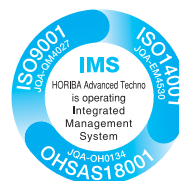


For Semiconductor and FPD Processes

## TMAH Concentration Monitor

# HE-960H-TM



CE marking compliant

Ideal for management of TMAH concentration in developer solution

The HE-960H-TM accurately measures the concentration of TMAH (Tetra Methyl Ammonium Hydroxide), which is the main component of the photoresist developer solutions used in semiconductor and liquid crystal manufacturing processes. The FES-510 series of dedicated sensors offers a wide measurement range and outstanding chemical resistance, making it ideal for TMAH measurement.

Features a four-electrode carbon sensor with outstanding resistance to chemicals



Indication Converter HE-960H-TM



Sensor FES-510-3/4

### Features

- **Wide range compatibility**

Automatic decimal point adjustment enables a wide range of TMAH measurement, from 0.000 to 10.00%.

- **Automatic display range switching**

The display range automatically switches from high to low concentrations. This unit also allows the user to monitor changes while maintaining an effective conductivity resolution.

- **Enables three types of measurement: TMAH concentration, conductivity, and temperature**

TMAH concentration is measured while compensating for temperatures based on the relevant temperature characteristic data. This unit can also be used to measure the conductivity of other chemicals.

- **Chemical resistant four-electrode carbon sensor**

The sensor is a new FES-510 series four-electrode flow-type sensor made from glass carbon, which is highly resistant to chemicals.

- **4-channel transmission output**

This unit is equipped with four output channels, so separate channels can be allocated to TMAH concentration, conductivity, and temperature. Choose from two types of current output: 4 to 20 mA DC, or 0 to 20 mA DC.

- **24 V DC power supply**

- **RoHS compliant**

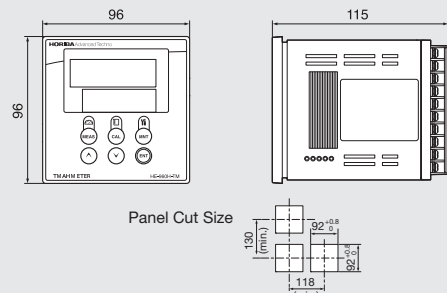
 The HE-960H-TM is also an environmentally-friendly product that uses lead-free solder for mounting chips on the PCB.

## Specifications (Indication Converter)

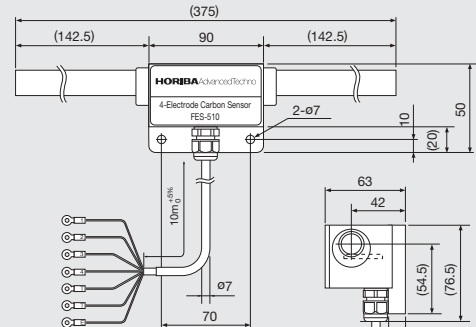
Model	HE-960H-TM
Measurement method	4-electrode carbon flow-type conductivity measurement – concentration conversion
Sensor input	1-channel
Temperature sensor specifications	Platinum resistance 1000Ω/0°C
Measuring range	TMAH concentration 0 to 10%
	Conductivity 0 to 1000 mS/cm (Measurement range without temperature conversion) Temperature: 0 to 100°C (The number of decimals displayed can be selected from 1 and 2.)
Repeatability	TMAH concentration : Within ±0.5% of the full scale (in equivalent input)
	Conductivity : Within ±1.0% of the full scale (in equivalent input)
Linearity	TMAH concentration : Within ±0.5% of the full scale (in equivalent input)
	Conductivity : Within ±1.0% of the full scale (in equivalent input)
Transmission output	No. of outputs: 4
	4 to 20 mA DC or 0 to 20 mA DC: I/O insulation type
	Maximum load resistance: 900Ω
	Transmission output range: Custom setting possible within measurement range (Negative terminals of each transmission output channels are connected internally thus have the same electric potential.)
Contact output	No. of outputs: 5
	Alarm contact outputs: R1, R2, R3 and R4
	Contact type: Relay contact, SPST
	Contact rating: 240 V AC, 1A and 30 V DC, 1A (resistance load) Contact function: Selectable between upper/lower limit operation (ON/OFF control), delay operation, and hysteresis
Error alarm output (RF)	Contact type: Relay contact, SPDT
	Contact rating: 240 V AC, 1A and 30 V DC, 1A (resistance load)
	Contact function: Selectable from error, trouble warning and maintenance
Contact input	No. of inputs: 1
	Contact status: Open collector no-voltage contact a Contact function: Transmission output hold
Communications output	RS-485 input/output
Calibration function	Conductivity: Based on the specified compensation coefficient for the cell constant (parameter input)
	Temperature: Calibrated by comparing with the reference thermometer
Transmission output Hold function	Selectable from the previous value hold and optional value hold (However, only the previous value hold is available during the maintenance mode.)
Self-diagnosis function	<ul style="list-style-type: none"> <li>• Sensor diagnosis (Short-circuit and disconnection of the temperature sensor)</li> <li>• Out of the measurement range</li> <li>• Converter error</li> </ul>
Temperature compensation	• TMAH specific temperature compensation
	• Input of optional temperature compensation coefficient (Reference temperature: 25°C, Temperature coefficient: 0 to 3%/°C)
Temperature compensation range	TMAH: 15 to 90°C, Conductivity: 0 to 100°C (Temperature compensation out of range is extended on the compensation function)
Ambient environment	Temperature: -5 to 45°C, Relative humidity: 20 to 85% (without condensation)
Power supply	24 V DC ±10%, 10 W (max.)
Protective structure	Panel: IP65, Rear case: IP20, Terminal: IP00 (indoor-use panel installation type)
Mass	Approx. 550g
Conforming standards	CE marking, FCC Part 15
Compatible sensors	FES-510 series (flow-type carbon sensor)

## External dimensions Unit : mm (in)

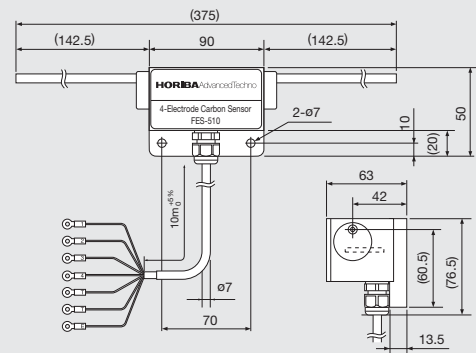
### ■ Indication Converter HE-960H-TM



### ■ Sensor FES-510-3/4

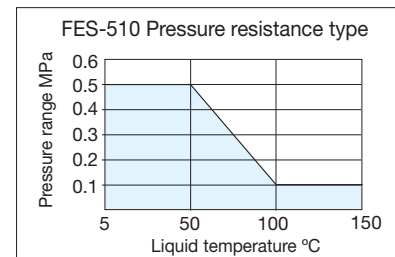


### FES-510-1/2



## Specifications 4-electrode carbon flow-type conductivity sensor

Model	FES-510	FES-510	FES-510	FES-510	FES-510	FES-510	FES-510
	-1/4	-3/8	-1/2	-3/4	-1	-6_4	-10_8
Liquid end material	Glass carbon (electrode), PFA (body), Kalrez® (seal)						
Piping size	1/4 inch	3/8 inch	1/2 inch	3/4 inch	1 inch	ø6/ø4 mm	ø10/ø8 mm
Sample flow rate	0 to 2 L/min	0 to 8 L/min	0 to 10 L/min	0 to 15 L/min	0 to 25 L/min	0 to 2 L/min	0 to 8 L/min
Sample pressure range	0 to 0.5 MP for 5 to 50°C, 0 to 0.1 MP for above 100°C For 50 to 100°C, pressure range is plotted between 0.5 MPa and 0.1 MPa as shown on the line graph (refer to diagram on the right)						
Sample temperature	5 to 100°C (Aqueous solution which boils at 100°C)						
Cable length	10 m (standard)						



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

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