

For Ultra-Pure Water

2-Channel Resistivity Meter HE-960RW



CE marking compliant



High-precision temperature compensation function for measuring ultra-pure water resistivity

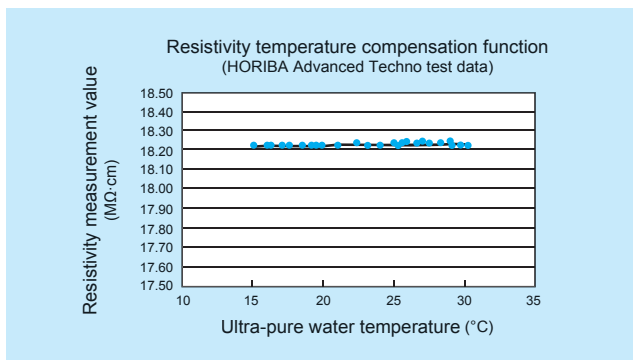
This resistivity meter is ideal for such applications as the high-precision water monitoring employed at ultra-pure water plants used in semiconductor manufacturing. They utilize newly designed, high-precision, high-stability temperature measurement circuitry and a vastly improved temperature compensation function, an important element for measuring the resistivity of ultra-pure water.

High-precision temperature compensation function for measuring ultra-pure water resistivity

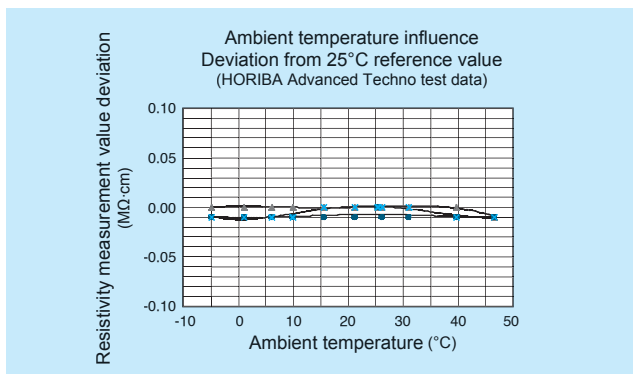
Features

Highly precise, highly stable temperature compensation function

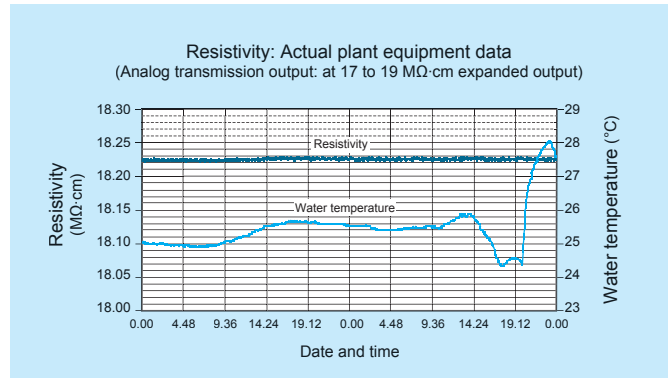
- Highly precise temperature measurement is enabled through high-precision platinum temperature resistors (Pt 1,000Ω) and constant current circuitry.
- Handling of the ultra-pure water resistivity temperature characteristics curve and the temperature characteristics of impurities is made independent and temperature compensation is performed to achieve 25°C resistivity.
- Temperature and resistivity measurement stabilizing circuitry and high-precision, temperature-compensation software serve to control fluctuations in measured values in the region of 18 MΩ·cm resistivity to within a minimum 0.02 MΩ·cm over a water temperature range of 15°C to 35°C.



- A chopper-type, low temperature drift, operational amplifier and pair resistivity sensors greatly reduce the effects of secular change and ambient temperature fluctuations and further improve the reliability of resistivity measurements.
- The width of resistivity fluctuations is maintained to within 0.05 MΩ·cm over an ambient temperature range of 0°C to 40°C.



- Stable resistivity measurement without a delay in temperature compensation is now possible even for such processes as hot purified water applications that consistently experience water temperature fluctuations.



50 m extension possible for sensor cables

The circuits that measure resistivity utilize a shield-drive method that is unaffected by the inter-cable capacity. As a result, the length of the sensor cables can be extended to up to 50 meters. In addition, by registering the cable length in a converter, any influence on temperature measurement caused by the cable's line resistance when extended can be automatically corrected, thus reducing temperature measurement errors.

Flexible analog transmission output

With built-in, 2-channel (4 to 20 mA and 0 to 20 mA) transmission output circuits, the desired resistivity and temperature data can be assigned to either channel. The transmission output range can also be set for a selected scale within the range of measurement. By employing low-drift, highly stable circuitry, resistivity measurements reliable to within 0.01 MΩ·cm can also be transmitted, even during expanded output.

2-channel simultaneous measurement

The HE-960RW employs independent internal circuits for connecting two sensors to a single converter, allowing two independent resistivity measurements as well as desalination rate calculation and output for two separate locations.

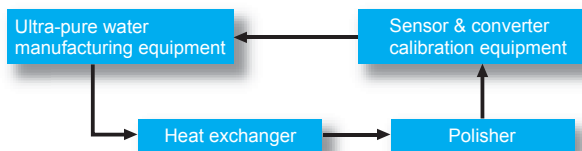
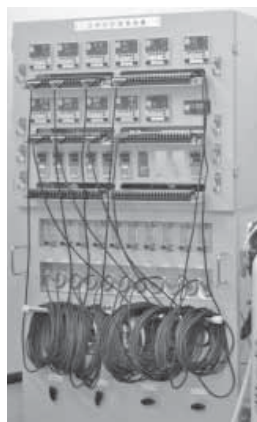
Four contact alarms

Four integrated contacts are available as alarm output. Upper and lower resistivity limits and equipment failure alarms can be assigned to each channel. Moreover, contact response delay time can be set as well.

Communication device ability (RS-485)

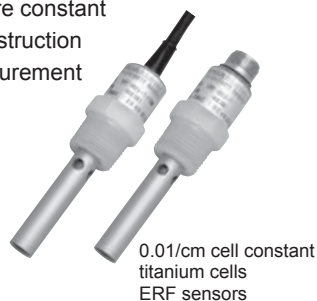
Abundant in-house calibration equipment

HORIBA Advanced Techno resistivity meters are only shipped after cell-constant inspection is performed on the resistivity sensors and inspection for temperature sensor instrumental errors is implemented using calibration equipment that has been adjusted with high-traceability reference equipment. The sensors can also be combined with a converter for integrated calibration in advance of shipping.



Sensors

By simply inputting the temperature constant recorded on the sensor into the instruction converter, high temperature measurement precision can be achieved. It is also possible to perform temperature calibration in comparison with standard reference thermometers.



0.01/cm cell constant titanium cells ERF sensors

* ERF-001 sensors use 3850 ppm/°C platinum temperature resistors.

Resistivity sensor code chart

Model	Cell constant	Connection	Electrode material	Temperature inspection	Pair calibration	Cable length	Terminal shape	Specifications
ERF								Resistivity sensor
	-001							Cell constant: 0.01/cm
		-L						Lead type
		-C						Connector type
			-T					Titanium (Acceptable temperature range: 0 to 80°C)
			-H					Hastelloy (Acceptable temperature range: 0 to 100°C)
				-N				Without temperature inspection
					-R			With 0°C temperature inspection
						-N		Without pair calibration
						-S		With pair calibration
						-10		10 m (standard)
						-XX*		Designated cable length (special order)
						None		When connector type is selected
						-Y		Y terminal (standard)
						-O		Round terminal (special order)
						None		When connector type is selected

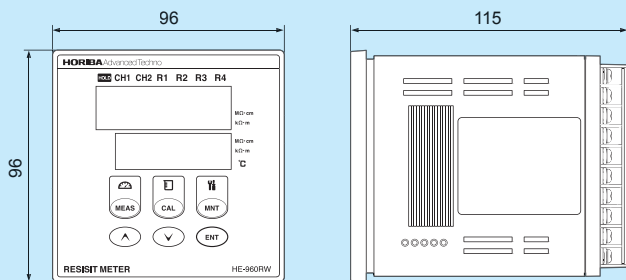
- The maximum cable extension should be 50 meters.
- Do not use a relay box.
- * User-definable

Specifications

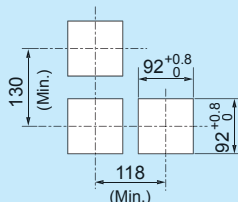
HE-960RW converter

Model	HE-960RW		
Measurement method	2-electrode method		
Sensor input	2-channel (for concurrent measurement with sensors isolated each other)		
Cell constant	Approx. 0.01/cm		
Temperature sensor specifications	Platinum resistance 1000Ω/0°C coefficient 3850 ppm/°C standard		
Measuring range	Resistivity	MΩ·cm	0 to 2.00
		kΩ·m	0 to 20.0
			0 to 200.0
			0 to 1000.0*
	*:Measurable without temperature compensation		
	Temperature: 0°C to 100°C (Select your desired decimal point from 0, 1, and 2 digits)		
	Desalination rate: 0% to 100%		
Repeatability	Within ±0.1% of the full scale (in equivalent input)		
Linearity	Within ±0.5% of the full scale (in equivalent input)		
Effects of ambient temperature	Resistivity:	within 0.05 MΩ·cm over ambient temperature fluctuations of between 0°C and 40°C	
	Temperature:	within 0.1°C over ambient temperature fluctuations of between 0°C and 40°C	
Transmission output	Number of outputs:	2	
	4 mA to 20 mA DC / 0 mA to 20 mA DC : input/output isolated type	Maximum load resistance : 900Ω	
	Transmission output range :	Freely selectable within the measurement range. However, repeatability and linearity will remain accurate to the separately set measuring range. (Negative terminals of each transmission output channel are connected inside and thus have the same electric potential.)	
Contact output	Number of output :	4 points	
	Alarm contact output (R1,R2,R3,R4)	Contact type : relay contact, R1, R2, R3 :SPST R4 : SPDT	
	Contact rating:	240 V AC 3 A and 30 V DC, 3 A (resistance load)	
	Contact function:	selectable from upper/lower limit operation (ON/OFF control), delay, and hysteresis	
	Output contents:	selectable from the selected measurement, anomaly alarm, and maintenance. (However, R1 and R2, R3 and R4 share the COMMON contacts respectively.)	
Communication output	RS-485 input/output		
Calibration function	Specific resistance : Based on the specified compensation coefficient for the cell constant (parameter input)		
	Temperature: Calibrated by comparing with the reference thermometer		
Transmission output hold feature	Selectable from the Previous value hold and the Optional value hold. (However, only the previous value hold is available in the maintenance mode.)		
Self-diagnosis function	<ul style="list-style-type: none"> • Sensor diagnosis (Short-circuit and disconnection of the temperature sensor) • A/D converter scale over • Out of the measurement range • Converter error 		
Temperature compensation	<ul style="list-style-type: none"> • Temperature compensation for ultra-pure water and impurities Select the temperature characteristics of impurities - NaCl temperature characteristics - Arbitrary temperature coefficient entry (temperature coefficient : ±5%/°C) Reference temperature: 5°C to 95°C		
Temperature compensation range	0°C to 100°C		
Ultra-pure water Specific resistance selection	Measurement unit	MΩ·cm	18.23 (standard), 18.18, 18.24
		kΩ·m	182.3 (standard), 181.8, 182.4
Clipping function	When the measured value is above the upper limit of the measurement range derived from the specified specific resistance, the specified resistance is used as the measured value.		
Ambient environment	Temperature: -5°C to 45°C, Relative humidity: 20% to 85% (without dew condensation)		
Power supply	100 V to 240 V AC ±10%, 50/60 Hz, 15 VA (max)		
Protective structure	Panel: IP65, Rear case: IP20, Terminal: IP00 (Indoor-use panel installation type)		
Mass	Approx. 550 g		
Conforming standards	CE Marking, FCC Part15		
Pair calibration precision	Resistivity:	within ±0.01 MΩ·cm (as per reference device, at identical temperature)	
	Temperature:	within ±0.02°C (as per reference device, at identical temperature)	

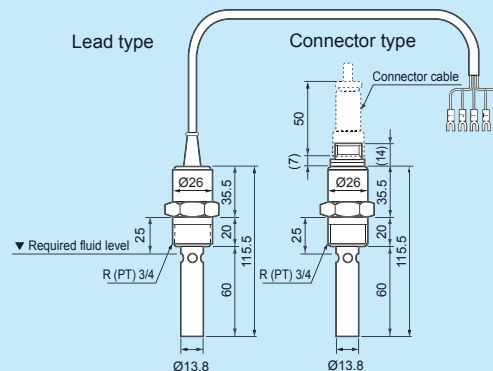
HE-960RW converter



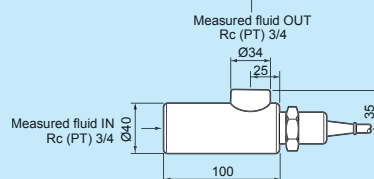
Panel cut size



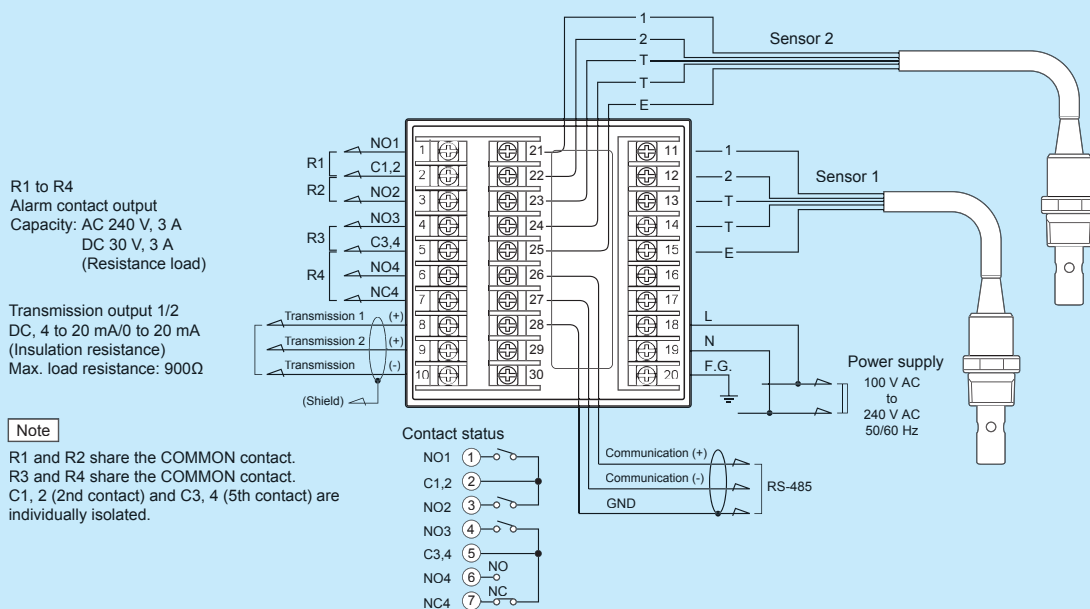
ERF-001 series resistivity sensors



EFA-30 series flow-type holder



External connections



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

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