

# High-speed Spectroscopic Ellipsometer [UNECS Series]

UNECS series is a kind of spectroscopic ellipsometers to measure the refractive index and thickness of the thin film quickly and accurately. It adopts an unique measurement method, and realizes the compact size and high-speed measurement. It has a strong products line, such as the portable type, the automatic stage type, and the built-in type etc.



UNECS-Portable



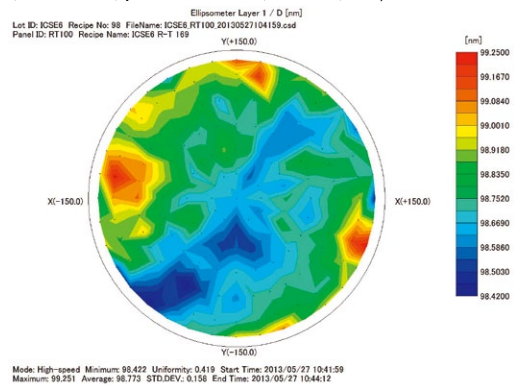
UNECS-3000A

## Features

- ▶ **High-speed Measurement :**  
The snapshot measurement method is realized and the high-speed measurement is 20ms per point.
- ▶ **Visible Spectral Range :**  
The spectral wavelength range can be selected. The standard type is 530nm~750nm and the visible spectral type is 380nm~760nm.
- ▶ **Compact Sensor Unit :**  
The sensor unit is light-weighted and very compact. It consists of an optical element that does not have any rotating mechanism. In addition, there is no need for any periodic maintenance.
- ▶ **Strong Product-line :**  
There is a strong products line with the portable type, the manual/automatic stage type, the built-in type and the large substrate type etc.

## Applications

- ▶ Measurement for transparent or semi-transparent thin films thickness(D), reflective index(N) and extinction coefficient(K). (Oxide film, nitride film, photo-resist film, ITO film, etc.)



< UNECS-3000A 2D Color Map >  
SiO<sub>2</sub> film on  $\phi$ 300mm Wafer  
Measurement Time : 133sec/169points

# High-speed Spectroscopic Ellipsometer [UNECS Series]

## ▶ UNECS-Portable(Portable)



### Compact Light-weighted Portable Type

#### Features

The weight of the measurement unit is only 2.2kg. It is easy to be carried for vacuum equipments site acceptance test and can measure large size samples by detaching its sample stage and putting it directly on samples.

#### Specifications

Wavelength Range	530~750nm or 380~760nm
Spot Size	φ 1mm or φ 0.3mm
Angle of Incidence	70°
Film Thickness Repeatability	1σ=0.1nm
Film Thickness Measurement Range	1nm~2μm
Measurement Time	Sampling: 20ms~3000ms Analyzing time: 300ms
Sample Stage	Fixed Stage (< φ150mm, detachable)
Control PC	Laptop PC including analysis software

#### Configuration

- ▶ Measurement unit (including fixed stage).
- ▶ Control box.
- ▶ Light source unit.
- ▶ Control PC (Laptop type) and operation manual (CD).

## ▶ UNECS-1500M(Manual Stage)



### Manual Stage Type for φ150mm Samples

#### Features

It is easy to locate measurement points by the easy-to-use manual R-θ stage.

#### Specifications

Wavelength Range	530~750nm or 380~760nm
Spot Size	φ 1mm or φ 0.3mm
Angle of Incidence	70°
Film Thickness Repeatability	1σ=0.1nm
Film Thickness Measurement Range	1nm~2μm
Measurement Time	Sampling: 20ms~3000ms Analyzing: 300ms
Sample Stage	Manual R-θ stage for φ150mm sample
Control PC	Laptop PC including analysis software

#### Configuration

- ▶ Measurement unit (including manual stage and Control box).
- ▶ Light source unit.
- ▶ Control PC (Laptop type) and operation manual (CD).

▶ UNECS-1500A/2000A/3000A(Auto Mapping Stage)



Automatic Stage Type with Mapping Function

Features

3 models are available for  $\phi 150$ , 200 and 300mm samples. Auto mapping R- $\theta$  stage and auto focus function make it possible to measure film thickness of entire sample surface and display film thickness distribution by color map.

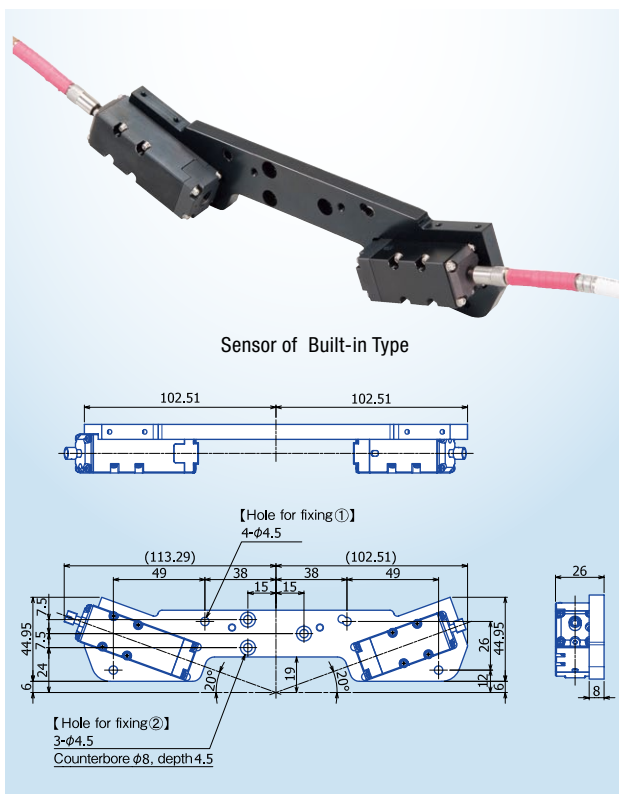
Specifications

Model	1500A	2000A	3000A
Wavelength Range	530~750nm or 380~760nm		
Spot Size	$\phi 1\text{mm}$ or $\phi 0.3\text{mm}$		
Angle of Incidence	70°		
Film Thickness Repeatability	1 $\sigma$ =0.1nm		
Film Thickness Measurement Range	1nm~2 $\mu\text{m}$		
Measurement Time	Sampling: 20ms~3000ms Analyzing: 300ms		
Sample Stage	$\phi 150\text{mm}$	$\phi 200\text{mm}$	$\phi 300\text{mm}$
Maximum Automatic Measurable Points	200	200	2,000
Control PC	Laptop PC including analysis software		

Configuration

- ▶ Measurement unit.
- ▶ Control unit.
- ▶ Control PC (Laptop type) and operation manual (CD).

▶ UNECS-1M(Integration)



Built-in Type for System Integration

Features

The light-weighted and compact design make it possible to be integrated into various equipments. It is suitable for both of vacuum and atmospheric pressure environments.

Specifications

Wavelength Range	530~750nm or 380~760nm
Spot Size	$\phi 1\text{mm}$ or $\phi 0.3\text{mm}$
Angle of Incidence	70°
Film Thickness Repeatability	1 $\sigma$ =0.1nm
Film Thickness Measurement Range	1nm~2 $\mu\text{m}$
Measurement Time	Sampling: 20ms~3000ms Analyzing: 300ms
Installation Environment	Atmosphere or vacuum

Configuration

- ▶ Measurement unit.
- ▶ Control box.
- ▶ Light source unit.
- ▶ Operation manual (CD).
- ▶ Analysis software (CD).

[For large size substrate] In addition to these standard models, the model for large size substrate (G6) is available. Please contact us for more information.

# High-speed Spectroscopic Ellipsometer [UNECS Series]

## Specifications

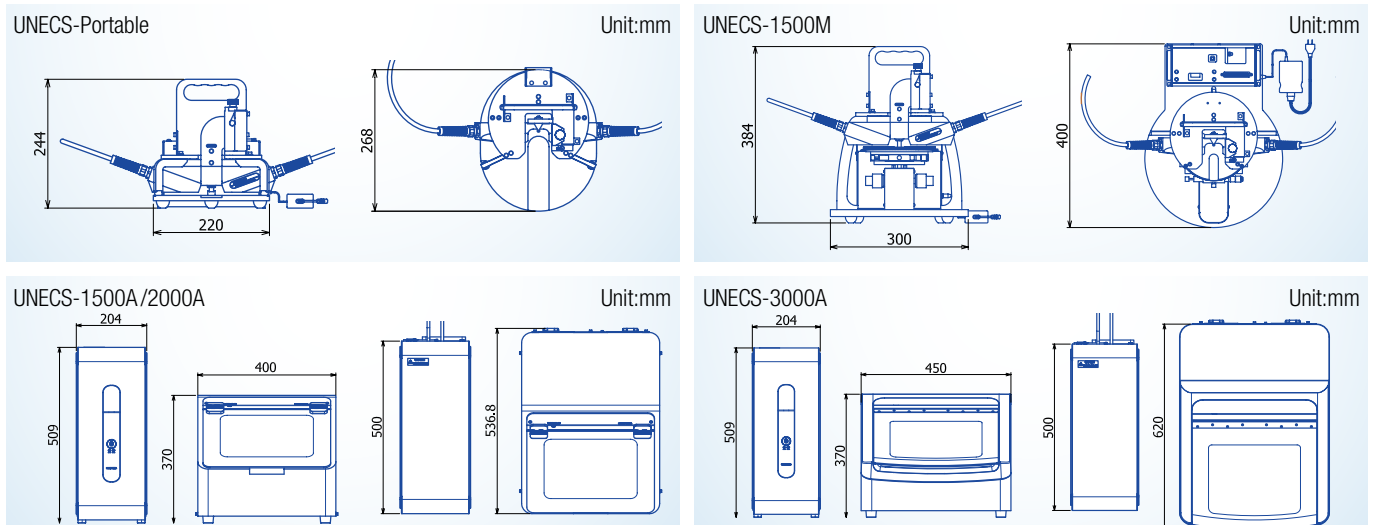
Model name	UNECS-Portable	UNECS-1500M	UNECS-1500A	UNECS-2000A	UNECS-3000A
Measurement method	Spectroscopic ellipsometry				
Film for measurement *0	Transparent film and semitransparent film				
Wavelength	530-750nm or 380-760nm				
Light source	Halogen or xenon lamp				
Spot size	φ1mm or φ0.3mm				
Multilayer film measurement	Film thickness : Max 6 layer Film thickness and optical parameter : 1 layer (Only the top layer)				
Angle of incidence	70°				
Film thickness Repeatability *2*3*4	0.1nm				
Film thickness measurement range *3	1nm-2μm				
Scan time *3	Sampling	20-3000ms (setting is possible)			
	Analyzing	300ms			
Sample stage size	Fixed Stage (<φ150mm, detachable)	φ150mm		φ200mm	φ300mm
Stage travel range	R	90mm Manual	0-75mm Programmable(Resolution 0.1mm)	0-100mm Programmable(Resolution 0.1mm)	0-150mm Programmable(Resolution 0.1mm)
	θ	360° Manual	0-359.9° Programmable(Resolution 0.1°)		
Automatic measurable point			200 (Option:2,000)	200 (Option:2,000)	2,000
Focus(Z-axis)adjustment	Manual		Auto		
Maximum sample thickness	8mm	10mm	30mm		
Maximum sample weight	10kg				
Analytical function	① Ψ ( λ ), Δ ( λ ) measurement				
	② Calculation of film thickness(D) , reflective index(N), extinction coefficient(K)				
Material data file	Various such as oxide or nitride film (editing and adding available)				
Sample view camera				Option	
Control PC	Laptop PC Windows 7				
Dimensions W×D×H	Measurement unit :220mm×268mm×244mm (Not include PC, controller, the light source)	Measurement unit :300mm×400mm×384mm (Not include PC and light source)	Main unit :400mm×525mm×370mm Controller :204mm×500mm×509mm		Main unit :450mm×620mm×370mm
	Weight	Measurement unit :2.2kg Stage :1.3kg	Measurement unit :10.3kg	Main unit :24kg Controller :19kg	Main unit :31kg
Utility	Power	AC100 /200V Max 3A 50/60Hz		AC100 /200V Max 6A 50/60Hz	
	Vacuum	-		75kPa (When using vacuum chuck)	
Operation Environment	Temperature	25±5 [°C]			
	Humidity	65 [%RH] or less (Non condensing)			

※ 1 The semitransparent film is the upper bound in the measurement film thickness. ※ 2 When only the film thickness value is assumed to be a fitting parameter, and the SiO<sub>2</sub> film (about 100 nm) on the Si substrate is measured.  
 ※ 3 When SiO<sub>2</sub> single-layer film on Si wafer is measured. ※ 4 Standard deviation (1σ) when measuring it continuously ten times.

## Option

- ▶ Standard sample (100nm SiO<sub>2</sub>/Si)
- ▶ Operation manual (normal or clean paper)
- ▶ High density mapping for 2,000 points (for 1500A/2000A)
- ▶ 3D color map (for 1500A/2000A/3000A)
- ▶ Sample observation camera (for 1500A/2000A/3000A)

## Dimensions



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