the [Basic].
- (5) Enter an End time and a sampling interval.
- (6) Check a desired operation mode.
- (7) Click the [OK] button.



- I need to perform a measurement manually.


Manual measurement is used for a test measurement or when a full automatic or automatic measurement cannot be performed due to extremely high viscosity of a sample or other reasons.

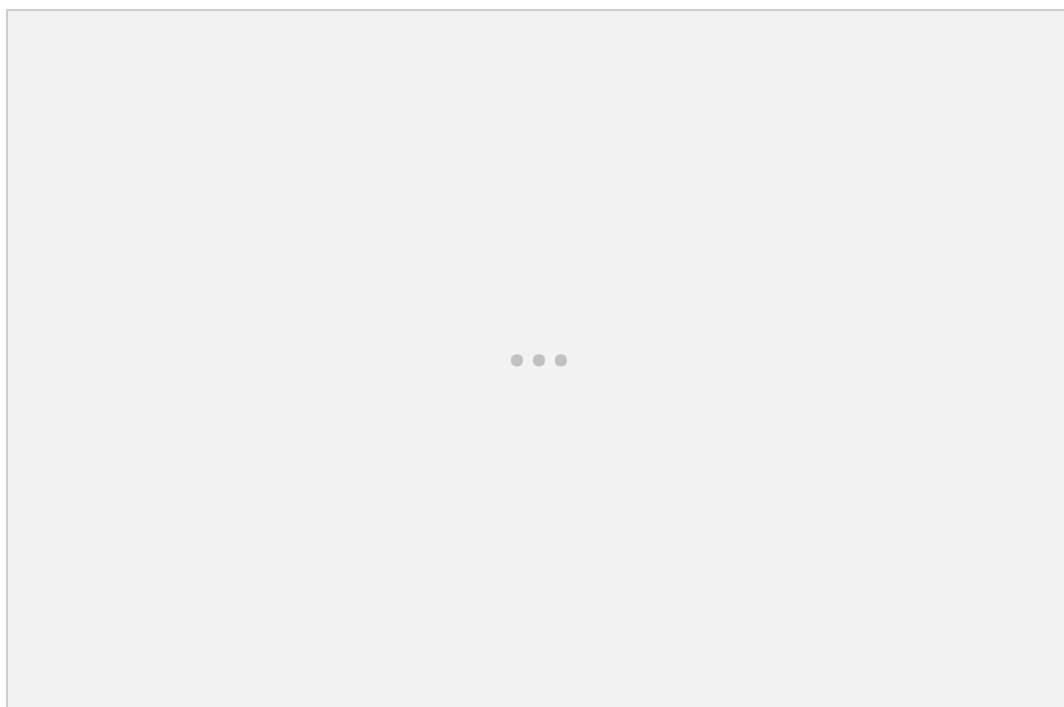
- (1) Click the [Setup] icon  and select the [Measurement Setup].
- (2) Click the [Basic] in the left column of the [Measurement] tab.
- (3) Select the [Manual] in the [Act Method].



- I

Change the probe settings when the probe is changed from a platinum plate to a glass plate (option) or a platinum ring (option).


- (1) Click the [Setup] icon  and select the [Measurement Setup].
- (2) Click the [Measuring Unit] in the left column of the [Measurement] tab.
- (3) Specify settings based on a desired probe.

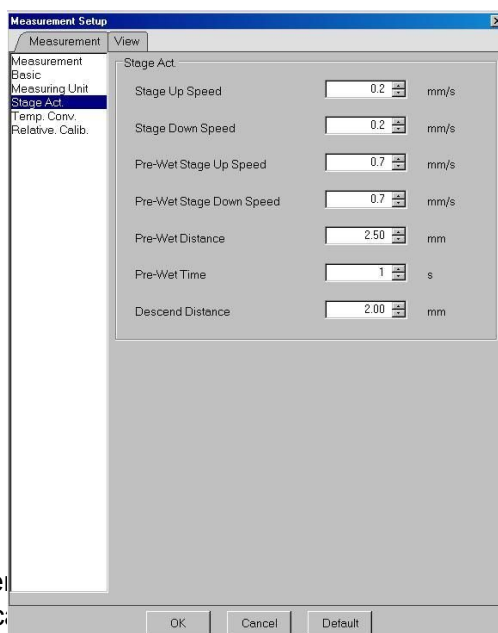


- I need to change the stage operation.

[Stage Act.] is specified when a sensitive sample is dealt in a measurement, or when the moving speed of the stage or the immersion depth/time in a pre-wetting is changed in a lamella length measurement, etc.

You can change the ascent/descent speed of the stage in a measurement and in a pre-wetting as well as the immersion depth/time in a pre-wetting.

- (1) Click the [Setup] icon  and select the [Measurement Setup].
- (2) Click the [Stage Act.] in the left column of the [Measurement] tab.
- (3) Specify desired values.




The screenshot shows the 'Measurement Setup' dialog box with the 'Stage Act.' tab selected. The left sidebar lists 'Measurement', 'Basic', 'Measuring Unit', 'Stage Act.', 'Temp. Conv.', and 'Relative. Calib.'. The main area contains the following settings:

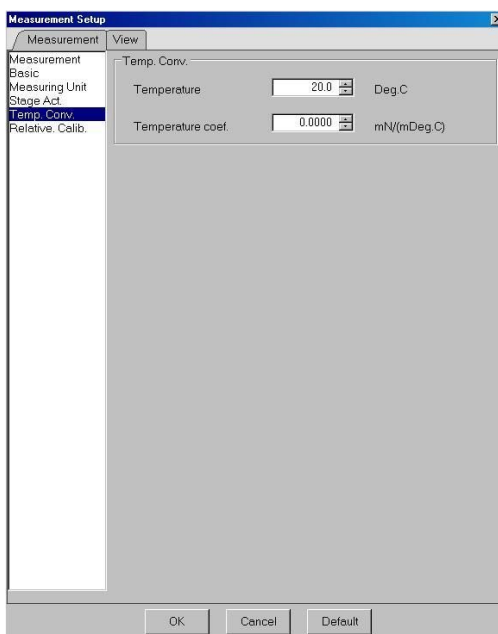
Parameter	Value	Unit
Stage Up Speed	0.2	mm/s
Stage Down Speed	0.2	mm/s
Pre-Wet Stage Up Speed	0.7	mm/s
Pre-Wet Stage Down Speed	0.7	mm/s
Pre-Wet Distance	2.50	mm
Pre-Wet Time	1	s
Descend Distance	2.00	mm

At the bottom are buttons for 'OK', 'Cancel', and 'Default'.

- I need to convert the temperature

A surface tension correction factor is entered, the temperature and displayed, by entering a known temperature correction factor of a liquid sample.

- (1) Click the [Setup] icon  and select the [Measurement Setup].
- (2) Click the [Temp. Conv.] in the left column of the [Measurement] tab.
- (3) Specify desired values.




The screenshot shows the 'Measurement Setup' dialog box with the 'Temp. Conv.' tab selected. The left sidebar lists 'Measurement', 'Basic', 'Measuring Unit', 'Stage Act.', 'Temp. Conv.', and 'Relative. Calib.'. The main area contains the following settings:

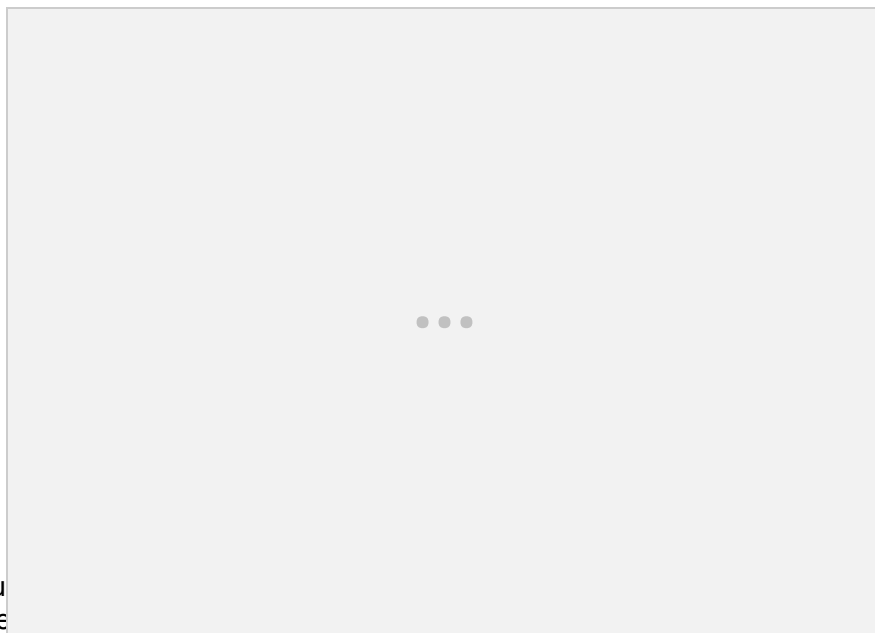
Parameter	Value	Unit
Temperature	20.0	Deg.C
Temperature coef.	0.0000	mN/(mDeg.C)

At the bottom are buttons for 'OK', 'Cancel', and 'Default'.

- I need to perform a relative calibration.

The [Use Relative. Calib.] check box in the [Measurement Setup] window does not correspond to the selection of relative calibration in the calibration window that is open to perform a calibration operation. Specify your choice respectively. Relative calibration setup is not displayed in a liquid density measurement.


- (1) Click the [Setup] icon  and select the [Measurement Setup].
- (2) Click the [Relative. Calib.] in the left column of the [Measurement] tab.
- (3) Specify desired values.



- I need to specify a liquid sample density.

A liquid sample density is required for the

Noüy method. Also, in an interfacial tension measurement, a density difference between the upper and lower layer liquid samples is required.

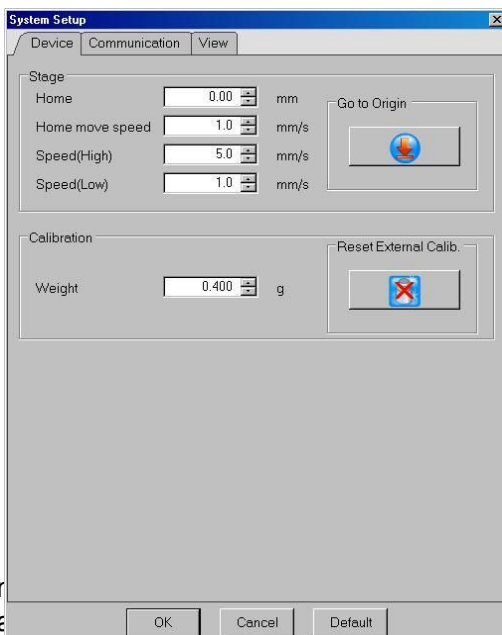
- (1) Click the [Setup] icon  and select the [Measurement Setup].
- (2) Click the [Sample] in the left column of the [Measurement] tab.
- (3) Specify a liquid sample density or a density difference between the upper and lower layer liquid samples.

← Enter a liquid density.

- I need to change the stage speed.

You can change the moving speed of the stage that is controlled by the ascent/descent buttons of the controller in a measurement sheet.

- (1) Click the [Setup] icon  and select the [System Setup].
- (2) Specify values in the [Device] tab.



- What are precautions in

It is difficult to yield a  use they may be added with surfactant, relatively high in viscosity, and prone to dry out.

In case a membrane is formed on the probe, suck it out by an aspirator or discard it just before a measurement. Also, if the sample's dispersion state varies widely, stir it thoroughly.

Clean the probe completely with water or a solvent so that the attached sample does not remain on the probe. Unless it is cleaned, the probe dries out remaining the sample on its surface. This makes the probe surface water repellent, which interferes with wetting. In case of a plate, its perimeter may increase, which leads to an erroneous measurement.

For a time-based measurement, note that some samples dry out quickly and attach to the probe, and in turn the measurement value may gradually decrease.

15.

# For Windows Vista

User account:

For Windows Vista, the following condition must be met to install and start DYNALYZER.

- User must be an Administrator to log in.

Otherwise, you must create a new account with the condition above.

You can check the current user name and create a new user account in the User Accounts screen. Open the Start menu and then the Control Panel. Click the User Accounts. Refer to Windows Vista Help for details.

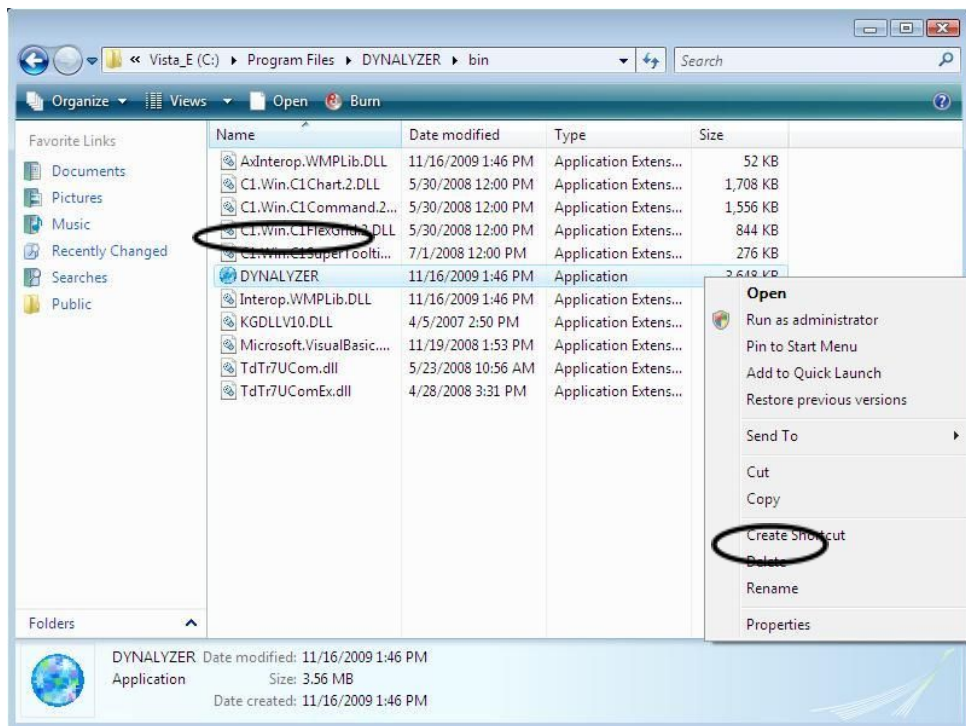


## Starting DYNALYZER with administrative rights

Due to the UAC (User Account Control), a feature of Windows Vista, DYNALYZER does not operate properly depending on the settings.

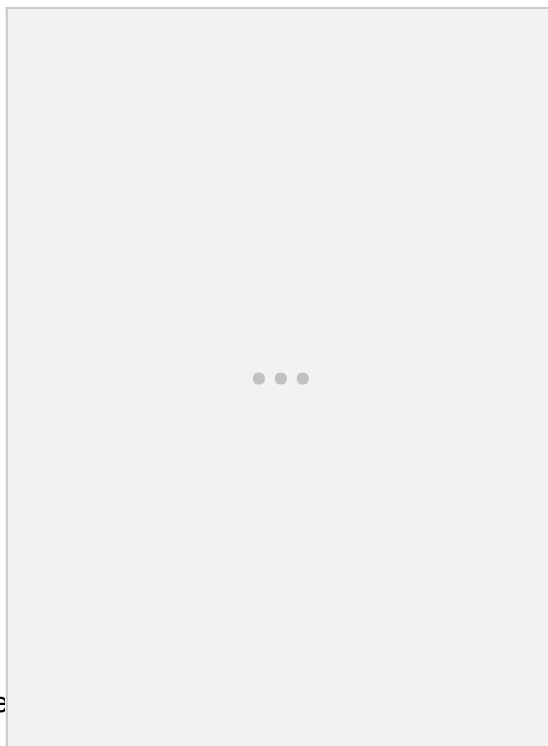
As a measure, start DYNALYZER with administrative rights following the steps below.

- (1) Open the install folder of DYNALYZER from the Explorer (generally in C:\Program Files\DYNALYZER\bin).
- (2) Right-click the file DYNALYZER and select the Properties (R).





(3) Select the Run this program as an administrator in the Compatibility tab and click the OK button.



Setup is complete.

Now, you can

DYNALYZER every time you start the software.

requires your approval for

16.

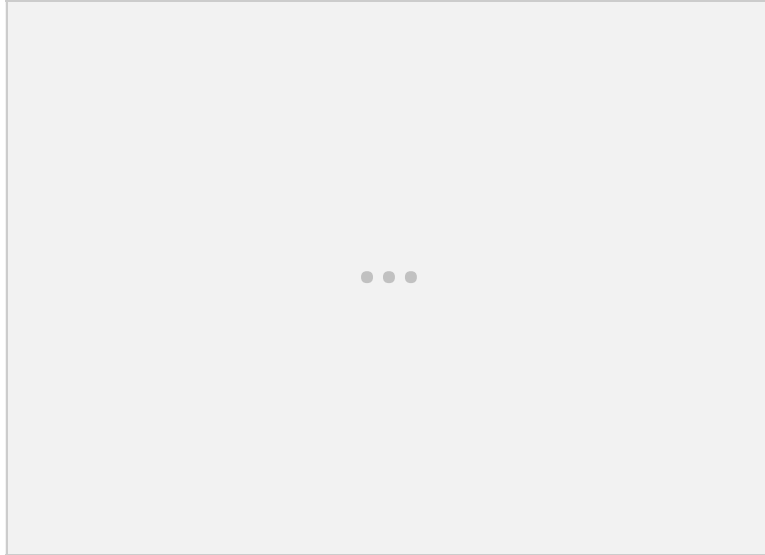
## For Windows XP

For Windows XP, the following condition must be met to install and start DYNALYZER.

- User must be a Computer administrator or Administrator to log in.

Otherwise, you must create a new account.

You can check the current user name and create a new user account in the User Accounts screen. Open the Start menu and then the Control Panel. Click the User Accounts. Refer to the Help menu of each OS for details.



Usually, .NET Framework version 3.0 or above is not installed in Windows XP. Install it following the steps below.

#### Installing .NET Framework (main part)

- (1) Insert the DVD to read it automatically. Open the DotNET folder.



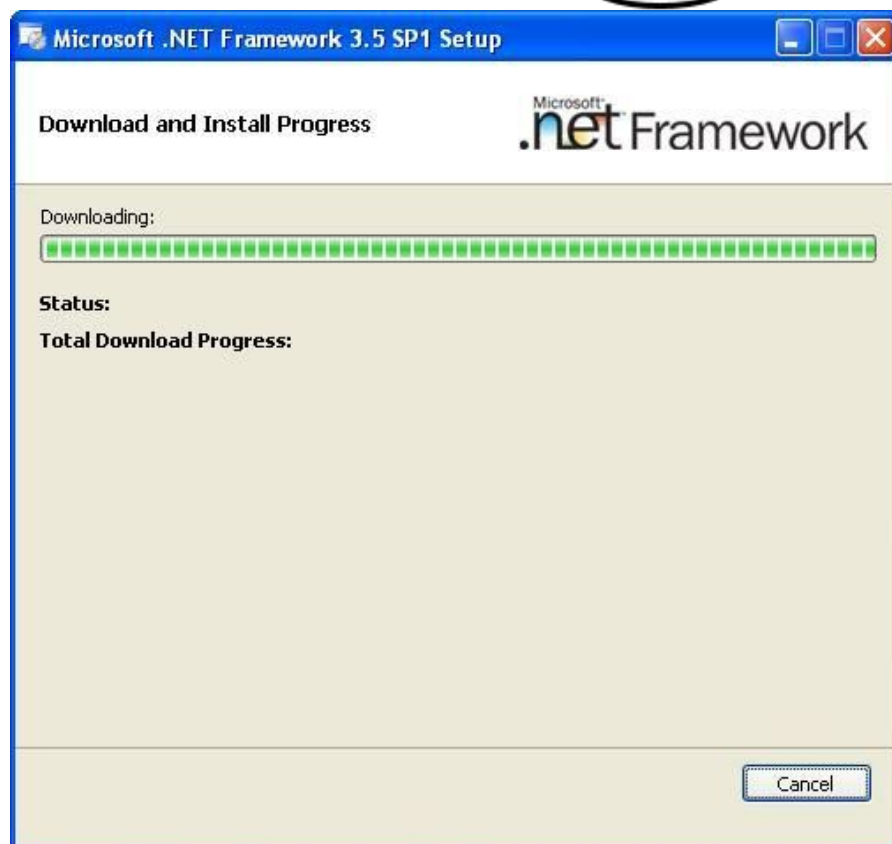
- (2) Double-click the SETUP.BAT file to start the installer.



- (3) The following screen appears. Select I Agree and click the Install button.

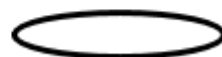


- (4) The following screen appears and the installation begins. It may take 10 minutes or more for installation.



(5) When the installation is complete, the following screen appears. Click the Finish button.

17.



# Install

DYNALYZER and the other drivers have been installed already at the time purchasing it, so installations are not necessary. If installations are needed in the cases like below, install them following the procedures. Here explains in the case of installation of DYNALYZER from CD-ROM. When DYNALYZER of the latest version is downloaded from our website and is installed, read the folder name etc. appropriately.

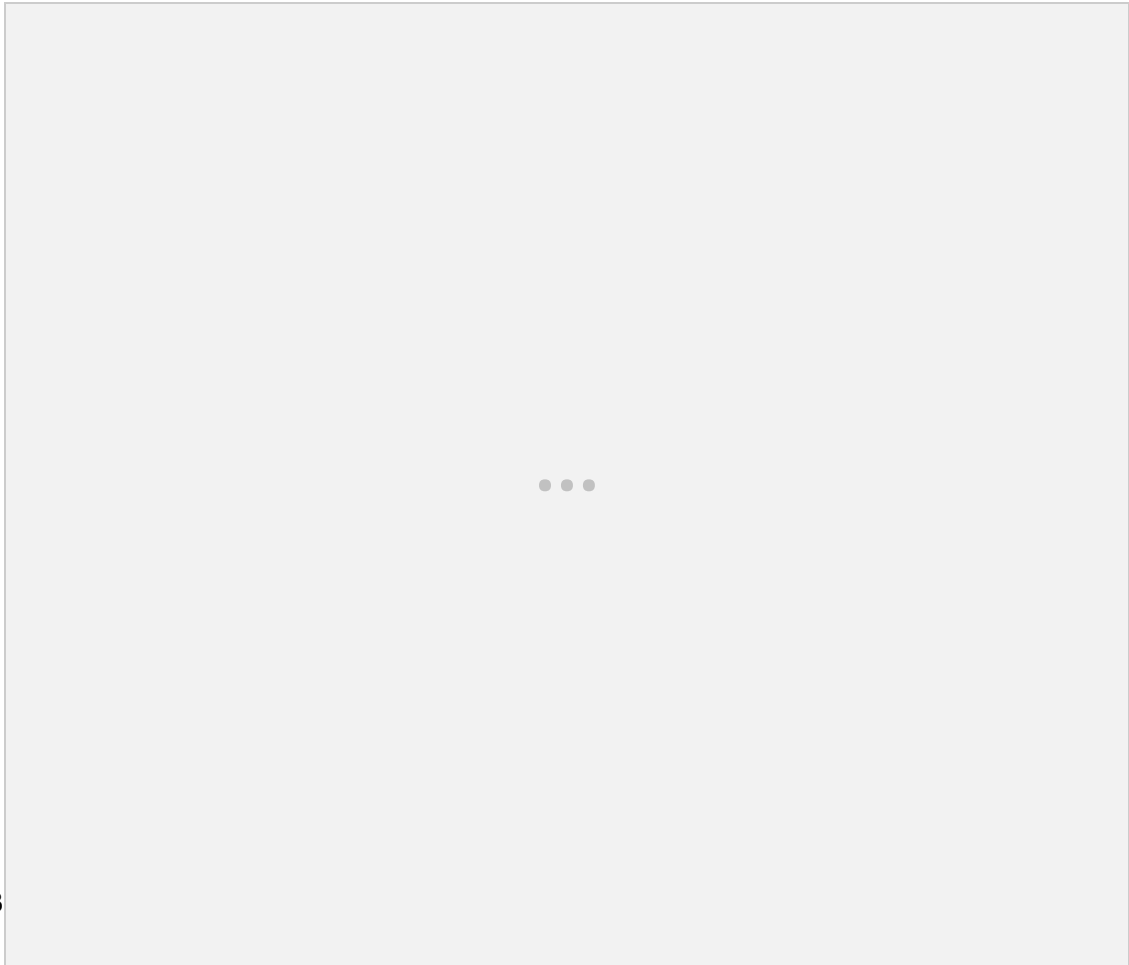
1. When purchasing DYNALYZER software only.
2. When exchanging the PC using.
3. When getting DYNALYZER of the latest version from the home page and upgrading it.
4. When installing DYNALYZER again for any reason.

## 17. 1. **Install DYNALYZER**

- (1) Installations must be done before connecting DY-300 with the PC.  
Insert DVD, and the PC read it automatically. Open the folder "SETUP," and next folder "ENGLISH."



(2) Double-click on the "SETUP\_J.msi" to start-up.

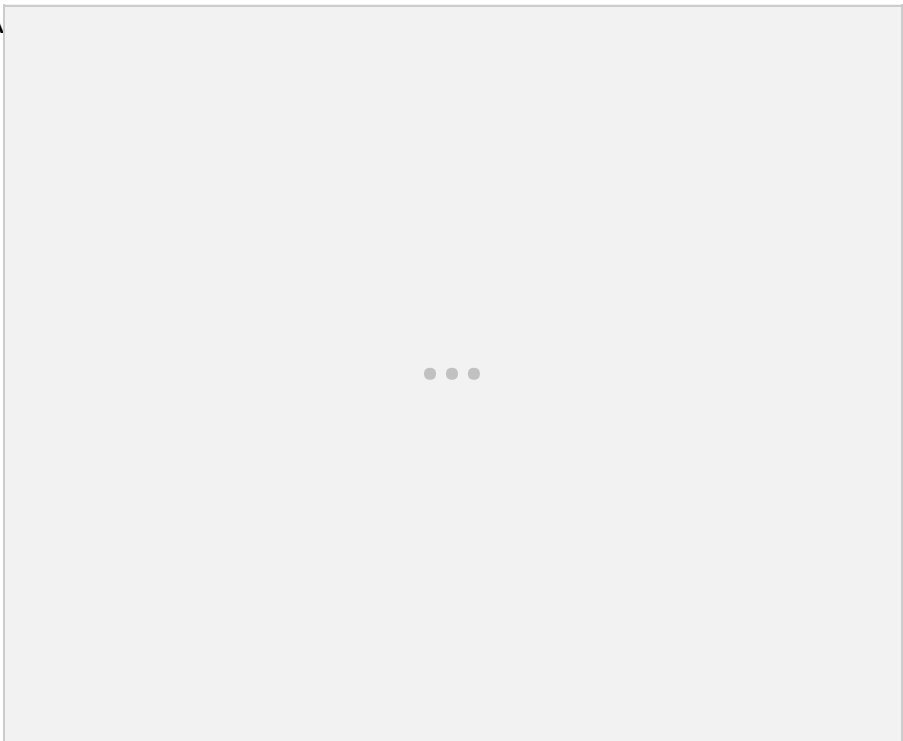


(4) Select the install-folder and click the [Next] button.

(5) [Confirm Installation] window is shown. Click the [Next] button.





(6) A  ton to finish.

### 17. 2. **Installation of license key of software**

When performing each measurement and analysis on DYNALYZER, insert the license key to the USB-port of the PC. The license key is type of USB.



The customer's name and the license data of available add-in software is written. If is lost or damaged, the measurements and analyses cannot be performed on DYNALYZER. Handle with care.



If "Found New Hardware Wizard" window is shown when inserting the license key, install the drivers following the procedures below.

- (1) The license key is recognized and "Welcome to the Found New Hardware Wizard" message is shown. Select "No, not this time" and click [Next] button.



- (2) Select "Install from a list or specific location [Advanced]" and click the [Next] button.



- (3) Set the install-disc (DVD-ROM) to the DVD-drive.



- (4) Select "Search for the best driver in these locations.", check "Include this location in the search", and click the [Browse] button. Select folder "LICENSE" in the folder "DRIVERS" of the DVD-drive and click the [Next] button.



- (5) Click the

17. 3.



## Install the communication driver

- (1) Connect DY-300 with the PC. Repeat the procedures (from (2) to (6)) four times.
- (2) The "Welcome to the Found New Hardware Wizard" window is shown. Select "No, not this time" and click the [Next] button.



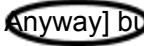
- (3) Select "Install from a list or specific location [Advanced]" and click the [Next] button.



(4) Select "Search for the best driver in these locations.", check "Include this location in the search", and click the [Browse] button. Select the folder "USB-SER" in the folder "DRIVERS" and click the [Next] button.



(5) The window like below is shown. Click the [Continue Anyway] button.



(6) Click the [Finish] button to finish the setup.



17. 4.



## Uninstall DYNALYZER

- (1) Click the [start] button and select [Control Panel.]
- (2) Double-click "Add or Remove Programs."



- (3) Select "DYNALYZER" in the "Add or Remove Programs" window and click the [Remove] button.



- (4) Uninstallation is done. Warning message might be displayed on the way, but go ahead.

18.

# Inquiries

For the following inquiries, please contact a local sales representative or our overseas sales department.

- Inquiries on products, description of operation manuals, or measurements
- Placing orders for consumables, accessories, or options
- Requests for paid sample measurement and demonstration of the instrument

Overseas Sales     5-4-41 Nobitome, Niiza-City, Saitama 352-0011, Japan  
TEL: +81-48-483-2629  
FAX: +81-48-483-2702  
<http://www.face-kyowa.com>

For the following inquiries, please also contact a local sales representative or our overseas sales department as above.

- Inquiries on or requests for inspection, repair, or relocation
  - Other questions
- 
- A free repair under the warranty is provided in accordance with our warranty guidelines. For more information, see the “Warranty” section.
  - After the warranty period is expired, a paid repair is provided when requested by a customer; provided that the functionalities can be recovered by the repair.

Please provide the following information when you make inquiries.

- Name
- Company/Division
- Phone
- Fax
- Product
- Customer ID, version number, etc.
- Delivery date
- Details on the symptoms

19.

# Warranty

## 19. 1. Coverage of warranty

We offer free repair under the warranty when a failure occurs during the warranty period of a relevant product under the proper use in accordance with the operation manuals. The warranty shall be provided in accordance with the following guidelines.

For information on the warranty for software, see the relevant "License Agreement."

The warranty of the instrument, options, and other third-party products is valid for 1 year from the "date of purchase." The warranty shall not cover consumables.

When a failure occurs on a product, please provide the "customer ID" which comes with the product. The product must be sent to us for free repair under the warranty. The repaired product will be sent back to you.

## 19. 2. Exempt from warranty

Please note that the warranty shall not cover the following cases despite during the warranty period.

- Failures and damage caused by a misuse or an unauthorized repair/modification
- Failures and damage caused during transportation (using a third party packaging material) or dropping after the purchase
- Phenomena caused by wearing under the normal operation or owing to changes over the time
  - ... Consumables, degraded fats and oils, resin parts, natural discoloration/degradation of painting, treatment, and coating on the surface
- Phenomena which does not affect the functionalities of the product
  - ... Sound, vibration, and operational feeling which do not affect the functionalities.
- Failures and damage caused by external factors
  - ... External factors, including samples, salt damage, fluorine or other chemicals, iron powder, smoke, etc.
  - Natural disasters (including earth-quake, storm, and flood), fires, accidents, etc.
- Those caused by the customer's utilities (facilities)
  - ... Impacts of a microwave/vibration-generating device installed in the adjacent place on the product, unstable power supply, excessively high/low input voltage
- Defects escalated by negligence though they can be detected and removed by a usual inspection
  - ... Continuing to use the product while neglecting smoking, which eventually causes a fire
- Failures and damage caused by computer viruses, along with OS, pre-installed software, or stored data on the computer.
- Failures and damage caused by improper storage of consumables/recording media, or use of unauthorized consumables
- A product which does not exist (is lost) or is transferred/resold
- A product to which another product provided by the customer, a trader, or a business partner is attached in accordance with the customer's request
  - ... PC, monitor, hot/cold water circulator, temperature meter, probe, cable, camera, etc.

## 19. 3. Disclaimer

We shall not be responsible for compensation for direct or indirect loss of damage caused by use or failures of a product.

For more information, please contact our sales or customer support division.

20.



# Specifications

## Product: DY-300

### Product specifications

Measurement method: Surface tension measurement (Wilhelmy method and du Noüy method),

Lamella length measurement, Liquid density measurement (Pycnometer method)

Measurement range: 0 to 100mN/m

Display resolution: 0.01mN/m

Repeatability (standard deviation): 0.2mN/m

Time-based measurement range: 1 to 86400s

Volume of sample: Approx. 20mL (petri dish), Approx 50mL (vessel)

Calibration method: Absolute calibration with balance weights, Relative calibration with liquid samples

Range of stage movement: 48mm

Stage speed: 0.1 to 1.0mm/s

Power rating: AC100V to 240V, 50/60Hz, 35W, 75VA

Fuse rating: 3.15A/250V

Operating environment: Temperature 10 to 35°C, Humidity 30 to 80%RH (non-condensing),  
No impact

of vibration or electric noise

Outer dimensions and Weight: 255(W) x 309(D) x 369(H)mm, 12.5kg

### PC requirements

PC: IBM PC/AT compatible PC

OS: Windows Vista / XP

CPU: Pentium Celeron 2 GHz or higher

Memory: 256 MB or more

Display: XGA (1024 x 768) with 16 bit color or higher

File system: DVD-ROM drive (prerequisite for installation)

Hard disk (prerequisite for operation)

Hard disk capacity: 1 GB or more (except for storage data files)

External port: USB 2.0 high speed port

\*The appearance and specifications are subject to change for improvement without prior notice.  
We shall not be liable for any defects resulting from failure to follow the instructions and restrictions on use of the instrument.  
We shall not be liable for any benefit and loss resulting from use of the instrument.