

Optimum measurement system for all types of application  
Industrial Water Quality Measuring Instruments

Field-installation type

## H-1 Series

4-Wire Transmitter

2-Wire Transmitter



Panel mount type

## SLIM48/96 Series

4-Wire Transmitter



### Measurement item



# Total support for all types of application from purified water



HORIBA H-1 and SLIM48/96 series of industrial water quality measuring instruments include a total array of measurement points for the broad applications required controlling of water quality. With sensors, cleaners, and various accessories, these water quality measuring instruments are applicable to all kinds of water treatment and reduce the maintenance load.

## Series Lineup of Industrial Water Quality Instruments

Series	Installation Location	Type	Power Supply	pH	ORP	Resistivity	Conductivity		Residual Chlorine	DO	NH <sub>4</sub> -N	F	MLSS	Turbidity	Color
							Low Conductivity Solutions	High Conductivity Solutions							
H-1	Field installation type	2-Wire Transmitter	24 V DC	HP-300	HO-300	HE-300R	HE-300C	—	—	HD-300	—	HC-300F	—	—	—
		2-Wire Multi-Parameter	24 V DC	HQ-300	HQ-300	HQ-300	HQ-300	—	—	HQ-300	—	HQ-300	—	—	—
		4-Wire Transmitter	90 to 264 V AC	HP-200	HO-200	HE-200R	HE-200C	HE-200H	HR-200	HD-200 HD-200FL	HC-200NH	HC-200F	HU-200SS	HU-200TB-W HU-200TB-H HU-200TB-EH HU-200TB-IM	HU-200CL
SLIM 48/96	Panel mount type	4-Wire Transmitter	90 to 264 V AC	HP-480 HP-960FTP	HO-480	HE-480R HE-960RW	HE-480C HE-960CW	HE-480H HE-960HI	HR-480P	HD-480	—	—	—	—	—

# monitoring to waste water monitoring



## Field-installation Type **H-1 Series**

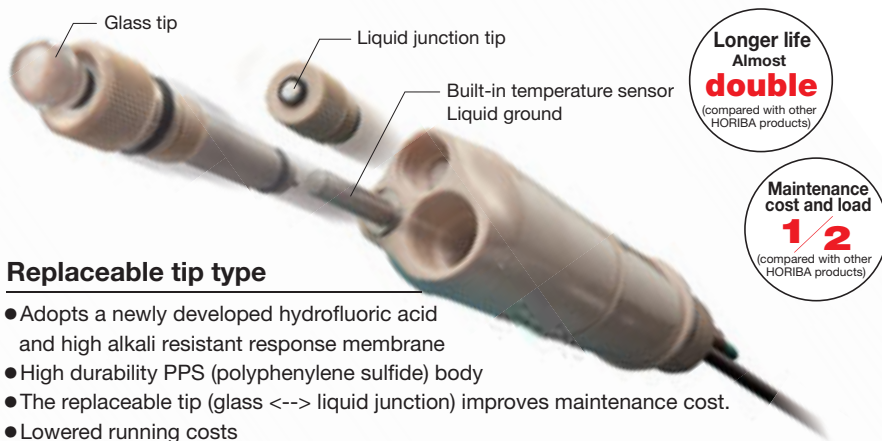
The Field installation type H-1 series Transmitters offer a rainproof structure. This has been newly developed under the concepts of “durability”, “functionality”, and “maintainability” in order to stand the severe environmental conditions of on-site processes. This series of units comprehensively can use all kinds of water treatment from purified water monitoring to waste water monitoring.



## Panel mount type **SLIM48/96 Series**

The panel mount type SLIM48/96 series instruments are the optimum Analyzers for incorporation in an instrumentation system. Their compact design means minimal space requirements for systems that combine multi-item measurement instruments. We recommend this series for automatic all-purpose monitoring of sewerage, factory effluent, factory processes, etc.

## Industrial pH electrode



Longer life  
Almost  
**double**  
(compared with other HORIBA products)

Maintenance  
cost and load  
**1/2**  
(compared with other HORIBA products)

### Replaceable tip type

- Adopts a newly developed hydrofluoric acid and high alkali resistant response membrane
- High durability PPS (polyphenylene sulfide) body
- The replaceable tip (glass <--> liquid junction) improves maintenance cost.
- Lowered running costs

Liquid junction: Porous ceramic; Temperature: -10 to 60°C; Pressure: 0 to 0.03 MPa (through internal liquid pressurization)  
Liquid contact material: glass, ceramic, fluorine rubber, polyphenylene sulfide resin, and titanium (for hydrofluoric acid resistance: Nickel chrome alloy)

### pH electrode HF

Combination with replaceable tip  
Model: 6171-50B



Resistant to the waste fluids of semiconductor processes and strong acids, including hydrofluoric acid.

### pH electrode Alkali

Combination with replaceable tip  
Model: 6172-50B



Resistant to the water used in brine electrolysis processes and high alkali waste fluids.

### pH electrode Oil

Combination with replaceable tip  
Model: 6173-50B



Resistant to oil contamination in petroleum refinery processes and boiler circulation water that includes petroleum.

### Standard electrode

#### Dome-shaped tough electrode

Integrated combination  
Model: 6108-50B



#### Fixed sleeve tough electrode

Integrated combination  
Model: 6109-50B



#### Hydrofluoric-acid resistant

Integrated combination  
Model: 6151-50B



#### High-alkali resistant

Integrated combination  
Model: 6152-50B



#### pH electrode standard

Combination with replaceable tip  
Model: 6174-50B



# HP-200

(4-Wire Transmitter)



# HP-300

(2-Wire Transmitter)



### HP-200 Specifications

Measuring method	Glass electrode method	
Measuring range	pH: 0 to 14 pH Temperature: 0 to 100°C	Resolution: 0.01 pH Resolution: 0.1°C
Repeatability	pH: ±0.03 or less	Temperature: ±0.3°C (for equivalent input)
Linearity	pH: ±0.03 or less	Temperature: ±0.3°C (for equivalent input)
Transmission output	Two points 4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω	
Contact output	Five points No-voltage contact output Relay contact, SPDT (1c) Contact function: R1, R2: Selectable from upper limit alarm, lower limit alarm, ON/OFF control, time-shared proportional control R3, R4: Selectable from upper limit alarm, lower limit alarm, transmission output hold operation, cleaning output FAIL: Malfunction alarm	
Contact input	One point Contact format: Open collector no-voltage a contact Contact function: Cleaning operation external input	
Communication function	RS-485 Two wire systems, Input/output isolated type (not isolated from transmission output)	
Temperature compensation range	0 to 100°C	
Ambient temperature	-20 to 55°C	
Temperature compensation element	Pt 1000 (0°C) Positive temperature sensitive resistor element: 500 Ω (25°C), 6.8 kΩ (25°C), 10 kΩ (25°C)	
Calibration method	Automatic or manual calibration	
Self-diagnosis function	Calibration error, Electrode diagnosis error, Analyzer malfunction	
Power supply	100 to 240 V AC 50/60 Hz Power consumption 15 VA (max.)	
Construction	Outdoor installation type: IP65 protection level Mounting method: 50 A pole or wall mounted Case: Aluminum alloy Mount fitting/hood: SUS304	
Weight	Approx. 4.5 kg	
Regulatory certification	CE marking, FCC rules	

### HP-300 Specifications

Measuring method	Glass electrode method	
Measuring range	pH: 0 to 14 pH Temperature: 0 to 100°C	Resolution: 0.01 pH Resolution: 0.1°C
Repeatability	pH: ±0.03 or less	Temperature: ±0.3°C (for equivalent input)
Linearity	pH: ±0.03 or less	Temperature: ±0.3°C (for equivalent input)
Transmission output	4 to 20 mA DC Input/output isolated type Maximum load resistance 600 Ω	
Contact input	One point Contact format: No-voltage a contact Contact function: Transmission output is held for closed contact input.	
Temperature compensation range	0 to 100°C	
Ambient temperature	-20 to 60°C	
Temperature compensation element	Pt 1000 (0°C) Positive temperature sensitive resistor element: 500 Ω (25°C), 6.8 kΩ (25°C), 10 kΩ (25°C)	
Calibration method	Automatic or manual calibration	
Self-diagnosis function	Calibration error, Electrode diagnosis error, Transmitter malfunction	
Power supply	24 V DC (operational voltage range: 21 to 32 V DC) 0.6 W (max.)	
Construction	Outdoor installation type: IP65 protection level Mounting method: 50 A pole or wall mounted Case: Aluminum alloy Mount fitting/hood: SUS304	
Weight	Approx. 4 kg	
Regulatory certification	CE marking, FCC rules	

## pH Electrodes

New pH electrode lineup enabling 50% reduction in maintenance load



6108-50B 6151-50B 6171-50B

	Type	Model	Useable temperature range	Useable pressure range	Combined holder
Standard	Dome type pH electrode	6108-50B <b>ToughH</b> <b>Pb Free</b>	-10 to 100°C	0 to 0.6 MPa	CH-101, CF-251 CF-301, CF-401
	Sleeve type pH electrode	6109-50B <b>ToughH</b> <b>Pb Free</b>	-10 to 80°C	0 to 0.03 MPa	CH-101 CF-251
	Plastic composite pH electrode (for Hydrofluoric acid containing sample)	6151-50B <b>ToughH</b> <b>Pb Free</b>	-10 to 60°C	0 to 0.2 MPa	CH-101 CF-251 CF-301
	Plastic composite pH electrode (for Highly alkaline sample)	6152-50B <b>ToughH</b> <b>Pb Free</b>	-10 to 60°C	0 to 0.2 MPa	CH-101 CF-251 CF-301
	Dome type pH electrode (gel)	6108G-50B <b>ToughH</b> <b>Pb Free</b>	-10 to 100°C	0 to 0.6 MPa	Specialized pressurized holder
Tip replaceable	pH electrode (Tip replaceable)	6174-50B <b>ToughH</b> <b>Pb Free</b>	-10 to 100°C	0 to 0.03 MPa	HIBP, HIBS CF-501
	pH electrode HF (Tip replaceable)	6171-50B <b>ToughH</b> <b>Pb Free</b>	-10 to 100°C	0 to 0.03 MPa	
	pH electrode Alkaline (Tip replaceable)	6172-50B <b>ToughH</b> <b>Pb Free</b>	-10 to 60°C	0 to 0.03 MPa	
	pH electrode Oil (Tip replaceable)	6173-50B <b>ToughH</b> <b>Pb Free</b>	-10 to 60°C	0 to 0.03 MPa	

**ToughH** (Tough electrode) Impact-resistant, splinterless glass electrode

**Pb Free** Lead free glass is used in both the sensitive glass areas and main body.

Contact your sales representative when electrodes are to be used with any of the samples below.

- With strongly oxidizing solutions such as aqua regia, chromic acid, hypochlorous acid, perchloric acid
- When corrosive gases (ammonia, chlorine, hydrogen sulfide) are involved

# HP-480

## (4-Wire Transmitter)



# HP-960FTP

## (4-Wire Transmitter)



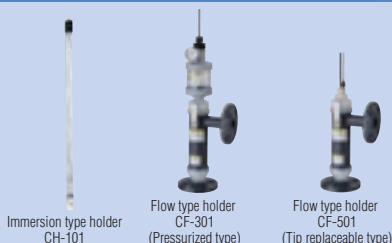
### HP-480 Specifications

Measuring method	Glass electrode method
Measuring range	pH: 0 to 14 pH Resolution: 0.01 pH Temperature: 0 to 100°C Resolution: 1°C (selectable display)
Repeatability	pH: ±0.05 pH (for equivalent input)
Transmission output	4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω
Transmission output range	Freely settable within Measuring range
Contact output	Output points: Two points (R1, R2) Contact format: Relay contact SPDT (1c) Contact capacity: 240 V AC 3 A, 30 V DC 3 A (resistance load) Contact function: Selectable from upper, lower limit operation (ON/OFF control) and malfunction alarm, maintenance operation
Calibration function	· Two point automatic calibration and manual calibration Two point automatic calibration: Automatic potential stability assessment Standard solution: Combination of pH 2, 4, 9, 10 (JIS) and pH 7 (JIS) Manual calibration: Freely settable, difference of 2 pH or more · Temperature calibration (One point)
Self-diagnosis function	Calibration error, Electrode diagnosis error, Analyzer malfunction
Power supply	100 to 240 V AC 50/60 Hz Power consumption 10 W or less
Temperature compensation range	0 to 100°C
Ambient temperature	-5 to 45°C
Temperature compensation element	Selectable from 500 Ω, 6.8 kΩ, 1 kΩ, 10 kΩ, 350 Ω, no compensation
Weight	Approx. 400 g
Regulatory certification	CE marking, FCC rules

### HP-960FTP Specifications

Measuring method	Glass electrode method
Measuring range	pH: 0 to 14 pH Resolution: 0.01 pH Temperature: 0 to 100°C Resolution: 1°C (selectable display)
Repeatability	pH: ±0.05 pH (for equivalent input)
Transmission output	4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω
Transmission output range	Free range within Measuring range
Contact output	Outputs points: Four points Alarm contact output (R1, R2, R3 and R4) Contact type: relay contact, SPDT (1c) 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, timesharing proportional control), alarm, and maintenance.
Control action	ON/OFF control · Upper and lower limits setting range: 0.00 to 14.00 pH · Control width: 0.00 to 4.00 pH (± 0.00 to ± 2.00 pH) · Time-division proportional control · Upper and lower limits setting range: 0.00 to 14.00 pH · Proportional band: 0.00 to 14.00 pH · Cycle time: 5 to 300 s · Control output shift capability: 0 to 50% of shift volume for the cycle time · Self-extending cycle time capability: The cycle time is extended automatically when the deviation value enters a set range (F zone) in proportion to the deviation value.(this feature has no effect when the shift function has been enabled.) · F zone: 1 to 100% of the proportional band (Self-extension of the cycle time starts working when the deviation enters the above range.) · Upper limit for extending the cycle time: 0 to 300 s. · Maximum control volume: 50 to 100% (To be applied regardless of whether the measured value is in the proportional band or not.)
Calibration function	· Two point automatic calibration or manual calibration Two point automatic calibration: Automatically determines whether the electric potential is stable or not. Types of standard solution: pH 2, 4, 7, 9 and 10 (JIS) Combination of standard solutions: pH7 and one of the others Manual calibration: Freely selectable, but the difference should be over 2 pH. · Temperature calibration (One point)
Self-diagnosis function	· Calibration function Asymmetry potential error, sensitivity error, response speed error and standard solution error · Electrode self-check Temperature sensor short-circuit and temperature sensor disconnection · Outside of the measuring range · Transducer error
Power supply	100 to 240 V AC, 50/60 Hz, 10 VA (max.)
Temperature compensation range	0 to 100°C
Ambient temperature	5 to 45°C
Temperature compensation element	Selectable from compensation ON (500Ω(25°C), 6.8kΩ(25°C), 350Ω(25°C), 1kΩ(0°C) or 10kΩ(25°C)) and compensation OFF
Weight	Approx. 500 g
Regulatory certification	CE marking, FCC rules

## Holder



	Application	Model	Main materials	Measurement solution conditions*			Interface
				Temperature	Pressure	Flow rate	
Immersion type	General use type	CH-101	PP	-5 to 80°C	Atmospheric pressure	2 m/sec or less (flow velocity)	—
	Tip replaceable type	HIBP	PP	-10 to 80°C			
Flow type	General use type	CF-251	PP	-5 to 80°C	Atmospheric pressure	0.3 to 10 L/min	JIS 10K 25A FF flange (Input port/output port)
	General use internal solution tank mounted type	CF-251-T	PP	-5 to 80°C			
	General use pressurized type	CF-301	PP	-5 to 80°C	0.3 MPa		
	Tip replaceable type	CF-501	PP	-5 to 80°C	Atmospheric pressure		

\* Usage conditions vary according to the combination of electrodes. Refer to the specifications document of each product for details.

## Accessories

### pH sensor extension cable

#### •C-5A

Used to connect transmitter and relay box.



Model	C-5A
Outer diameter	Ø10
Max. extendable distance	50 m

### Relay box

#### •CT-50pH (S/SE terminal attached)

If the distance between the electrode holder and analyzer or transmitter main unit is longer than the electrode cable, use the relay box as a cable repeater. Connect the relay box and analyzer or transmitter main unit using a specialized extension cable.



### Calibration standard solution

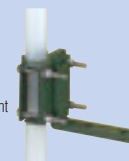
- pH7 standard solution (500 ml)
- pH4 standard solution (500 ml)
- pH9 standard solution (500 ml)
- Reference electrode internal solution (250 ml)
- ORP standard powder (10 packs)

Other powders are also available in addition to solutions.

### Mount fitting

- BA-2A (ABS)
- BA-1S (SUS)

Attachment/detachment can be performed in one step using the specialized mount fitting. Standard solution calibration and maintenance are also straightforward. The fitting is available in two types of material: either ABS resin or stainless steel (SUS304).



### [Loose flange]

This is an adapter for attaching the CH-101 series immersion type holder to the flange.



Model	Material	Interface
FK-1	PP	JIS10K
FK-1P	PVC	50A
FK-1S	SUS	

# HO-200

(4-Wire Transmitter)



# HO-300

(2-Wire Transmitter)



### HO-200 Specifications

Measuring method	Metal electrode method	
Measuring range	ORP: -2,000 to 2,000 mV Temperature: 0 to 100°C	Resolution: 1 mV Resolution: 0.1°C
Repeatability	ORP: ±5 mV or less Temperature: ±0.3°C	(for equivalent input)
Linearity	ORP: ±5 mV or less Temperature: ±0.3°C	(for equivalent input)
Transmission output	Two points 4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω	
Contact output	Three points No-voltage contact output Relay contact, SPDT (1c) Contact function: R1, R2: Selectable from upper limit alarm, lower limit alarm, ON/OFF control, transmission output hold operation, cleaning output FAIL: Malfunction alarm Control operation: Control width: 2 to 400 mV (±1 to ±200 mV)	
Contact input	One point Contact format: Open collector non-voltage a contact Contact function: Cleaning operation external input	
Communication function	RS-485 Two wire systems, Input/output isolated type (not isolated from transmission output)	
Ambient temperature	-20 to 55°C	
Temperature measurement element	Pt 1000 (0°C) Positive temperature sensitive resistor element: 500 Ω (25°C), 6.8 kΩ (25°C), 10 kΩ (25°C)	
Calibration method	Manual adjustment (offset) Correction (-200 to 200 mV) Manual sensitivity correction (0.500 to 1.500)	
Self-diagnosis function	Electrode diagnosis error, Analyzer malfunction	
Power supply	100 to 240 V AC 50/60 Hz Power consumption 15 VA (max.)	
Construction	Outdoor installation type: IP65 protection level Mounting method: 50 A pole or wall mounted Case: Aluminum alloy Mount fitting/hood: SUS304	
Weight	Approx. 4.5 kg	
Regulatory certification	CE marking, FCC rules	

### HO-300 Specifications

Measuring method	Metal electrode method	
Measuring range	ORP: -2,000 to 2,000 mV Temperature: 0 to 100°C	Resolution: 1 mV Resolution: 0.1°C
Repeatability	ORP: ±5 mV or less Temperature: ±0.3°C	(for equivalent input)
Linearity	ORP: ±5 mV or less Temperature: ±0.3°C	(for equivalent input)
Transmission output	4 to 20 mA DC Input/output isolated type Maximum load resistance 600 Ω	
Contact input	One point Contact format: No-voltage a contact Contact function: Transmission output is held for closed contact input.	
Ambient temperature	-20 to 60°C	
Temperature measurement element	Pt 1000 (0°C) Positive temperature sensitive resistor element: 500 Ω (25°C), 6.8 kΩ (25°C), 10 kΩ (25°C)	
Calibration function	Manual adjustment (offset) Correction (-200 to 200 mV) Manual sensitivity correction (0.500 to 1.500)	
Self-diagnosis function	Electrode diagnosis error, Transmitter malfunction	
Power supply	24 V DC (operational voltage range: 21 to 32 V DC) 0.6 W (max.)	
Construction	Outdoor installation type: IP65 protection level Mounting method: 50 A pole or wall mounted Case: Aluminum alloy Mount fitting/hood: SUS304	
Weight	Approx. 4 kg	
Regulatory certification	CE marking, FCC rules	

## ORP Electrodes



ORP electrode (Pt) 6805-50B

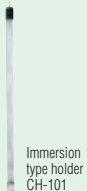
Type	Model	Sample temperature range	Sample pressure range	Combined holder
General use (Pt)	6805-50B <b>ToughH</b> <b>Pb Free</b>	0 to 80°C	0 to 0.03 MPa	CH-101 CF-251 CF-301
General use (Au)	6815-50B <b>ToughH</b> <b>Pb Free</b>			
Tip replaceable (Pt)	6870-60B <b>Pb Free</b>	0 to 105°C	0 to 0.03 MPa	HIBP HIBS CF-501

**ToughH** (Tough electrode) Impact-resistant, splinterless glass electrode



Lead free glass is used in both the sensitive glass areas and main body.

## Holder



Immersion type holder CH-101



Flow type holder CF-301 (Pressurized type)

	Application	Model	Main materials	Measurement solution conditions*			Interface
				Temperature	Pressure	Flow rate	
Immersion type	General use type	CH-101	PP	-5 to 80°C	Atmospheric pressure	2 m/sec or less (flow velocity)	—
	Tip replaceable type	HIBP	PP	-10 to 80°C			
Flow type	General use type	CF-251	PP	-5 to 80°C	Atmospheric pressure	0.3 to 10 L/min	JIS 10K 25A FF flange (Input port/ output port)
	General use internal solution tank mounted type	CF-251-T	PP	-5 to 80°C			
	General use pressurized type	CF-301	PP	-5 to 80°C	0.3 MPa		
	Tip replaceable type	CF-501	PP	-5 to 80°C	Atmospheric pressure		

\* Usage conditions vary according to the combination of electrodes. Refer to the specifications document of each product for details.

# HO-480

## (4-Wire Transmitter)



### HO-480 Specifications

Measuring method	Metal electrode method
Measuring range	ORP: $\pm 2,000$ mV Resolution: 1 mV
Repeatability	ORP: $\pm 5$ mV or less (for equivalent input)
Linearity	ORP: $\pm 5$ mV or less (for equivalent input)
Transmission output	4 to 20 mA DC Input/output isolated type Maximum load resistance 900 $\Omega$
Transmission output range	Freely settable within measuring range
Calibration function	Sensitivity correction Adjustment $\pm 200$ mV Span variable range 50.0 to 150.0%
Contact output	Output points: Two points (R1, R2) Contact format: Relay contact SPDT (1c) Contact capacity: 240 V AC 3 A, 30 V DC 3 A (resistance load) Contact function: Selectable from upper, lower limit operation (ON/OFF control) and malfunction alarm, maintenance operation
Self-diagnosis function	· Outside measuring range · Analyzer malfunction
Power supply	100 to 240 V AC 50/60 Hz Power consumption 10 VA (max.)
Ambient temperature	-5 to 45°C
Weight	Approx. 400 g
Regulatory certification	CE marking, FCC rules

### Accessories

#### ORP sensor extension cable

- C-2A (Temperature compensation non-electrode type)

Used to connect transmitter and relay box.



Model	C-2A
Outer diameter	$\varnothing 5$
Max. extendable distance	50 m

#### Relay box

- CT-50pH

If the distance between the electrode holder and analyzer or transmitter main unit is longer than the electrode cable, use the relay box as a cable repeater. Connect the relay box and analyzer or transmitter main unit using a specialized extension cable.



#### Calibration standard solution

- ORP standard powder (10 packs)

Other powders are also available in addition to solutions.

#### Mount fitting

- BA-2A (ABS)
- BA-1S (SUS)

Attachment/detachment can be performed in one step using the specialized mount fitting. Standard solution calibration and maintenance are also straightforward. The fitting is available in two types of material: either ABS resin or stainless steel (SUS304).



#### [Loose flange]

This is an adapter for attaching the CH-101 series immersion type holder to the flange.



Model	Material	Interface
FK-1	PP	JIS 10K 50A
FK-1P	PVC	
FK-1S	SUS	

# Resistivity

## HE-200R (4-Wire Transmitter)



## HE-300R (2-Wire Transmitter)



### HE-200R Specifications

Measuring method	Two electrode method		
Measuring range	Cell constant	/cm	0.01
	Electrical resistivity	MΩ·cm	0.000 to 2.000
		kΩ·m	0.00 to 20.00
			0.00 to 200.0*
			* With conditions under which temperature compensation is not performed, it is possible to display 0.0 to 100.0 MΩ·cm (0 to 1,000 kΩ·m).
	Temperature	°C	0 to 100 Resolution: 0.01°C
Repeatability	Electrical resistivity: ±0.1% full-scale or less, Temperature: ±0.1°C (for equivalent input)		
Linearity	Electrical resistivity: ±0.5% full-scale or less, Temperature: ±0.5°C (for equivalent input)		
Transmission output	Two points 4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω		
Contact output	Three points No-voltage contact output Relay contact, SPDT (1c) Contact function: R1, R2: Selectable from upper limit alarm, lower limit alarm, transmission output hold operation FAIL: Malfunction alarm Alarm operation: Output details: Electrical resistivity, temperature		
Contact input	One point Contact format: Open collector no-voltage a contact Contact function: Transmission output hold external input		
Communication function	RS-485 Two wire systems, Input/output isolated type (not isolated from transmission output)		
Temperature compensation range	0 to 100°C		
Ambient temperature	-20 to 55°C		
Temperature compensation element	Pt 1000 (0°C)		
Calibration function	Electrical resistivity: Based on input of cell constant correction coefficient (parameter input) Temperature: One point calibration compared with reference temperature gauge		
Additional function	Ultra-pure water electrical resistivity selection function, clip function		
Self-diagnosis function	Sensor diagnosis error, Analyzer malfunction		
Power supply	100 to 240 V AC 50/60 Hz Power consumption 15 VA (max.)		
Construction	Outdoor installation type: IP65 protection level Mounting method: 50 A pole or wall mounted Case: Aluminum alloy Mount fitting/hood: SUS304		
Compatible sensor	ERF series electrical resistivity sensor (cell constant 0.01/cm)		
Pair calibration accuracy*	Electrical resistivity: ±0.01 MΩ·cm or less (for standard unit / same temperature) Temperature: ±0.02°C or less (for standard unit / same temperature)		
Weight	Approx. 4.5 kg		
Regulatory certification	CE marking, FCC rules		

\* The sensor and analyzer are assembled in advance and pair calibration is performed before shipping.

### HE-300R Specifications

Measuring method	Two electrode method		
Measuring range	Cell constant	/cm	0.01
	Electrical resistivity	MΩ·cm	0.000 to 2.000
		kΩ·m	0.00 to 20.00
			0.00 to 200.0*
			* With conditions under which temperature compensation is not performed, it is possible to display 0.0 to 100.0 MΩ·cm (0 to 1,000 kΩ·m).
	Temperature	°C	0 to 100 Resolution: 0.01°C
Repeatability	Electrical resistivity: ±0.1% full-scale or less, Temperature: ±0.1°C (for equivalent input)		
Linearity	Electrical resistivity: ±0.5% full-scale or less, Temperature: ±0.5°C (for equivalent input)		
Transmission output	4 to 20 mA DC Input/output isolated type Maximum load resistance 600 Ω		
Contact input	One point Contact format: No-voltage a contact Contact function: Transmission output is held for closed contact input.		
Temperature compensation range	0 to 100°C		
Ambient temperature	-20 to 60°C		
Temperature compensation element	Pt 1000 (0°C)		
Calibration function	Electrical conductivity: Based on input of cell constant correction coefficient (parameter input) Temperature: One point calibration compared with reference temperature gauge		
Additional function	Ultra-pure water resistivity selection function, clip function		
Self-diagnosis function	Sensor diagnosis error, Transmitter malfunction		
Power supply	24 V DC (operational voltage range: 21 to 32 V DC) 0.6 W (max.)		
Construction	Outdoor installation type: IP65 protection level (rain-proof type) Mounting method: 50 A pole or wall mounted Case: Aluminum alloy Mount fitting/hood: SUS304		
Compatible sensor	ERF series electrical resistivity sensor (cell constant 0.01/cm)		
Pair calibration accuracy*	Electrical resistivity: ±0.01 MΩ·cm or less Temperature: ±0.02°C or less (for standard unit / same temperature)		
Weight	Approx. 4 kg		
Regulatory certification	CE marking, FCC rules		

\* The sensor and transmitter are assembled in advance and pair calibration is performed before shipping.

## Sensor

Ultra-pure water type Electrical Resistivity Sensor

Responds sensitively to changes in temperature of measured water

Screw in type

•ERF-001 series

ERF-001-L-T  
(Cable-attached type)



ERF-001-C-T  
(Connector type)



### Specifications

Model	ERF-001	
Cell constant	Approx. 0.01/cm	
Solution contact material	Electrode	Titanium
	Body	PVDF
	Packing	FKM
Measurement solution pressure	0 to 0.5 MPa	
Measurement solution temperature	0 to 80°C	
Cable length	Cable-attached type: 10 m, Y terminal (standard) Max. extendable distance: 50 m Connector type: 10 m (CK-10M), 20 m (CK-20M), 30 m (CK-30M)	
Attachment	Screw in type Thread aperture: R (PT) 3/4	
Combined holder	Flow type holder: EFA-30, EFA-30P, EFA-30S	

Caution: The selection of equipment will differ based on various conditions, including the installation site, usage environment, measurement samples, and any special characteristics. Contact your sales representative for details



# HE-480R

(4-Wire Transmitter)



HE-480R Specifications	
Sensor input	One channel (cell constant: 0.01/cm)
Measuring range	Resistivity: 0 to 0.200, 0 to 2.00, 0 to 20.0, 0 to 100.0 MΩ·cm : 0 to 2.00, 0 to 20.0, 0 to 200.0, 0 to 1,000 kΩ·m (In the 1,000 MΩ·cm and 1,000 kΩ·m range, measurement is possible without temperature compensation.) Temperature: 0 to 100°C (no places after decimal point, 1 digit, 2 digit selectable display)
Repeatability	±0.5% full-scale or less (for equivalent input)
Linearity	±0.5% full-scale or less (for equivalent input)
Transmission output	No. of outputs: One point 4 to 20 mA DC Input/output isolated type Maximum load resistance: 900 Ω
Transmission output range	Freely settable within measuring range
Contact output	No. of outputs: Two points (R1, R2) Contact format: Relay contact SPDT (1c) Contact capacity: 240 V AC 3 A, 30 V DC 3 A (resistance load) Contact function: Selectable from upper, lower limit operation (ON/OFF control) and malfunction alarm, maintenance operation
Calibration function	Conductivity: Input of cell constant correction coefficient (parameter input) Temperature: Calibration compared with reference temperature gauge
Power supply	100 to 240 V AC 50/60 Hz Power consumption 10 VA (max.)
Temperature compensation	· Ultra-pure water temperature characteristics (reference temperature: 25°C) · Reference temperature and temperature coefficient specified settings (reference temperature: 5 to 95°C temperature coefficient: ±5%/°C) · No temperature compensation
Ambient temperature	-5 to 45°C
Temperature compensation element	Pt 1000 (0°C)
Compatible sensor	ERF series resistivity sensor (cell constant: 0.01/cm)
Weight	Approx. 400g
Regulatory certification	CE marking, FCC rules

# HE-960RW

(4-Wire Transmitter)



HE-960RW Specifications	
Sensor input	Two channel (cell constant: 0.01/cm)
Measuring range	Resistivity: 0 to 0.200, 0 to 2.00, 0 to 20.0, 0 to 100.0 MΩ·cm* : 0 to 2.00, 0 to 20.0, 0 to 200.0, 0 to 1000 kΩ·m* (*: Measurable without temperature compensation) Temperature: 0 to 100°C (The displayed decimal place is selectable among 0, 1 and 2.)
Repeatability	±0.1% of the full-scale (for equivalent input)
Linearity	±0.5% of the full-scale (for equivalent input)
Transmission output	No. of outputs: Two points 4 to 20 mA DC isolated I/O type Maximum load resistance: 900 Ω
Transmission output range	Freely settable within measuring range
Contact output	No. of outputs: Four points (R1, R2, R3 and R4) Contact type: Relay contacts R1 to R3: SPST (1a); R4: SPDT (1c) Contact rating: 240 V AC 3 A, 30 V DC 3 A (Resistance load) Contact function: Select between upper/lower limit operation (ON/OFF control), alarm, and maintenance (R1 and R2, R3 and R4 are for common use, respectively)
Calibration function	Conductivity: Based on the specified compensation coefficient for the cell constant (parameter input) Temperature: Calibrated by comparing with the reference thermometer
Power supply	100 to 240 V AC 50/60 Hz 15 VA (max.)
Temperature compensation	· Based on the temperature characteristics of ultra-pure water (reference temperature: 25°C) · Based on the reference temperature and user-defined temperature coefficient (reference temperature: 5 to 95°C temperature coefficient: ±5%/°C) · No temperature compensation
Ambient temperature	-5 to 45°C
Temperature compensation element	Pt 1000 (0°C)
Compatible sensor	ERF series resistivity sensor (cell constant: 0.01/cm)
Weight	Approx. 550g
Regulatory certification	CE marking, FCC rules

## Holder

Flow type holder  
•EF-30 series



### Specifications

Model	EFA-30	EFA-30P	EFA-30S
Solution contact material	PVC	PVDF	SUS 316
Measurement solution temperature	0 to 50°C	0 to 100°C	0 to 100°C
Measurement solution pressure	0 to 0.1 MPa	0 to 0.1 MPa	0 to 0.5 MPa
Measurement solution flow rate	0 to 10 L/min		
Connection pipe aperture	Inlet: Rc (PT) 3/4, Outlet: Rc (PT) 3/4		

## Accessories

Connector cable  
•CK-10M/20M/30M

This cable is for joining a connector type sensor and analyzer or transmitter.



## Conductivity (Low Conductivity Solutions)

# HE-200C

## (4-Wire Transmitter)



# HE-300C

## (2-Wire Transmitter)



### HE-200C Specifications

Measuring method	Two electrode method				
Measuring range	Cell constant	/cm	0.01	0.1	1.0
	Electrical conductivity	μS/cm	0.000 to 2.000 0.00 to 20.00	0.000 to 2.000 0.00 to 20.00 0.0 to 200.0 0 to 2,000*	0.0 to 200.0 0 to 2,000
		mS/m	0.0000 to 0.2000 0.000 to 2.000	0.0000 to 0.2000 0.000 to 2.000 0.00 to 20.00 0 to 200.0*	0.00 to 20.00 0.0 to 200.0
	TDS conversion	mg/L	0.00 to 2.00 0.0 to 20.0	0.0 to 20.0 0 to 200	0 to 200 0 to 2,000
			Electrical conductivity measurement and TDS conversion measurement cannot be selected at same time.		
Temperature	°C	0 to 100 Resolution: 0.01°C			
* Range only applies to sanitary sensors.					
Repeatability	Electrical conductivity: ±0.5% full-scale or less, TDS conversion: ±1.5% full-scale or less Temperature: ±0.1°C (for equivalent input)				
Linearity	Electrical conductivity: ±0.5% full-scale or less, TDS conversion: ±1.5% full-scale or less Temperature: ±0.5°C (for equivalent input)				
Transmission output	Two points 4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω				
Contact output	Three points No-voltage contact output Relay contact, SPDT (1c) Contact function: R1, R2: Selectable from upper limit alarm, lower limit alarm, USP assessment, transmission output hold operation FAIL: Malfunction alarm Alarm operation: Output details: Electrical conductivity (or TDS conversion), temperature				
Contact input	One point Contact format: Open collector no-voltage a contact Contact function: Transmission output hold external input				
Communication function	RS-485 Two wire systems, Input/output isolated type (not isolated from transmission output)				
Temperature compensation range	0 to 100°C (but for 0°C or less, 100°C or more, extend and perform calculation)				
Ambient temperature	-20 to 55°C				
Temperature compensation element	Pt 1000 (0°C)				
Calibration function	Electrical conductivity: Based on input of cell constant correction coefficient (parameter input) TDS conversion: Conversion based on specified coefficient (0.30 to 1.00) Temperature: One point calibration compared with reference temperature gauge				
Self-diagnosis function	Sensor diagnosis error, Analyzer malfunction				
Power supply	100 to 240 V AC 50/60 Hz Power consumption 15 VA (max.)				
Construction	Outdoor installation type: IP65 protection level Mounting method: 50 A pole or wall mounted Case: Aluminum alloy Mount fitting/hood: SUS304				
Weight	Approx. 4.5 kg				
Regulatory certification	CE marking, FCC rules				

### HE-300C Specifications

Measuring method	Two electrode method				
Measuring range	Cell constant	/cm	0.01	0.1	1.0
	Electrical conductivity	μS/cm	0.000 to 2.000 0.00 to 10.00	0.000 to 2.000 0.00 to 20.00 0.0 to 100.0	0.0 to 200.0 0 to 1,000
		mS/m	0.0000 to 0.2000 0.000 to 1.000	0.0000 to 0.2000 0.000 to 2.000 0.00 to 10.00	0.00 to 20.00 0.0 to 100.0
	TDS conversion	mg/L	0.00 to 2.00 0.0 to 10.0	0.0 to 20.0 0 to 100	0 to 200 0 to 1,000
			Electrical conductivity measurement and TDS conversion measurement cannot be selected at same time.		
Temperature	°C	0 to 100 Resolution: 0.01°C			
Repeatability	Electrical conductivity: ±0.5% full-scale or less TDS conversion: ±1.5% full-scale or less Temperature: ±0.1°C (for equivalent input)				
Linearity	Electrical conductivity: ±0.5% full-scale or less TDS conversion: ±1.5% full-scale or less Temperature: ±0.5°C (for equivalent input)				
Transmission output	4 to 20 mA DC Input/output isolated type Maximum load resistance 600 Ω				
Contact input	One point Contact format: No-voltage a contact Contact function: Transmission output is held for closed contact input.				
Temperature compensation range	0 to 100°C (but for 0°C or less, 100°C or more, extend and perform calculation)				
Ambient temperature	-20 to 60°C				
Temperature compensation element	Pt 1000 (0°C)				
Calibration function	Electrical conductivity: Based on input of cell constant correction coefficient (parameter input) TDS conversion: Conversion based on specified coefficient (0.30 to 1.00) Temperature: One point calibration compared with reference temperature gauge				
Self-diagnosis function	Sensor diagnosis error, Transmitter malfunction				
Power supply	24 V DC (operational voltage range: 21 to 32 V DC) 0.6 W (max.)				
Construction	Outdoor installation type: IP65 protection level Mounting method: 50 A pole or wall mounted Case: Aluminum alloy Mount fitting/hood: SUS304				
Compatible sensor	ESH series electrical conductivity sensor (cell constant 0.01/cm, 0.1/cm, 1.0/cm)				
Weight	Approx. 4 kg				
Regulatory certification	CE marking, FCC rules				

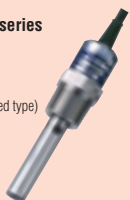
## Sensor

### General use Two Electrode Electrical Conductivity Sensor

#### Screw in type

#### •ESH-001/01/1 series

ESH-01  
(Cable-attached type)



ESH-01  
(Connector type)



For flange mounting  
ESH-01  
(Connector type)



### Specifications

Model	ESH-001			ESH-01			ESH-1			
Cell constant	Approx. 0.01/cm			Approx. 0.1/cm			Approx. 1.0/cm			
Solution contact material	Electrode	Selectable from SUS316 or titanium								
	Body	PVDF								
	Packing	FKM								
Measurement solution pressure	0 to 0.5 MPa									
Measurement solution temperature	0 to 100°C									
Cable length	Cable-attached type: 10 m, Y terminal (standard) Max. extendable distance: 100 m Connector type: 10 m (CK-10M), 20 m (CK-20M), 30 m (CK-30M)									
Attachment	Screw in type Thread aperture: R(PT) 3/4									
Combined holder	Flow type holder: EFA-30, EFA-30P, EFA-30S									

# HE-480C

(4-Wire Transmitter)



# HE-960CW

(4-Wire Transmitter)



## HE-480C Specifications

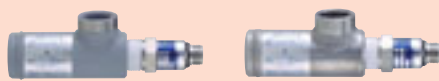
Measuring method	Two electrode method				
Sensor input	One channel (cell constant: 0.01/cm, 0.1/cm, 1.0/cm)				
Measuring range	Cell constant	/cm	0.01	0.1	1.0
	Conductivity	μS/cm	2.000 to 20.00	20.00 to 200.0	200.0 to 2000
		mS/m	0.2000 to 2.000	2.000 to 20.00	20.00 to 200.0
	TDS conversion	mg/L	2.00 to 20.0	20.0 to 200	200 to 2000
Temperature: 0 to 100°C (The displayed decimal place is selectable among 0, 1 and 2)					
Repeatability	±0.5% full-scale or less (but TDS is ±1.5% full-scale or less)				
Transmission output	No. of outputs: One point 4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω				
Contact output	No. of outputs: Two points (R1, R2) Contact format: Relay contact SPDT (1c) Contact capacity: 240 V AC 3 A, 30 V DC 3 A (resistance load) Contact function: Selectable from upper, lower limit operation (ON/OFF control), USP assessment, malfunction alarm, maintenance operation				
Calibration function	Conductivity: Input of cell constant correction coefficient (parameter input) Temperature: Calibration compared with reference temperature gauge TDS: Conversion based on specified coefficient (0.30 to 1.00)				
Power supply	100 to 240 V AC 50/60 Hz Power consumption 10 VA (max.)				
Temperature compensation	<ul style="list-style-type: none"> <li>Temperature characteristics of ultra-pure water (reference temperature 25°C)</li> <li>Reference temperature and temperature coefficient specified settings (reference temperature: 5 to 95°C temperature coefficient: ±5%/°C)</li> <li>NaCl temperature characteristics</li> <li>No temperature compensation</li> </ul>				
Ambient temperature	-5 to 45°C				
Temperature compensation element	Pt 1000 (0°C)				
Compatible sensor	ESH, FS series conductivity sensor (Cell constant: 0.01/cm, 0.1/cm, 1.0/cm)				
Weight	Approx. 400g				
Regulatory certification	CE marking, FCC rules				

## HE-960CW Specifications

Measuring method	Two electrode method				
Sensor input	Two channel (cell constant: 0.01/cm, 0.1/cm, 1.0/cm)				
Measuring range	Cell constant	/cm	0.01	0.1	1.0
	Conductivity	μS/cm	2.000 to 20.00	20.00 to 200.0	200.0 to 2000
		mS/m	0.2000 to 2.000	2.000 to 20.00	20.00 to 200.0
	TDS conversion	mg/L	2.00 to 20.0	20.0 to 200	200 to 2000
Temperature: 0 to 100°C (The displayed decimal place is selectable among 0, 1 and 2)					
Repeatability	Within ±0.5% of the full scale (TDS: within ±1.5% of the full-scale)				
Transmission output	No. of outputs: Two points 4 to 20 mA DC isolated I/O type Maximum load resistance 900 Ω				
Contact output	No. of outputs: Four points (R1, R2, R3 and R4) Contact type: Relay contacts R1 to R3: SPST (1a); R4: SPDT (1c) Contact rating: 240 V AC 3 A, 30 V DC 3 A (resistance load) Contact function: Select between upper/lower limit operation (ON/OFF control), USP determination, Error alarm, and Maintenance (R1 and R2, R3 and R4 are for common use, respectively)				
Calibration function	Conductivity: Based on the specified compensation coefficient for the cell constant (parameter input) Temperature: Calibrated by comparing with the reference thermometer TDS: Conversion using a user-defined coefficient value (0.30 to 1.00)				
Power supply	100 to 240 V AC 50/60 Hz 15 VA (max.)				
Temperature compensation	<ul style="list-style-type: none"> <li>Based on the temperature characteristics of ultra-pure water (reference temperature 25°C)</li> <li>Based on the reference temperature and user-defined temperature coefficient (reference temperature: 5 to 95°C temperature coefficient: ±5%/°C)</li> <li>Based on the temperature characteristics of NaCl</li> <li>No temperature compensation</li> </ul>				
Ambient temperature	-5 to 45°C				
Temperature compensation element	Pt 1000 (0°C)				
Compatible sensor	ESH and FS series conductivity sensor (cell constant: 0.01/cm, 0.1/cm or 1.0/cm)				
Weight	Approx. 550g				
Regulatory certification	CE marking, FCC rules				

## Holder

Flow type holder  
•EFA-30 series



EFA-30 (PVC)

EFA-30S (SUS 316)

### Specifications

Model	EFA-30	EFA-30P	EFA-30S
Solution contact material	PVC	PVDF	SUS 316
Measurement solution temperature	0 to 50°C	0 to 100°C	0 to 100°C
Measurement solution pressure	0 to 0.1 MPa	0 to 0.1 MPa	0 to 0.5 MPa
Measurement solution flow rate	0 to 10 L/min		
Connection pipe aperture	Inlet: Rc (PT) 3/4, Outlet: Rc (PT) 3/4		

## Accessories

Relay box  
•CT-50EC



Specialized extension cable  
•C-5C



Connector cable  
•CK-10M/20M/30M



This cable is for joining a connector type sensor and analyzer or transmitter.

# Conductivity (High Conductivity Solutions)

## HE-200H (4-Wire Transmitter)



## HE-480H (4-Wire Transmitter)



### HE-200H Specifications

Measuring method	Four electrode method		
Measuring range	Electrical conductivity: 0.0 to 200.0 mS/cm* 0.00 to 20.00 S/m* (Switchable between fixed range (decimal point) and automatic range) * With conditions under which temperature compensation is not performed, it is possible to display 0 to 2,000 mS/cm (0 to 200 S/m). Temperature: 0 to 100°C Resolution: 0.01°C		
Salinity conversion function	Seawater: 0.00 to 4.00% NaCl: 0.0 to 20.0%		
Concentration conversion function	NaOH: 0.00 to 5.00%, HNO <sub>3</sub> : 0.00 to 5.00%, H <sub>3</sub> PO <sub>4</sub> : 0.00 to 5.00 Specified 1 to 4: 0.00 to 100.00%		
Repeatability linearity	Electrical conductivity	Cell constant	0.1/cm 1.0/cm
		0 to 20.00 mS/cm	±0.5% full-scale or less ±0.5% full-scale or less
		20.0 to 200.0 mS/cm	±1.0% full-scale or less ±0.5% full-scale or less
	Condition	For equivalent input	
Temperature	Repeatability: ±0.1°C, Linearity: ±0.5°C		
Transmission output	Two points 4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω		
Contact output	Three points No-voltage contact output Relay contact, SPDT (1c) Contact function: R1, R2: Selectable from upper limit alarm, lower limit alarm, transmission output hold operation FAIL: Malfunction alarm Alarm operation: Output details: Electrical conductivity (or conversion value), temperature Note: Range only applies to sanitary sensors.		
Contact input	Two points Contact format: Open collector no-voltage a contact Contact function: Transmission output range switching, transmission output hold external input Function selectable from "Transmission 4 range selection" or "Transmission 2 range selection + hold" Linking to selected transmission range also allows automatic switching of display		
Communication function	RS-485 Two wire systems, Input/output isolated type (not isolated from transmission output)		
Temperature compensation range	0 to 100°C (but for 0°C or less, 100°C or more, extend and perform calculation)		
Ambient temperature	-20 to 55°C		
Temperature compensation element	Pt 1000 (0°C)		
Calibration function	Electrical conductivity: Based on input of cell constant correction coefficient (parameter input) Temperature: One point calibration compared with reference thermometer		
Self-diagnosis function	Sensor diagnosis error, Analyzer malfunction		
Power supply	100 to 240 V AC 50/60 Hz Power consumption 15 VA (max.)		
Construction	Outdoor installation type: IP65 protection level Mounting method: 50 A pole or wall mounted Case: Aluminum alloy Mount fitting/hood: SUS304		
Weight	Approx. 4.5 kg		
Regulatory certification	CE marking, FCC rules		

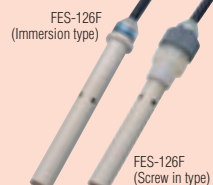
### HE-480H Specifications

Measuring method	Four electrode method		
Sensor input	One channel (cell constant: 1.0/cm)		
Temperature sensor specifications	Measurement temperature resistor element 1,000 Ω/0°C		
Measuring range	Conductivity (mS/cm)	0.00 to 20.00	0.0 to 200.0
	(S/m)	0.000 to 2.000	0.00 to 20.00
		0.00 to 20.00	0.00 to 50.00
	Note: In the 200.0 mS/cm, 20.00 S/m range, with a reference temperature of 25°C, measurement is possible for a freely settable temperature coefficient of up to ±3.5%/°C. Note: In the 500.0 mS/cm, 50.00 S/m range, measurement is possible without temperature compensation.		
	Seawater salinity conversion: 0.00 to 4.00%		
	NaCl salinity conversion: 0.0 to 20.0%		
	Temperature: 0 to 100°C (no places after decimal point, 1 digit, 2 digit selectable display)		
Repeatability	±0.5% full-scale or less (salinity conversion and 500 mS/cm range: ±1.0%)		
Transmission output	No. of outputs: One point 4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω		
Contact output	No. of outputs: Two points (R1, R2) Contact format: Relay contact SPDT (1c) Contact capacity: 240 V AC 3 A, 30 V DC 3 A (resistance load) Contact function: Selectable from upper, lower limit operation (ON/OFF control) and malfunction alarm, maintenance operation		
Calibration function	Conductivity: Input of cell constant correction coefficient (parameter input) Temperature: Calibration compared with reference temperature gauge		
Power supply	100 to 240 V AC 50/60 Hz 10 VA (max.)		
Ambient temperature	-5 to 45°C		
Temperature compensation	· NaCl temperature characteristics · Reference temperature and temperature coefficient specified settings (reference temperature: 5 to 95°C temperature coefficient: ±5%/°C) · No temperature compensation		
Compatible sensor	FES series conductivity sensor (Cell constant: 1.0/cm) Note: The measurable range differs according to the sensor model.		
Weight	Approx. 400 g		
Regulatory certification	CE marking, FCC rules		

### Sensor

General use Four Electrode Conductivity Sensor

Immersion type / Screw in type  
•FES-100 series



### Specifications

Model	FES-125F	FES-126F
Cell constant	Approx. 1.0/cm	
Solution contact material	Electrode	Titanium
	Body	PVC PPS
	Packing	FKM
Measurement solution pressure	0 to 0.5 MPa	
Measurement solution temperature	0 to 50°C	0 to 120°C*
Cable length	10 m, Y terminal (standard) When extending more than this, use CT-20EC relay box. Max. extendable distance: 50 m	
Attachment	1. Immersion type 2. Screw in type Use EA-20 screw in adapter. Use EA-40 screw in adapter.	
Combined holder	Flow type holder: EF-20, EF-20P, EF-20 S	

\* When used with immersion type, condition changes to 0 to 50°C.

### Holder

Flow type holder  
•EF-20 series

### Specifications

Model	EF-20	EF-20P	EF-20S
Solution contact material	PVC	PVDF	SUS 316
Measurement solution temperature	0 to 50°C	0 to 100°C	0 to 100°C
Measurement solution pressure	0 to 0.1 MPa	0 to 0.1 MPa	0 to 0.5 MPa
Measurement solution flow rate	0 to 10 L/min		
Connection pipe aperture	Inlet: Rc (PT) 1/2, Outlet: Rc (PT) 1/2		



Caution: The selection of equipment will differ based on various conditions, including the installation site, usage environment, measurement samples, and any special characteristics. Contact your sales representative for details.

# HE-960HI

## (4-Wire Transmitter)



### HE-960HI Specifications

Measuring method	Four electrode method	
Measuring range	Conductivity	0 to 200 mS/cm (measuring range of conductivity before temperature compensation: 0 to 500 mS/cm)
	Temperature	0.0 to 100.0°C
Repeatability	0.000 to 2.000 mS/cm	±0.5% full scale
	0.00 to 20.00 mS/cm	±0.5% full scale
	0.0 to 200.0 mS/cm	±0.5% full scale
	0 to 500 mS/cm	±1.0% full scale
	0.0 to 100.0°C	±0.2°C
	Using equivalent input	
Transmission output	Number of output: Four points 4 to 20 mA DC input/output isolated type Maximum load resistance: 900Ω	
Transmission output range	Free setting within the measurement range (Negative terminals of each transmission output channel are connected inside and thus have the same electrical potential.)	
Contact output	<p>Number of relay: Five            ALARM contact R1, R2, R3 and R4            Contact type: relay contact, SPST(1a)            Contact rating: 240VAC, 1A or 30VDC, 1A (resistance load)            Contact function: Upper or lower ON/OFF alarm on each measurement items, conductivity, concentration, temperature, including delay time and hysteresis.            Contact action: Closed when status is in the event. Opened when status is normal or power is down.            R1, R2 and R3 share a common terminal.            Self diagnosis contact RF            Contact type: relay contact, SPDT(1c)            Contact rating: 240VAC, 1A or 30VDC, 1A (resistance load)            C-NO contact action: Closed when status is normal. Opened when any erroneous status is detected or power is down.            R4 and RF share a common terminal.</p>	
Calibration function	<p>Conductivity: Cell constant input in the parameter input menu.            Temperature: By comparing with the reference thermometer.</p>	
Power supply	100 to 240 V AC, 50/60 Hz, 20 VA (max.)	
Temperature compensation	0 to 100°C (However, it is calculated by extending 0°C or less, 100°C or more)	
Ambient temperature	-5 to 55°C	
Compatible sensor	<p>Submersible FES-210, FES-220, FES-230, FES-240 series sanitary four-electrode conductivity sensor            Flow-through FES-310 series sanitary four-electrode conductivity sensor</p>	
Weight	Approx. 550 g	
Regulatory certification	CE marking, FCC rules	

# Residual Chlorine

## HR-200 (4-Wire Transmitter)



## HR-480P (4-Wire Transmitter)



### HR-200 Specifications

Measurement target	Free residual chlorine
Measuring method	Polarography
Measuring range	Residual Chlorine: 0 to 3 mg/L Temperature: 0 to 50°C Resolution: 0.01 mg/L Resolution: 0.1°C
Repeatability	Residual Chlorine: ±0.05 mg/L or less Temperature: ±0.5°C (for equivalent input)
Linearity	Residual Chlorine: ±0.05 mg/L or less Temperature: ±0.5°C (for equivalent input)
Transmission output	Two points 4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω
Contact output	Three points No-voltage contact output Relay contact, SPDT Contact capability R1, R2: Selectable from upper limit alarm, lower limit alarm, ON/OFF control, currently holding transmission output, and cleaning output. (opened at alarm operation, closed usually, closed at power-off) FAIL: Error warning (normally closed; open when an error occurs; open when the power is turned OFF)
Contact input	Two points Contact type: No-voltage a contact for open collector Contact capability: Input 1: External input for transmission holding Input 2: Flow switch input for interlock (Open due to decreased flow)
Communication capability	RS-485 Two-wire input/output isolated type (not isolated from transmission output)
Temperature compensation range	0 to 50°C
Ambient temperature	0 to 55°C
Cleaning capability	Electrochemical Cleaning between Cathode and Electrochemical cleaning electrode
Calibration method	Zero calibration (Zero liquid calibration) SPAN calibration (Compare to measurement value of DPD method, Including zero electric calibration)
Self-diagnosis function	Calibration error, Temperature sensor diagnostic error, Meter error
Power supply	100 to 240 V AC, 50/60 Hz 35 VA (max.) when an automatic cleaner is connected.
Construction	Outdoor installation type: IP65 Protection class Installation method: 50 A pole-mounted or wall-mounted Material of case: Aluminum alloy (coated with epoxy modified melamine resin) Material of mounting brackets: SUS304
Weight	Approx. 4.5 kg
Regulatory certification	CE marking, FCC rules

### HR-480P Specifications

Measurement target	Free residual chlorine
Measuring method	Polarography
Measuring range	Residual chlorine: 0 to 3 mg/L (Display range 0 to 5 mg/L) Resolution 0.01 mg/L Temperature: 0 to 50°C (Display range -10 to 110°C) Resolution 0.1°C
Repeatability	Residual chlorine: ±0.05 mg/L (response for equivalent input) Temperature: ±0.5°C (response for equivalent input)
Linearity	Residual chlorine: ±0.05 mg/L (response for equivalent input) Temperature: ±0.5°C (response for equivalent input)
Transmission output	Two points 4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω
Contact output	Three points Output type: No-voltage contact output Relay contact, SPST(1a) Contact capability R1, R2, R3: Selectable from upper limit alarm, lower limit alarm, transmission output Hold, and cleaning output. (Closed at alarm operation, opened usually, closed at power off) FAIL: Error alarm (Closed in the normal state, opened in the failure state or While the power is down) RNG1, RNG2: Range signal by 2 bits binary output
Contact input	One point Contact type: No-voltage a contact for open collector Conditions ON resistance: 100 Ω max. Open voltage: 24 VDC Short-circuit current: 12 mA DC max Contact function: Flow switch input for interlock (Open due to decreased flow)
Temperature compensation range	0 to 50°C
Cleaning capability	Cleaning period Select from 1hour, 2hour, 4hour, 6hour, 8hour, 12hour, 1day, 2day, 3day, 4day, 5day, 6day, 7day
	Cleaning time 5 to 600 seconds
	Hold time 10 to 600 seconds
	Timer accuracy 2minutes per month
Calibration function	Zero calibration (Zero liquid calibration) SPAN calibration(Compare to measurement value of DPD method, Including zero electric calibration)
Additional function	Automatic detection of calibration failure (Zero error) Calibration history (Elapsed days from the last calibration either zero or span. zero shift)
Self-diagnosis function	Calibration error Temperature sensor diagnostic error Meter error
Power supply	100 V to 240 V AC 50/60 Hz 15 VA (max.)
Weight	Approx. 400 g
Regulatory certification	CE marking, FCC rules

## Sensor

### Specifications

Model	RA-10	RA-20
	Overflow type	Inline type
Measuring method	Polarography	
Sample condition	Temperature	0 to 45°C (without freeze)
	Flow rate	1.3 to 2.0 L/min
	Pressure	Within 0.5 MPa
	pH	5.8 to 8.6 pH (Constant)
Electrical conductivity	More than 10 mS/m	
Wetted part material	PVC, PPO, EPDM	
Electrode material	Au, AgCl, C	
Bead material	SiO <sub>2</sub>	
Filter material	Nylon	
Pipe arrangement	Sample inlet	PREFAB JOINT TS16A (ASHAHI)
	Sample outlet	PREFAB JOINT TS16A (ASHAHI)
Cleaning method	Physical polishing by glass bead, Electrochemical Cleaning	
Cable length	Standard: 2 m, Maximum extension: 40 m	



RA-10



RA-20

Caution: The selection of equipment will differ based on various conditions, including the installation site, usage environment, measurement samples, and any special characteristics. Contact your sales representative for details.

# Dissolved Oxygen

## HD-200 (4-Wire Transmitter)



## HD-300 (2-Wire Transmitter)



### HD-200 Specifications

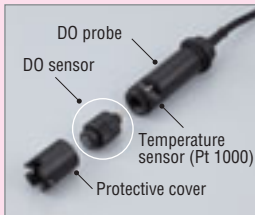
Measuring method	Membrane type polarography method
Measuring range	Dissolved oxygen concentration: 0 to 20 mg/L Resolution: 0.01 mg/L Saturation ratio: 0 to 200% Resolution: 1% Temperature: 0 to 50°C Resolution: 0.1°C
Repeatability	Dissolved oxygen concentration: ±0.5% full-scale or less, Temperature: ±0.5°C (for equivalent input)
Linearity	Dissolved oxygen concentration: ±0.5% full-scale or less, Temperature: ±0.5°C (for equivalent input)
Transmission output	Two points 4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω
Contact output	Three points No-voltage contact output Relay contact, SPDT(1c) Contact function R1, R2: Selectable from upper limit alarm, lower limit alarm, ON/OFF control, transmission output hold operation, cleaning output FAIL: Malfunction alarm Control operation Control range: 0.02 to 1.00 mg/L (±0.01 to ±0.50 mg/L)
Contact input	One point Contact format: Open collector no-voltage a contact Contact function: Cleaning operation external input
Communication function	RS-485 Two wire systems, Input/output isolated type (not isolated from transmission output)
Temperature compensation range	0 to 50°C
Ambient temperature	-20 to 55°C
Temperature measurement element	Pt 1000 (0°C) (Built into DO-1100 probe)
Calibration method	Atmospheric calibration or saturated liquid calibration
Self-diagnosis function	Calibration error, Sensor diagnosis error, Analyzer malfunction
Power supply	100 to 240 V AC 50/60 Hz 15 VA (max.)
Construction	Outdoor installation type: IP65 protection level Mounting method: 50 A pole or wall mounted Case: Aluminum alloy Mount fitting/hood: SUS304
Compatible sensor	Sensor: 5505, 5510 Probe: DO-1100
Weight	Approx. 4.5 kg
Regulatory certification	CE marking, FCC rules

### HD-300 Specifications

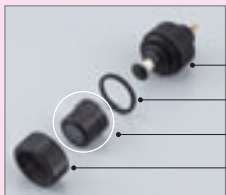
Measuring method	Membrane type polarography method
Measuring range	Dissolved oxygen: 0 to 20 mg/L Resolution: 0.01 mg/L Saturation ratio: 0 to 200% Resolution: 1% Temperature: 0 to 50°C Resolution: 0.1°C
Repeatability	Dissolved oxygen concentration: ±0.5% full-scale or less, Temperature: ±0.5°C (for equivalent input)
Linearity	Dissolved oxygen concentration: ±0.5% full-scale or less, Temperature: ±0.5°C (for equivalent input)
Transmission output	4 to 20 mA DC Input/output isolated type Maximum load resistance 600 Ω
Contact input	One point Contact format: No-voltage a contact Contact function: Transmission output is held for closed contact input.
Temperature compensation range	0 to 50°C
Ambient temperature	-20 to 60°C
Temperature measurement element	Pt 1000 (0°C) (Built into DO-1100 probe)
Calibration method	Atmospheric calibration or saturated liquid calibration
Self-diagnosis function	Calibration error, Sensor diagnosis error, Transmitter malfunction
Power supply	24 V DC (operational voltage range: 21 to 32 V DC) 0.6 W (max.)
Construction	Outdoor installation type: IP65 protection level Mounting method: 50 A pole or wall mounted Case: Aluminum alloy Mount fitting/hood: SUS304
Compatible sensor	Sensor: 5505, 5510 Probe: DO-1100
Weight	Approx. 4 kg
Regulatory certification	CE marking, FCC rules

## Sensor

Combines sensor replacement and internal solution, membrane replacement during parts renewal



### DO sensor structure



### Specifications

Model	5505	5510
Measuring method	Membrane type polarography	
Construction	Sensor replacement and membrane internal solution replacement system	
Material	Membrane thickness	50 μm
	Membrane material	PFA
	Electrode material	C-Ag
	Solution contact material	PPO, PFA, EPDM
	Internal solution	KCl (neutral)
Performance	Response speed (90% response)	120 sec. or less
	Repeatability	±0.1 mg/L
Measurement solution conditions	Temperature	0 to 50°C
	Pressure	0 to 0.5 MPa
	Flow velocity	20 cm/sec. or more
Combined probe	DO-1100	

**Pb Free**

The membrane remains fixed to the diaphragm cap, simplifying the replacement work during tip renewal.

## Probe



### Specifications

Model	DO-1100
Construction	Tip replacement type
Measurement solution temperature	0 to 50°C (no freezing)
Measurement solution pressure	0 to 0.5 MPa
Solution contact material	PPO, EPDM, Ti
Combined sensor	5505, 5510

Caution: The selection of equipment will differ based on various conditions, including the installation site, usage environment, measurement samples, and any special characteristics. Contact your sales representative for details.

# Dissolved Oxygen

## HD-200FL (4-Wire Transmitter)



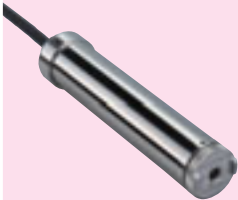
## HD-480 (4-Wire Transmitter)



HD-200FL Specifications	
Measuring method	Optical (fluorescent)
Measuring range	DO: 0 to 20 mg/L Resolution: 0.01 mg/L Saturation: 0 to 200% Resolution: 0.1% Temperature: 0 to 50°C Resolution: 0.1°C
Repeatability	±1% of full scale
Linearity	±2% of full scale
Transmission output	Two points 4 to 20 mA DC output isolated type Maximum load resistance 900 Ω Range 1: DO concentration: Freely selectable within the measurement range Range 2: Temperature: Freely selectable within the range from -10.0 to 110.0°C Alarm: Burnout function (3.8 mA or 21 mA) Hold: Selectable from previous value hold, optional value hold
Contact output	Three points Dry contact output Relay contact, SPDT (1c) Signal R1, R2: upper limit alarm, lower limit alarm, hold, Cleaning (selectable) FAL: Alarm Control operation Control width: 0.02 to 4.00 mg/L (±0.01 to ±2.00 mg/L)
Communication function	RS-485 Two wire systems, Input/output isolated type (not isolated from transmission output)
Temperature compensation range	0 to 50°C
Self-diagnosis function	Calibration error, sensor diagnosis error, converter alarm
Operating temperature range	-20 to 55°C (Should not be frozen)
Power supply	100 to 240 V AC 50/60 Hz 15 VA (max.)
Structure	IP65: 50 A pole or wall mounting Case: Aluminum alloy Mounting brackets, hood: SUS304
Compatible sensor	DO-2000
Weight	Main unit body: Approx. 3.5 kg Hood, mounting brackets: Approx. 1 kg
Regulatory certification	CE marking, FCC rules

HD-480 Specifications	
Measuring method	Galvanic cell method
Measuring range	Dissolved oxygen: 0 to 20 mg/L Resolution: 0.01 mg/L Saturation ratio: 0 to 200% Resolution: 1% Temperature: 0 to 40°C Resolution: 0.1°C
Repeatability	Dissolved oxygen: ±0.5% full-scale or less (for equivalent input)
Linearity	Dissolved oxygen: ±0.5% full-scale or less (for equivalent input)
Transmission output	4 to 20 mA DC Input/output isolated type Maximum load resistance 900 Ω
Transmission output range	Freely settable within measuring range
Contact output	No. of outputs: Two points (R1, R2) Contact format: Relay contact SPDT (1c) Contact capacity: 240 V AC 3 A, 30 V DC 3 A (resistance load) Contact function: Selectable from upper, lower limit operation (ON/OFF control) and malfunction alarm, maintenance operation, temperature
Calibration function	· Atmospheric calibration or saturated liquid calibration · Salinity correction (0.0 to 5.0%) · Temperature calibration (2 points)
Self-diagnosis function	· Calibration failure (zero error, sensitivity error) · Sensor diagnosis (temperature sensor short-circuit, temperature sensor disconnection) · Outside measuring range · Analyzer malfunction
Power supply	100 to 240 V AC 50/60 Hz 10 VA (max.)
Temperature compensation range	0 to 40°C
Ambient temperature	-5 to 45°C
Compatible sensor	Sensor: 5405, Probe: DP-100
Weight	Approx. 400 g
Regulatory certification	CE marking, FCC rules

### Sensor



Specifications	
Model	DO-2000
Sensor cap	5700A
Measurement sample temperature	0 to 50°C
Measurement depth	10 m
Wetted material	SUS316, NBR, PVC
Weight	Approx. 3.0 kg (including 10 m cable)

### Holder

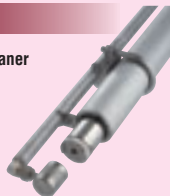
- **Immersion type holder**  
DH-101 series (insertion type)  
NH-10 series (drop-in type)
- **Flow type holder**  
DF-30 series

### Cleaner

- **Immersion type jet cleaner**  
JDH series
- **Flow type jet cleaner**  
JDF series
- **Ultrasonic cleaner**  
UH / UDH series



Intermittent cleaning by air jet cleaner



Continuous cleaning by ultrasonic cleaner

### Accessories

- **DO sensor extensive cable**  
C-7E



- **Relay box**  
CT-5000



### Sensor

Specifications	
Model	5405
Construction	Cartridge replacement disposable type
Cleaner combination	Possible
Film thickness	50 μm
Responsiveness (for same measurement conditions)	90% response 120 sec. or less
Measurement solution conditions	Temperature: 0 to 40°C Pressure: 0 to 0.1 MPa (DO measurement is possible to a maximum depth of 10 m.) Flow velocity: 25 cm/sec. or more
Film material	PTFE
Combined probe	DP-100



5405

**[Disposable type sensor]**  
The film recovering work required when renewing conventional electrodes is no longer necessary and anyone can easily perform replacement. In addition, disposable type sensors deliver high quality and low cost.

### Probe

Specifications	
Model	DP-100
Construction	Immersion type
Measurement solution temperature	0 to 40°C
Solution contact material	PVC, titanium, CR
Combined sensor	5405

#### [Immersion type probe]

Directly immerse the probe in the measurement solution during use. No special installation work is required. Immersion type holders / flow type holders are available according to the application.



DP-100

### Cleaner

- **Water/air jet Cleaner Flow type**  
JDF-30



- **Water/air jet Cleaner Immersion type**  
JDH-10





# Ammonia Nitrogen

## HC-200NH (4-Wire Transmitter)



### HC-200NH Specifications

#### • Ammonia nitrogen meter specifications

Combination sensor unit model	AM-2000
Sensor model	7691*: Ammonium ion chip, 7692*: Potassium ion chip for compensation, 7211: Reference chip
Measuring method	Ion selective electrode
Measuring range	NH <sub>4</sub> -N: 0 to 1000 mg/L (display range: 0 to 2000 mg/L) Temperature: 0 to 40°C (display range: -10 to 110°C)
Display resolution	NH <sub>4</sub> -N: 0.01 mg/L: 0.00 to 10.00 mg/L 0.1 mg/L: 0.0 to 100.0 mg/L 1 mg/L: 0 to 1000 mg/L Temperature: 0.1°C
Repeatability	NH <sub>4</sub> -N: Larger value between 3%±1 digit of measured value or 0.2 mg/L±1 digit (with standard solution) Temperature: ±0.3°C
Potassium ion compensation	Compensation range: Potassium ion concentration is under 10 times of ammonium ion concentration and under 1000 mg/L Compensation error: ±20% (measured value)
Additional function	Adjustment with manual analysis (One point), calibration curve input function (primary expression)
Self-diagnostic function	Correction error, sensor diagnostic error, transmitter malfunction

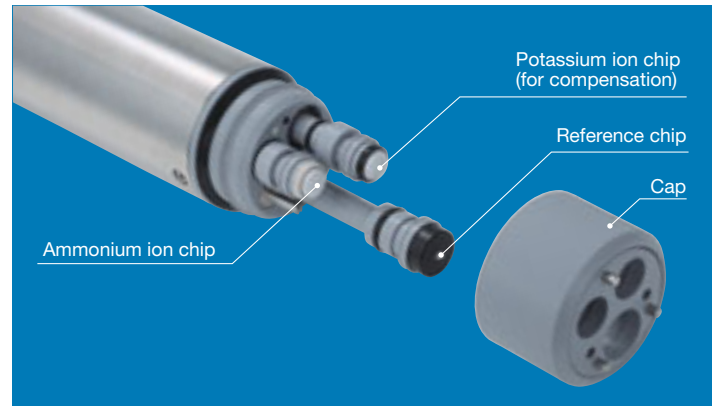
#### • Optical dissolved oxygen meter (optional)

Combination sensor unit model	DO-2000
Sensor model	5700A: Sensor cap
Measuring method	Optical (fluorescent)
Measurement range	Dissolved oxygen concentration: 0 to 20 mg/L Display resolution 0.01 mg/L Saturation degree: 0 to 200% Display resolution 0.1% Temperature: 0 to 50°C Display resolution 0.1°C
Self-diagnostic	Correction error, sensor diagnostic error, transmitter malfunction

#### • Transmitter common specifications

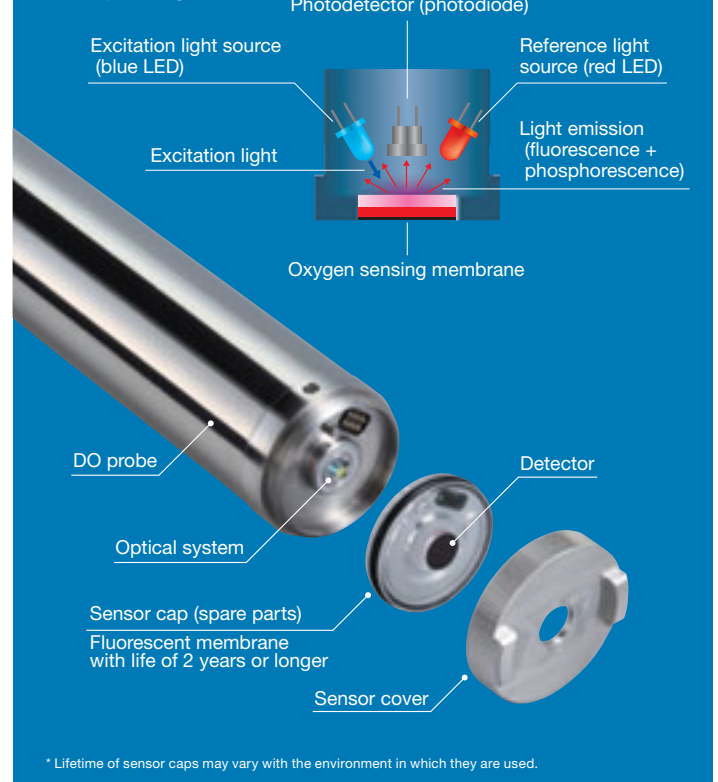
Transmission output	Three points DC 4 to 20 mA input-output isolated type Maximum load resistance 900 Ω Select Three items from below Output range 1: Ammonia nitrogen concentration: Configurable within measurement range Output range 2: Dissolved oxygen concentration: Configurable within measurement range Output range 3: Temperature reading of the ammonia nitrogen meter: Configurable within measurement range of -10 to 110°C Output range 4: Temperature reading of the dissolved oxygen meter: Configurable within measurement range of -10 to 110°C
Operation temperature range	-20 to 55°C
Power supply	100 to 240 V AC 50/60 Hz Consumption power 28 VA (max.)
Structure	Outdoor installation type: Protection level IP65 Installation method: 50 A pole or attached to wall Case: aluminum alloy Attachment bracket: Hood: SUS304
Weight	Approx. 4.5 kg (Unit: Approx. 3.5 kg Hood, attachment bracket: Approx. 1 kg)
Regulatory certification	CE Marking, FCC rules

### Structure : AM-2000



### Structure : DO-2000

#### • Principle diagram



\* Lifetime of sensor caps may vary with the environment in which they are used.

## Sensor



AM-2000

### Specifications

Model	AM-2000
Sample condition	0 to 40°C, 4.0 to 8.5 pH
Measurement depth	10 m
Wetted material	SUS316, FKM, PVC
Weight	Approx. 2.7 kg (including 10 m cable)



DO-2000

### Specifications

Model	DO-2000
Measurement sample temperature	0 to 40°C
Measurement depth	10 m
Wetted material	SUS316, NBR, PVC
Weight	Approx. 3.0 kg (including 10 m cable)

# Fluoride Ion

## HC-200F (4-Wire Transmitter)



## HC-300F (2-Wire Transmitter)



### HC-200F Specifications

Measuring method	Fluoride ion electrode method
Measuring range	0.0 to 10.0, 0.0 to 20.0 mg/L (Resolution: 0.1 mg/L) 0 to 50, 0 to 100, 0 to 200 mg/L (Resolution: 1 mg/L) 0 to 500, 0 to 1000, 0 to 2000 mg/L (Resolution: 10 mg/L) 0 to 5000, 0 to 10000 mg/L (Resolution: 100 mg/L)
Linearity	±10% FS (excluding detection unit), ±30% FS (including detection unit)
Repeatability	±7% FS (excluding detection unit), ±30% FS (including detection unit)
Contact output	No. of outputs: Three points (R1, R2, FAIL) Contact type: SPDT Contact rating: AC 25 V 3 A, DC 30 V 3 A (resistance load)
Contact input	No. of contacts: One point For cleaning
Transmission output	4 to 20 mA DC Max. load res. 900 Ω
Additional functions	Error message Alarm ON delay Cleaning time Set periodic cleaning Select transmission output state in Hold mode during calibration or cleaning Output hold functions Set damping factor function Transmission output, Arbitrary Hold setting
Power supply	100 to 240 V AC 50/60 Hz VA (max.)
Ambient environment	-20 to 55°C
Structure	Outdoor installation: JIS C0920, Protection level: 3 (rain-proof) Installation method: 50 A pole or wall attachment
Weight	Approx. 4.5 kg
Regulatory certification	CE marking, FCC rules

### HC-300F Specifications

Measuring method	Fluoride ion electrode method
Measuring range	0.0 to 10.0, 0.0 to 20.0 mg/L (Resolution: 0.1 mg/L) 0 to 50, 0 to 100, 0 to 200 mg/L (Resolution: 1 mg/L) 0 to 500, 0 to 1000, 0 to 2000 mg/L (Resolution: 10 mg/L) 0 to 5000, 0 to 10000 mg/L (Resolution: 100 mg/L)
Linearity	±10% FS (excluding detection unit), ±30% FS (including detection unit)
Repeatability	±7% FS (excluding detection unit), ±30% FS (including detection unit)
Contact input	No. of contacts: One point For holding signal
Transmission output	4 to 20 mA DC Max. load res. 600 Ω
Additional functions	Error message Select transmission output state in Hold mode during calibration or cleaning Output hold functions Set damping factor function Transmission output, Arbitrary Hold setting
Power supply	21 to 32 V DC
Ambient environment	-20 to 60°C
Structure	Outdoor installation: JIS C0920, Protection level: 3 (rain-proof) Installation method: 50 A pole or wall attachment
Weight	Approx. 4.5 kg
Regulatory certification	CE marking, FCC rules

### Accessories

Relay box  
•CT-50EC

Specialized extension cable  
•C-7E



### Sensor



### Specifications

Model	1009
Measuring method	Ion electrode method, LaF3 response membrane
Test sample environment	pH range: 4 to 8 (at 0.2 mg/L), 4 to 10 (at 20 mg/L), 4 to 12 (at 2000 mg/L) Temperature range: 0 to 40°C, Electric conductivity: Over 500 μS/cm Flow speed range: 1 to 20 cm/sec.
Compensation element	Pt 1000 Ω (0°C)
Temperature compensation range	0 to 40°C
Cable length	5 m
Weight	Approx. 200 g
Compatible holders	CH-101 series (Immersion type holder), CF-250/300 series (Flow type holder)
Compatible cleaning device	JCH-121 Immersion type water-jet cleaning device JCH-311 Circulation type water-jet cleaning device

## MLSS (Mixed Liquor Suspended Solid)

# HU-200SS

## (4-Wire Transmitter)



### HU-200SS Specifications

Measuring method	Light transmission method
Measurable range	Activated sludge (MLSS): 0 to 20000 mg/L Resolution: 1 mg/L (0 to 10000 mg/L) Kaolin: 0 to 10000 mg/L 10 mg/L (10000 to 22000 mg/L) Clay (inorganic mud): 0 to 20000 mg/L
Repeatability	Within a reading value $\pm 3\%$ or $\pm 10$ mg/L, whichever is larger. (sensor connecting sludge measured value)
Transmission output	One point 4 to 20 mA DC Input/output isolated type Maximum load resistance 900 $\Omega$
Transmission output range	Free range
Contact output	Three points Output type: No-voltage contact output Relay contact, SPDT Contact capability R1, R2: Selectable from upper limit alarm, lower limit alarm, transmission output Hold, and cleaning output FAIL: Error warning
Cleaning output	One point Active voltage contact output (connected supply voltage output) Contact capability: Solenoid valve drive for cleaning
Contact input	One point Contact type: No-voltage a contact for open collector Contact function: Cleaning operation external input.
Communication function	RS-485 Two-wire input/output isolated type (not isolated from transmission output)
Ambient temperature	-20 to 55°C
Calibration method	<ul style="list-style-type: none"> <li>Zero calibration: With clean water</li> <li>Span calibration: Concentration conversion method using coefficient input</li> <li>Working curve selection: (selection of activated sludge and inorganic mud)</li> </ul> There is a feature that allows you to match an instrument indicated value to a hand analyzed value of sludge (by the Mass method).
Self-diagnosis	Sensor check error, Transmitter error
Power supply	100 to 240 V AC, 50/60 Hz 35 VA (max.) when an automatic cleaner is connected.
Structure	Outdoor installation type: IP65 Protection class Installation method: 50 A pole-mounted or wall-mounted Material of case: Aluminium alloy (coated with epoxy modified melamine resin) Material of mounting brackets: SUS304
Weight	Approx. 4.5 kg
Regulatory certification	CE marking, FCC rules

### Sensor

#### Specifications

Model	SS-90
Measuring method	Light transmission method
Light source	LED, 880 nm,
Detector	Silicon photo diode
Cell length	Approx. 7 mm
Self-check	Water immersion detection
Operating temperature range	5°C to 50°C (without freezing)
Measured liquid pressure	0 MPa to 0.2 MPa
Material of wetted part	PPO SUS316 PFA FKM EPDM PVC
Cable length	10 m (standard), maximum extension: 50 m (overall length: 60 m)
Power supply	12 V DC supplied from the HU-200SS Transmitter
External dimensions	48 mm in diameter x 250 mm in length (excluding the cable)
Weight	Approx. 0.8 kg (excluding the cable)



### Holder and Cleaner

- **Immersion type holder**  
DH-101 series (insertion type)  
NH-10 series (drop-in type)
- **Immersion type jet cleaner**  
JDH series
- **Immersion type jet cleaner**  
JH-100 series (Submersible type)



### Accessories

- **MLSS Sensor extension cable**  
•CT-7E



- **Relay box**  
•CT-50SS



Caution: The selection of equipment will differ based on various conditions, including the installation site, usage environment, measurement samples, and any special characteristics. Contact your sales representative for details.

## Turbidity

# HU-200TB-IM

(4-Wire Transmitter)



# HU-200TB-W

(4-Wire Transmitter)



### HU-200TB-IM Specifications

Measuring method	90-degree transmission-scattering method
Measuring range	Turbidity Formazin: 0 to 4000 NTU Kaolin: 0 to 2000 degrees (Display range: 2001 to 4000 degrees) SS Kaolin: 0 to 2000 mg/L (Display range: 2001 to 4000 mg/L)
Transmission output	Two points 4 to 20 mA DC input/output isolated type Maximum load resistance 900 Ω
Contact output	Six points Output type: No-voltage contact output Relay contact, SPST Contact capability R1, R2, R3: Selectable from upper limit alarm, lower limit alarm, transmission output Hold, and cleaning output Setting range: Within the measurement range of turbidity or absorbance Delay time: 0 to 600 s FAIL: You can use the NO and NC relay contact. Error alarms for values outside the measurement range, self-checks, and calibration errors can be set Delay time: 0 to 600 s RNG1, RNG2: Status output of the transmission output range
Contact input	Four points Contact type: No-voltage a contact for open collector Contact function EXT1: Transmission output hold EXT2: Cleaning operation external input EXT3 EXT4: Selection from four ranges by 2 bits input
Communication function	RS-485 Two wire type, the power source of the communication is isolated from the power of measurement circuit. (The power source of transmission and communication are not isolated)
Ambient temperature	-20 to 55°C
Self-diagnosis	Sensor check error, Transmitter error
Power supply	100 to 240 V AC 50/60 Hz 36 VA (max.)
Structure	Outdoor installation type: IP65 Protection class Installation method: 50 A pole-mounted or wall-mounted Material of case: Aluminium alloy (coated with epoxy modified melamine resin) Material of mounting brackets: SUS304
Weight	Approx. 4.5 kg
Regulatory certification	CE marking, FCC rules

### HU-200TB-W Specifications

Measuring method	90-degree transmission-scattering method
Measuring range	Kaolin 0 to 1000 degrees (Display range: 0 to 1100 degrees) or 0 to 1000 mg/L Formazin 0 to 2000 degrees (Display range: 0 to 2200 degrees) PSL 0 to 100 degrees (Display range: 0 to 110 degrees)
Transmission output	Two points 4 to 20 mA DC input/output isolated type Maximum load resistance 900 Ω
Transmission output range	Free range
Contact output	Four points Output type: No-voltage contact output Relay contact, SPST Contact capability R1, R2, R3: Selectable from upper limit alarm, lower limit alarm, transmission output Hold, and cleaning output. FAIL: Error alarm RNG1, RNG2: Range signal by 2 bits binary output
Contact input	Four points Contact type: No-voltage a contact for open collector Contact function EXT1 EXT2: Can be selected from auto zero cal directives or transmission hold EXT3 EXT4: Selection from four ranges by 2 bits input
Communication function	RS-485 Two wire input/output isolated type (not isolated from transmission output)
Ambient temperature	-20 to 55°C
Self-diagnosis	Sensor check error, Converter error
Power supply	100 to 240 V AC 50/60 Hz 35 VA (max.)
Structure	Outdoor installation type: IP65 Protection class Installation method: 50 A pole-mounted or wall-mounted Material of case: Aluminium alloy (coated with epoxy modified melamine resin) Material of mounting brackets: SUS304
Weight	Approx. 4.5 kg
Regulatory certification	CE marking, FCC rules

## Sensor

### Specifications

Model	SS-150
Measuring method	Light scattering/transmission method or transmission method
Light source	Infrared LED 860 nm
Detector	Silicon photo diode
Automatic cleaner	Rotary wiper
Measured liquid temperature	0 to 45°C (Without freezing)
Measured liquid pressure	0 to 0.1 MPa
Material of wetted Part	PFA, POM, FKM, M, SUS316, EPDM, PVC,
Cable length	Provided standard cable: 10 m, maximum extension distance: 50 m
Power supply	24 V DC 6 W supplied from HU-200TB-IM Transmitter
Weight	Approx. 1.0 kg (excluding cables)



### Specifications

Model	SS-120-W
Measuring method	90-degree transmission-scattering method
Light source	LED 860 nm
Detector	Silicon photo diode
Automatic cleaner	Wiper (Option)
Measured liquid temperature	5 to 45°C (without freezing)
Measured liquid pressure	0 to 0.3 MPa
Material of wetted Part	PVC SUS316 FKM silicone rubber hard glass EPDM
Cable length	Standard attachment cable: 5 m
Installation	Screwing in bore size: Rc3/4
Power supply	12 V DC supplied from HU-200TB Transmitter
Weight	Mainframe: approx. 3.5 kg Cleaner: 2.5 kg



Caution: The selection of equipment will differ based on various conditions, including the installation site, usage environment, measurement samples, and any special characteristics. Contact your sales representative for details.

# HU-200TB-H

## (4-Wire Transmitter)



### HU-200TB-H Specifications

Measuring method	90-degree transmission-scattering method
Measuring range	Kaolin 0 to 10.00 degrees (Display range: 0 to 11.00 degrees) Formazin 0 to 10.00 NTU (Display range: 0 to 11.00 NTU ) PSL 0 to 10.00 degrees (Display range: 0 to 11.00 degrees)
Transmission output	Two points 4 to 20 mA DC input/output isolated type Maximum load resistance 900 Ω
Transmission output range	Free range
Contact output	Two points Output type: No-voltage contact output Relay contact, SPST Contact capability R1, R2, R3: Selectable from upper limit alarm, lower limit alarm, transmission output Hold, and cleaning output. FAIL: Error alarm RNG1, RNG2: Status output of the transmission output range
Contact input	Four points Contact type: No-voltage a contact for open collector Contact function EXT1 EXT2: Can be selected from auto zero cal directives or transmission hold EXT3 EXT4: Selection from four ranges by 2 bits input
Communication function	RS-485 Two wire input/output isolated type (not isolated from transmission output)
Ambient temperature	-20 to 55°C
Self-diagnosis	Sensor check error, Converter error
Power supply	100 to 240 V AC 50/60 Hz 35 VA (max.)
Structure	Outdoor installation type: IP65 Protection class Installation method: 50 A pole-mounted or wall-mounted Material of case: Aluminium alloy (coated with epoxy modified melamine resin) Material of mounting brackets: SUS304
Weight	Approx. 4.5 kg
Regulatory certification	CE marking, FCC rules

# HU-200TB-EH

## (4-Wire Transmitter)



### HU-200TB-EH Specifications

Measuring method	90-degree transmission-scattering method
Measuring range	Kaolin Formazin PSL: 0 to 2.0000 degrees (Display range: 0 to 2.0000 degrees)
Transmission output	Two points 4 to 20 mA DC input/output isolated type Maximum load resistance 900 Ω
Transmission output range	Free range
Contact output	Six points Output type: No-voltage contact output Relay contact, SPST Contact capability R1, R2, R3: Selectable from upper limit alarm, lower limit alarm, transmission output Hold, and cleaning output. Setting range: Within the measurement range of turbidity or absorbance Delay time: 0 to 600s FAIL: You can use the NO and NC relay contact. Error alarms for values outside the measurement range, self-checks, and calibration errors can be set Delay time: 0 to 600s RNG1, RNG2: Status output of the transmission output range
Contact input	Four points Contact type: No-voltage a contact for open collector Contact capability EXT1 EXT2: Can be selected from auto zero cal directives or transmission hold EXT3 EXT4: Selection from four ranges by 2 bits input
Communication function	RS-485 Two wire input/output isolated type (not isolated from transmission output)
Ambient temperature	-20 to 55°C
Self-diagnosis	Transmitter error
Power supply	100 to 240 V AC 50/60 Hz 35 VA (max.)
Structure	Outdoor installation type: IP65 Protection class Installation method: 50 A pole-mounted or wall-mounted Material of case: Aluminium alloy (coated with epoxy modified melamine resin) Material of mounting brackets: SUS304
Weight	Approx. 4.5 kg
Regulatory certification	CE marking, FCC rules

## Sensor

### Specifications

Model	SS-120-H
Measuring method	90-degree transmission-scattering method
Light source	LED 660 nm
Detector	Silicon photo diode
Automatic cleaner	Wiper (Option)
Measured liquid temperature	5 to 45°C (without freezing)
Measured liquid pressure	0 to 0.3 MPa
Material of wetted Part	PVC SUS316 FKM silicone rubber hard glass EPDM
Cable length	Standard attachment cable: 5 m
Installation	Screwing in bore size: Rc3/4
Power supply	12 V DC supplied from HU-200TB Transmitter
Weight	Mainframe: approx. 3.5 kg Cleaner: 2.5 kg



### Specifications

Model	SS-120-LD
Measuring method	90-degree transmission-scattering method
Light source	Laser diode 670 nm
Detector	Silicon photo diode
Measured liquid temperature	0 to 40°C (no freezing)
Measured liquid pressure	0 to 0.3 MPa
Material of wetted Part	PVC SUS316, FKM Silicone rubber Hard glass EPDM
Cable length	Standard attachment cable: 5 m
Power supply	12 V DC 6 W supplied from HU-200TB-EH transmitter
Weight	Approx. 3.5 kg



Model	Turbidity Concentration (NTU, mg/L)									
	0.0001	0.001	0.01	0.1	1	10	100	1000	10000	100000
SS-120-W										
SS-120-H										
SS-120-LD										
SS-150										

Wide Range: 2000 mg/L

High Sensitivity: 10 mg/L

Ultra High Sensitivity: 2 mg/L

Wide Range throw in Type: 4000 mg/L

Caution: The selection of equipment will differ based on various conditions, including the installation site, usage environment, measurement samples, and any special characteristics. Contact your sales representative for details.

## Color

# HU-200CL

(4-Wire Transmitter)



### HU-200CL Specifications

Measuring method	Light transmission method
Measuring range	Color 0 to 100 (TCU, ptCo) Turbidity 0 to 50 (mg/L)
Transmission output	Two points 4 to 20 mA DC input/output isolated type Maximum load resistance 900 Ω
Transmission output range	Free range
Contact output	Six points Output type: No-voltage contact output Relay contact, SPDT Contact capability R1, R2, R3: Selectable from upper limit alarm, lower limit alarm, transmission output Hold, and cleaning output. FAIL: Error alarm
Contact input	Two points Contact type: No-voltage a contact for open collector Contact capability EXT1: Command to clean or to hold transmission E XT2: Command to calibrate or to hold transmission
Communication function	RS-485 Two wire input/output isolated type (not isolated from transmission output)
Ambient temperature	-20 to 55°C
Self-diagnosis	Transmitter error
Power supply	100 to 240 V AC 50/60 Hz 30 VA (max.)
Structure	Outdoor installation type: IP65 Protection class Installation method: 50 A pole-mounted or wall-mounted Material of case: Aluminium alloy (coated with epoxy modified melamine resin) Material of mounting brackets: SUS304
Weight	Approx. 4.5 kg
Regulatory certification	CE marking, FCC rules

## Multi-Parameter Transmitter

# HQ-300

(2-Wire Transmitter)

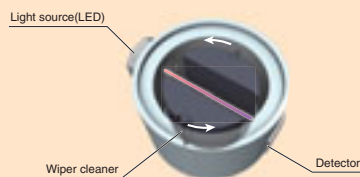


### HQ-300 Specifications

Measurement item	pH, ORP, Dissolved oxygen, Electrical conductivity, Electrical resistivity, Fluoride ion(optional)		
Measuring range	pH	0 to 14 pH	
	ORP	-2000 to 2000 mV	
	Dissolved oxygen	0 to 20 mg/L	
	Electrical conductivity	0 to 2000 μS/cm (0 to 200 kΩ·m) (Measurement range varies with cell constant)	
	Electrical resistivity	0 to 20 MQ·cm (0 to 200 kΩ·m)	
	Fluoride ion(optional)	0 to 10000 mg/L	
Accuracy	pH	Repeatability	±0.03 pH at equivalenceinput
		Linearity	±0.03 pH at equivalenceinput
	ORP	Repeatability	±5 mV at equivalenceinput
		Linearity	±5 mV at equivalenceinput
	Dissolved oxygen	Repeatability	±0.5% of full scale at equivalenceinput
		Linearity	±0.5% of full scale at equivalenceinput
	Electrical conductivity	Repeatability	±0.5% of full scale at equivalenceinput
		Linearity	±0.5% of full scale at equivalenceinput
	Electrical resistivity	Repeatability	±0.1% of full scale at equivalenceinput
		Linearity	±0.5% of full scale at equivalenceinput
	Fluoride ion(optional)	Repeatability	±7% of full scale at equivalenceinput
		Linearity	±10% of full scale at equivalenceinput
Transmission output	4 to 20 mA DC Maximum load resistance 550 Ω		
HART communication	Protocol revision	7	
	Burst mode	Not supported	
	Multi-drop connection	15 transmitters maximum	
Contact input	No-voltage "a" contact		
Ambient Temperature	-20 to 60°C		
Power supply	24 V DC (Power-supply voltage range: 21 V DC to 32 V DC ) 0.6W (max.)		
Construction	Outdoor installation type: IP 65 Protection class installation method: 50 A pole-mounted or wall-mounted Material of case: Aluminium alloy (coated with epoxy modified melamine resin) Material of mounting brackets:SUS304		
Weight	Approx. 4 kg		
Regulatory certification	CE marking, FCC rules		

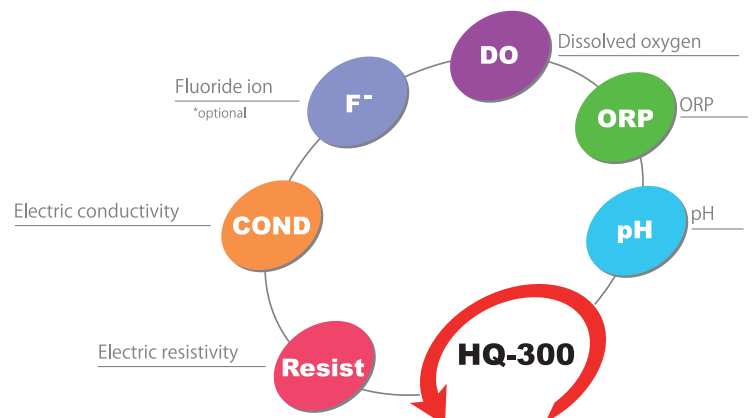
HART® is a registered trademark of FieldComm Group.

## Sensor









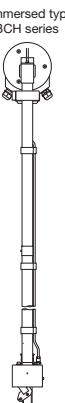



### Specifications

Model	CL-20
Measuring method	Light transmission method
Light source	Two, LEDs 390 nm, 660 nm
Detector	Silicon photo diode
Automatic cleaner	Rotary wiper
Measured liquid temperature	0 to 45°C (without freezing)
Measured liquid pressure	Within 0.1 MPa
Material of wetted Part	PVC Titanium FKM EPDM Hard Glass
Power supply	24 V DC supplied from HU-200CL transmitter
Weight	Approx. 8 kg



Caution: The selection of equipment will differ based on various conditions, including the installation site, usage environment, measurement samples, and any special characteristics. Contact your sales representative for details.

## Lineup of Cleaners

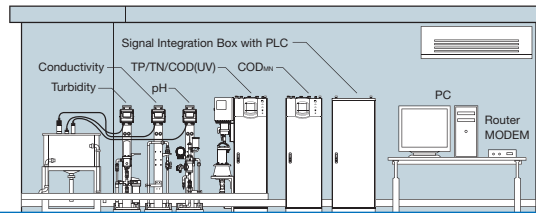
Ultrasonic Cleaner UCH-1X1 UCF-3X1	Jet Cleaner JCH-1X1 JCF-3X1	Jet Driven Brush Cleaner BH-1X1	Brush Cleaner BCH-1X1	Brush/Jet Cleaner BCH-1X1J	Chemical Cleaner CCH-1X1	Chemical Brush Cleaner CBCH-1X1	pH Meter with Auto Calibration Function AH-151
<p>The use of original burst oscillation method enables continuous cleaning, as measurement values are not affected during cleaning.</p>	<p>Cleans with water or air jet. Effective physical cleaning to remove adhered substances.</p>	<p>Cleaner with a brush rotated by water or air jet. Can be used in an explosion-proof area, as power supply is not required as long as jet source is available.</p>	<p>Motor-driven brush cleaner. Effective physical cleaning to remove adhered substances.</p>	<p>Composite type cleaner, combining a motor-driven brush cleaner and a jet cleaner.</p>	<p>Chemical cleaner using dilute hydrochloric acid. Optimum for removing coating materials such as calcium.</p>	<p>Composite type cleaner, combining a chemical cleaner using dilute hydrochloric acid and a motor-driven brush cleaner.</p>	<p>pH meter with automatic functions to clean electrodes with chemicals and calibrate standard solutions and to measure pH, which significantly reduces man-hours required for maintenance. Regular cleaning and calibration enable stable and reliable pH measurement.</p>
<p>[Immersed type] UCH series</p> 	<p>[Immersed type] JCH series</p> 	<p>[Immersed type] BH series</p> 	<p>[Immersed type] BCH series</p> 	<p>[Immersed type] BCH series</p> 	<p>[Immersed type] CCH series</p> 	<p>[Immersed type] CBCH series</p> 	<p>[Immersed type] AH-151-CH</p> 
<p>[Circulation type] UCF series</p> 	<p>[Circulation type] JCF series</p> 						

## Comparison Table of Automatic Cleaners

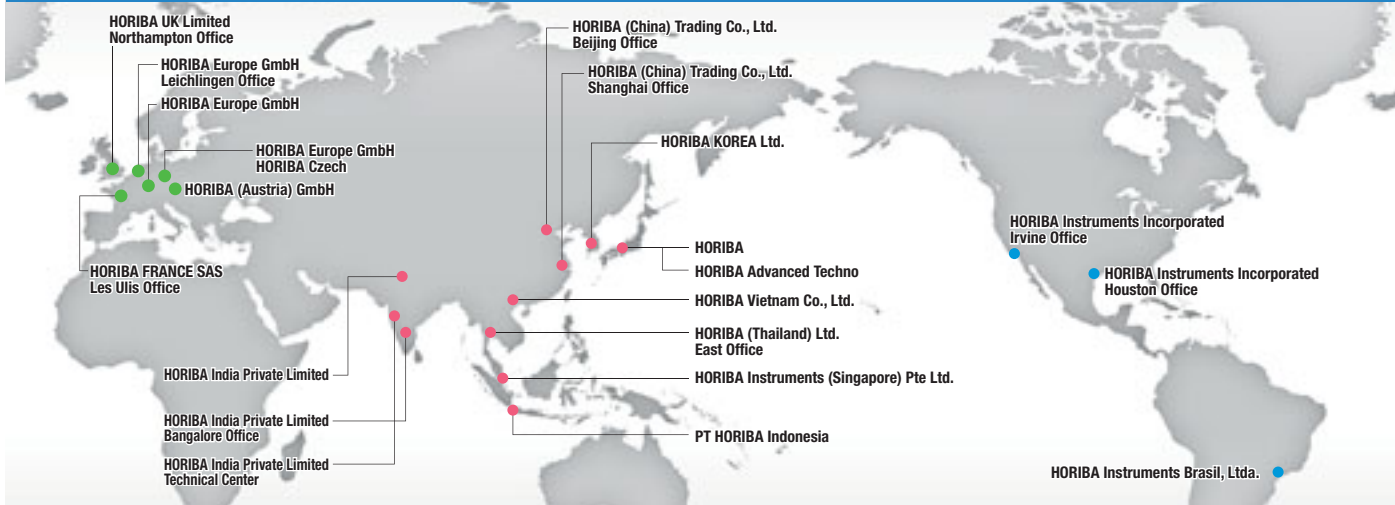
	Ultrasonic Cleaner	Jet Cleaner	Jet Driven Brush Cleaner	Brush Cleaner	Brush/Jet Cleaner	Chemical Cleaner	Chemical Brush Cleaner	pH Meter Auto Calibration Function
pH	○	○	○	○	○	○	○	○
ORP	○	○	○	○	○	○	○	×
DO(Polarography)	×	○	×	×	×	×	×	×
DO (Optical)	○	○	×	×	×	×	×	×
NH <sub>4</sub> -N	○	○	×	×	×	×	×	×
F	×	○	×	×	×	○	×	×
MLSS	×	○	×	×	×	×	×	×

## Water Quality Monitoring System

As the item to watch water quality, we offer the following automatic analytical instruments.



## HORIBA Global Network



## IMS

The HORIBA Group adopts IMS (Integrated Management System) which integrates Quality Management System ISO9001, Environmental Management System ISO14001, and Occupational Health and Safety Management System OHSAS18001. We have now integrated Business Continuity Management System ISO22301 in order to provide our products and services in a stable manner, even in emergencies.



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

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