

## Low Concentration HF Monitor in Diluted sulfuric acid/Hydrogen peroxide

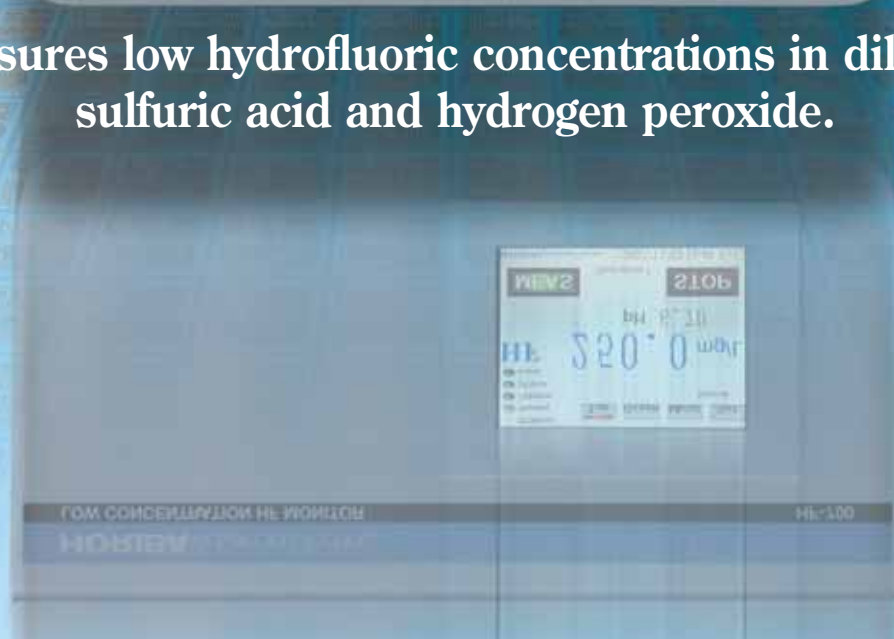
### HF-700

### Continuous Measurement

A proprietary measurement flow ensures high measurement stability.



Measures low hydrofluoric concentrations in diluted sulfuric acid and hydrogen peroxide.



# Enables management of hydrofluoric concentrations in sulfuric acid and hydrogen peroxide at the ppm level.

Management of hydrofluoric concentrations at the ppm level is extremely important for the solution of diluted sulfuric acid, hydrogen peroxide and a small amount of hydrofluoric acid that plays an effective role in the removal of the polymer residue following the etching process. If the concentration is too low, the polymer removal effect is weakened. If it is too high, it causes excessive etching. The HF-700 stabilizes hydrofluoric concentrations on the order of ppm in diluted sulfuric acid and hydrogen peroxide to enable continuous measurement and allow effective process management.



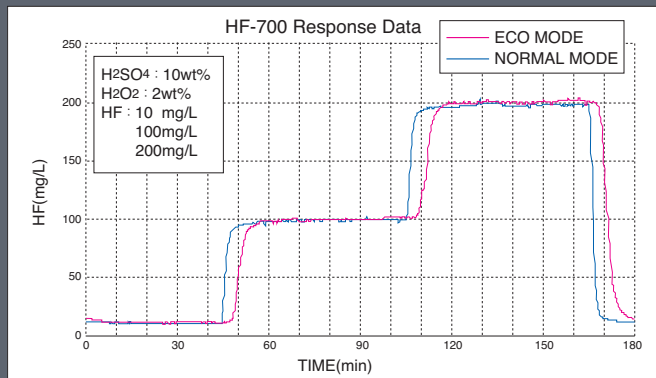
## Stable and continuous measurement

Continuous measurement of low hydrofluoric concentrations in diluted sulfuric acid and hydrogen peroxide has been achieved using an Automatic Neutralizing function, which continuously neutralizes the sample water, and a fluoride ion electrode, developed through proprietary Horiba technology.

## Multiple measurement modes to fit the application

Four modes of operation can be combined to best suit your needs.

- Selection 1** [NORMAL MODE] — The standard mode that gives priority to response speed.
- Selection 2** [ECO MODE] — A reagent-saving mode that saves on reagent consumption.
- Selection 3** [CONT. MODE] — A continuous measurement mode that measures the concentration
- Selection 4** [INTERMIT. MODE] — An intermittent measurement mode.

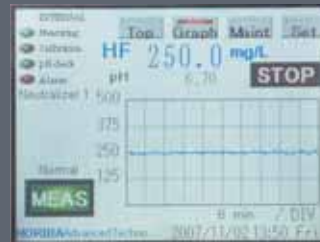


## Easy-operation touch panel

The HF-700 adopts a graphical LCD touch panel screen. This easy-to-read and interactive display improves operation and makes handling of the monitor simple as well.



## Built-in alarm history and graph function



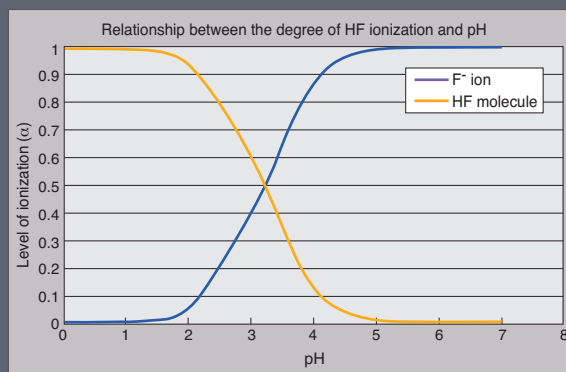
With a single touch, the HF-700's display indicates, in graph form, the alarm history and measurement variations recorded during continuous measurement.

## Measurement Principle

Under an acid state, HF (hydrofluoric acid) exists as HF molecules. However, once it approaches a neutral state, the molecules are ionized and, at around pH7, become almost 100% F<sup>-</sup> (fluoride ions).

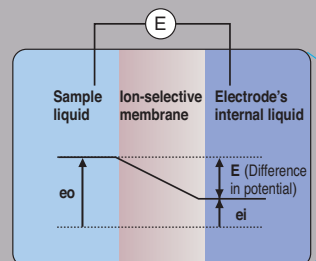
In the wet process for semiconductors, a mixed solution of diluted sulfuric acid and hydrogen peroxide with a small amount of hydrofluoric acid added is used as polymer remover.

Because it is in a strong acid state, the pH of this solution can be adjusted by mixing in a strong alkali neutralizing solution, and the HF concentration in diluted sulfuric acid and hydrogen peroxide can be measured based on the potential obtained using a fluoride ion electrode.



## About fluoride ion electrode

Ion electrode converts the potential generated in the electrode's internal liquid into a concentration of the potential of the sample liquid comparison electrode.



# diluted

## Low Concentration HF Monitor in Diluted sulfuric acid/Hydrogen peroxide

### HF-700

#### Built-in automatic calibration function

Calibration is accomplished automatically on the HF-700's front touch panel and with an external input signal.

#### Easy electrode replacement

The chip-type design of the HF-700's fluoride ion electrode enables easy replacement of the electrode.



#### Less chemical replacement

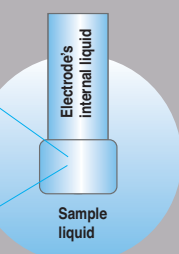
Equipping the HF-700 with a dual-tank automatic replacement function for the neutralizing solution has reduced the chemical replacement cycle.



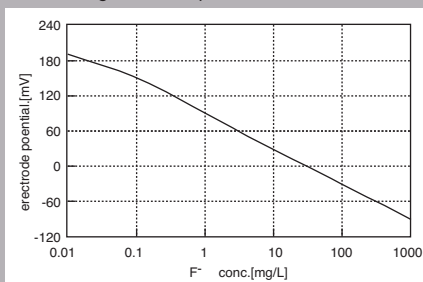
#### Compact size

The compact design makes moving and set-up a snap. A special optional cabinet where the necessary reagents and peripheral devices can be compactly stored is also available.

the sample liquid and level, based on electrode.



The F<sup>-</sup> ion potential and concentration have the following relationship



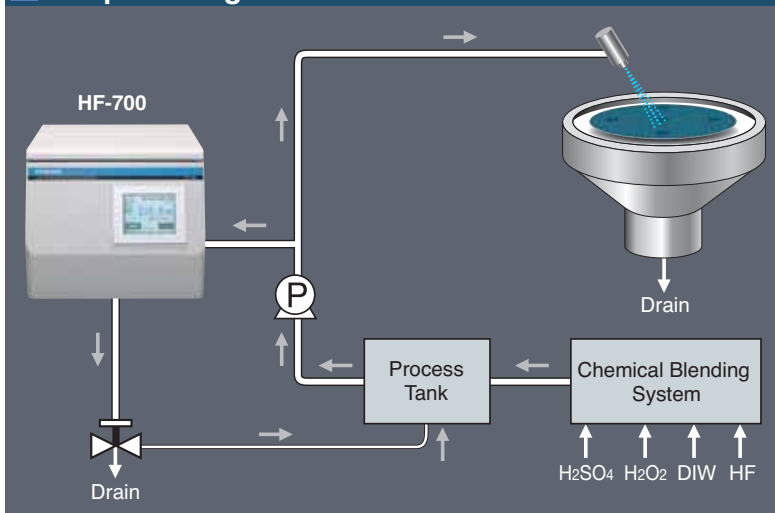
#### Specifications

Model	HF-700
Measurement method	Fluoride ion electrode method
Measuring range	0 to 1000mg/L (Measuring range : 0 to 100/200/500/1000mg/L)
Repeatability	Within $\pm 2\%$ of full scale *1
Stability	Within $\pm 2\%$ of full scale/10 min *1
Response time	NORMAL MODE Within 5 min/90%*1 (pH of the sample being constant) Within 15 min/90%*1 (pH varied by sulfuric acid concentration recipe.) *The allowance of concentration change is $\pm 10\%$ ECO MODE Within 15 min/90%*1 (pH of the sample being constant) Within 30 min/90%*1 (pH varied by sulfuric acid concentration recipe.) *The allowance of concentration change is $\pm 10\%$
Displayed resolution	HF : 0.1 mg/L (0 to 100/0 to 200/0 to 500 mg/L range) 1 mg/L (0 to 1000 mg/L range)
Transmission output	Number of transmission output : 3 4 to 20 mA DC Input/output isolated (Three output circuits are not isolated.) Max. load resistance : 500 $\Omega$ for voltage output Transmission output range : measuring range Item of transmission : HF concentration, pH
Contact output	Number of relay : 18 Number of SPST relay : 12 Contact type : relay contact, SPST (1a); (share a common terminal) Contact rating : 24 V DC, 0.1 A (resistance load) Contact function: Measuring signal, Calibrating signal, HF high/low alarm1, HF high/low alarm2, KCl empty, Error of sensor, Hold signal, Standard solution empty Number of SPDT relay : 6 Contact type : relay contact, SPDT (1c) Contact rating : 24 V DC, 0.1 A (resistance load) Contact function: Leakage alarm, Lack of sample, Low neutralizer level, Lack of DIW, Abnormality detection batch alarm
Contact input	Number of input contact : 8 Contact type : open collector no-voltage a contact ON resistance : 100 $\Omega$ (max.) Short circuit current : 12 mA (max.) Contact function : ON/standby, Start measurement, Start calibration, sample lack, DIW lack, NORMAL/ECO mode, sample line select
Communication function	Communication type : RS-232C
Calibration function	· 4point calibration with reagent HF Sensor : HF Lo and High reference solution pH Sensor : pH7 and pH4 standard solution · Calibration Start : Panel operation or External Cal start signal · Calibration time : Approx. 40 min. (HF), approx. 20 min. (pH)
Sample condition	Sulfuric acid concentration: 2 to 15 wt% Peroxide concentration: 0 to 20 wt% Temperature: 10 to 35°C Flow rate: 20 to 200 ml/min Pressure: Max. 0.02 MPa (Margin of fluctuation: within $\pm 0.005$ MPa) *2
DIW condition	Temperature: 10 to 35°C Flow rate: 20 to 200 ml/min Pressure: Max. 0.02 MPa (Margin of fluctuation: within $\pm 0.005$ MPa) *2
Instrument air system	Pressure: 0.35 to 0.45 MPa
Ambient environment	Temperature : 10 to 35°C Humidity : 20 to 85% (without dew condensation)
Structure	Indoor-use
Display	LCD : 320x240 dot-matrix with light up and touch panel
Power supply	100 to 240 V AC $\pm 10\%$ 50/60 Hz 80 VA (max.)
Mass	Analyzing unit approx. 22 kg
Conforming standards	CE Marking, FCC Part15, SEMI S2
Others	Accessories Two neutralizer tanks (Automatic switching between tanks possible) Standard solution case (Calibration standard bottles of HF and pH are in the accessory case)

\*1: Based on Horiba's standard solution

\*2: Use the regulator to perform pressure control at the stage before input.

## Sample configuration



## HF-700 Product code table

Model	Power supply	Fitting	Manual	Sample reagent	Others	Specification
HF-700						HF-700 (1 unit) *1
	- AC100					AC 100 to 120 V
	- AC200					AC 200 to 240 V
		- P				Piller SUPER300P
		- X2				Other features
			- E			English
			- J			Japanese
				blank		Without sample reagent for initial run
				- SEE		With sample reagent for initial run *2
					blank	No other options
					- X5	Other options

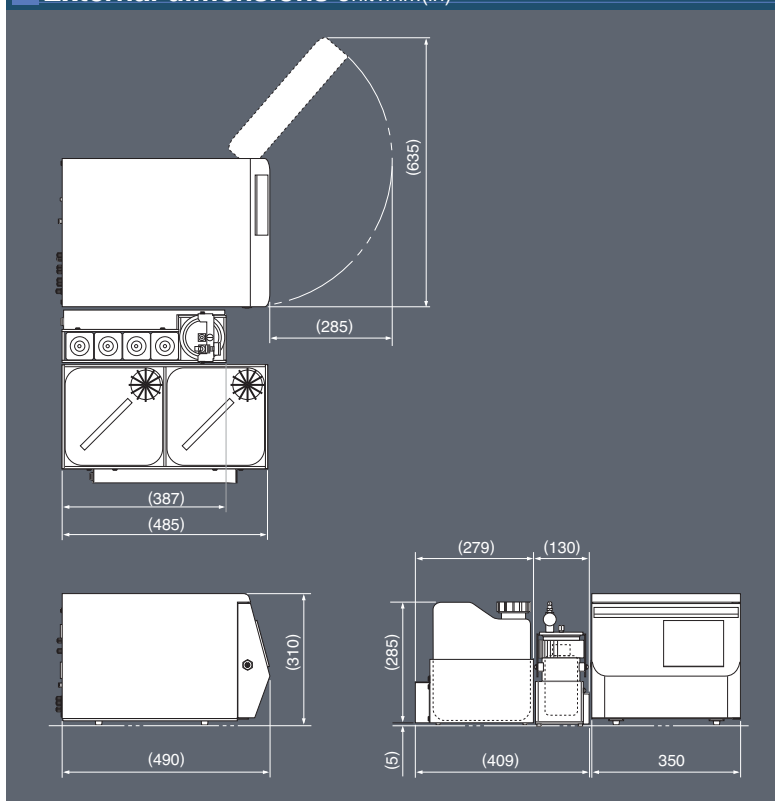
### \*1 Accessories

Item	Q'ty
pH electrode	2
F electrode tip	2
F electrode holder	1
Tube (for tube pump)	3

### \*2 Sample reagent for initial run

Item	Q'ty
Standard solution (HF-L 10 mg/L)	1
Standard solution (HF-H 100 mg/L)	1
Standard solution pH7	1
Standard solution pH4	1
Neutralizer (10 L)	2
KCL solution	1

## External dimensions Unit: mm(in)



## Spare parts

Item	Description
6106-05C	pH electrode 6106-05C-1K
#1007	F ion electrode #1007
FH-05D	F ion holder FH-05D
Tube Assay	3 pump tubes (for replacement)
HF-L STANDARD	Standard solution HF-L 10 mg/L (500 ml)
HF-H STANDARD	Standard solution HF-H 100 mg/L (500 ml)
pH7 STANDARD	Standard solution pH7 (500 ml)
pH4 STANDARD	Standard solution pH4 (500 ml)
NEUTRALIZER	Neutralizer (10 L)
KCL	KCL solution (500 ml)

## Related Products

### SPM Monitor CS-150

The CS-150 is a high-precision chemical concentration monitor designed to measure SPM solutions used in semiconductor-manufacturing cleaning processes. Featuring fast response and a compact size, the CS-150 continually monitors the concentrations of the various components of the SPM solutions (H<sub>2</sub>SO<sub>4</sub>/H<sub>2</sub>O<sub>2</sub>/H<sub>2</sub>O) used to remove metal ions and organic substances.



### Low Concentration Type

### HF/HCl/NH<sub>3</sub> Concentration Monitor HF-960M

The HF-960M uses sensors that offer outstanding corrosion resistance for high-precision, high-speed measurement of low concentrations of hydrofluoric acid, hydrochloric acid and ammonia, and is thus perfect for single-bath and wafer cleaning.



Please read the operation manual before using this product to assure safe and proper handling of the product.

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