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HORIBA AdvancedTechno

Industrial

Conductivity/Resistivity Meter



ISO9001 JQA-QM4027
ISO14001 JQA-EM4530
IMS
HORIBA Advanced Techno is operating Integrated Management System
OHSAS18001 JQA-OH0134

Industrial Conductivity Meter and Resistivity Meter Lineups

The industrial-technology and

Measurement principle: Resistivity | 2-electrode conductivity

Conductivity (SI unit)	0.01 µS/cm (1 µS/m)	0.1 µS/cm (10 µS/m)	1 µS/cm (100 µS/m)	10 µS/cm (1000 µS/m)
	0.0548			
Resistivity	100 MΩ·cm	10 MΩ·cm	1 MΩ·cm	100 KΩ·cm
	18.24			
Sample examples	Ultra pure water	Pure water, Water for Injection	Distilled water	Rain water, Sterilized purified water, purified water

Resistivity meter | **Conductivity meter** (low concentration type)

Pure water, Ultra pure water / Industrial water / Distilling plants

■ 2-channel resistivity meter
HE-960RW

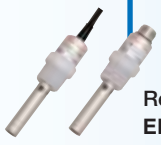


P4

■ Resistivity meter
HE-480R



P4



Resistivity sensor
ERF-001 Series

Measurement range: 0-100.0 MΩ·cm

■ Conductivity meter
CE-200C



P6

(Rain-proof type)

■ Conductivity meter (low concentration type)
HE-480C



P6



Conductivity sensor
ESH-001

Measurement range: 0-20 µS/cm



Conductivity sensor
ESH-01

Measurement range: 0-200 µS/cm

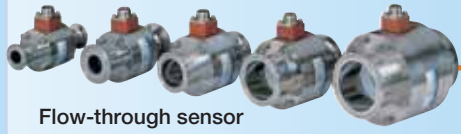
* When used in conjunction with the CE-200C, measurement ranges expand to 10 µS/cm

Pharmaceutical processes / Food and beverage processes

■ Sanitary conductivity meter (low concentration type)
HE-960CW



P7



Flow-through sensor
FS-01 Series

Measurement range: 0-2000 µS/cm

Semiconductor cleaning processes

■ Carbon sensor resistivity meter
HE-960RW-GC



P5

HE-960R-GC



P5



Carbon sensor
ERF-01-L-GC2

Measurement range: 0-100.0 MΩ·cm

■ Carbon sensor conductivity meter
HE-480C-GC



P7



Carbon sensor
ESH-01-L-GC5

Measurement range: 0-200 µS/cm

Note: Measurement range listed in this document

grade conductivity meters and resistivity meters made by Horiba Advanced Techno are highly reliable products that pledge the high accuracy and high stability of creative sensing a wealth of experience in diverse fields. Horiba Advanced Techno meets user needs with rich lineups for each and every type of application.

4-electrode conductivity

100 µS/cm (10 mS/m)	1000 µS/cm (100 mS/m)	10 mS/cm (1000 mS/m)	100 mS/cm (10 S/m)	1000 mS/cm (100 S/m)
10 KΩ·cm	1 KΩ·cm	100 Ω·cm	10 Ω·cm	1 Ω·cm
Tap water, Boiler water, Mineral water	Salt water solution, Beer, juice and sports drinks	Seawater, CIP: Cleaning-in-Place for chemicals	Inorganic acids, strong electrolytes	

Conductivity meter (high concentration type)

■ 2-channel conductivity meter
HE-960CW



P7



Conductivity sensor
ESH-1

Measurement range: 0-2000 µS/cm

(ESH-001), 100 µS/cm (ESH-01) and 1000 µS/cm (ESH-1).

■ Conductivity meter ■ Conductivity meter (high concentration type) ■ Conductivity meter (wide range type)

CEH-200



P8

(Rain-proof type)

HE-480H



P8

HE-960HS



For details regarding this product, please contact us directly.

4-electrode conductivity sensor
FES-125F
FES-126F



Measurement range: 0-500 mS/cm

* When used in conjunction with the CEH-200, measurement range expands to 20 mS/cm.



Insertion type sensor
ESH-01-C-S-SN-1.5S

Measurement range: 0-200 µS/cm

■ Sanitary conductivity meter (wide range type)
HE-960HI



P9



Flow-through sensor
FES-300 Series



Insertion type sensor
FES-200 Series

Measurement range: 0-500 mS/cm

(low concentration type)



Carbon sensor
ESH-1-L-GC9

Measurement range: 0-2000 µS/cm

■ Carbon sensor conductivity meter (wide range type)
HE-960HC



P9



Flow type carbon sensor
FES-510 Series

Measurement range: 0-1000 mS/cm

is the maximum measurement possible and may vary depending on the combination used, environment conditions, and setting.

Resistivity Meter

Resistivity meters

2-channel resistivity meter

HE-960RW

2 ch | Panel mount DIN96

- High-quality resistivity meter
- 2-channel simultaneous measurement
- Employs highly accurate, high-stability temperature measurement circuits
- Built-in RS-485 communications output



Model	HE-960RW
Measurement method	Electrode type (2-electrode method)
Sensor input	2-channel (cell constant: 0.01/cm)
Temperature sensor	Resistance thermometer: 1000 Ω/0°C
Measurement range	Resistivity: 0 to 2.00, 0 to 20.00 MΩ·cm 0 to 20.0, 0 to 200.0 kΩ·m (Without temperature compensation, resistivity can be measured in 100.0 MΩ·cm and 1000 kΩ·m ranges.) Temperature: 0 to 100°C (The number of decimals displayed can be selected between none, 1, and 2.)
Reproducibility	±0.1% FS (equivalent input)
Linearity	±0.5% FS (equivalent input)
Transmission output	No. of outputs: 2; 4 to 20 mA DC/0 to 20 mA DC; I/O insulation type; maximum load resistance 900 Ω
Contact output	No. of outputs: 4 (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, and R3 and R4 are for common use, respectively.)
Communication function	RS-485 I/O
Calibration function	Resistivity: Based on the specified compensation coefficient for the cell constant (parameter input) Temperature: Calibrated by comparing with the reference thermometer
Temperature compensation	Temperature compensation for impurities in ultra-pure water (Temperature characteristics of impurities are user-selectable.) ●Based on the temperature characteristics of NaCl (reference temperature: 5 to 95°C) ●Based on the user-defined temperature coefficient (reference temperature: 5 to 95°C; temperature coefficient: ±5%/°C)
Power requirements	100 to 240 V AC ±10%, maximum 15 VA
Conforming standards	CE marking, FCC regulations
Compatible sensors	**ERF-001 series resistivity sensor (cell constant: 0.01/cm)**

Resistivity meter

HE-480R

1 ch | Panel mount SLIM48

- Measures ultra pure water at a high degree of accuracy
- Implements advanced temperature compensation
- Allows for setting of the reference temperature to any value



Model	HE-480R
Measurement method	Electrode type (2-electrode method)
Sensor input	1-channel (cell constant: 0.01/cm)
Temperature sensor	Resistance thermometer: 1000 Ω/0°C
Measurement range	Resistivity: 0 to 0.200, 0 to 2.00, 0 to 20.00 MΩ·cm 0 to 2.00, 0 to 20.0, 0 to 200.0 kΩ·m (Without temperature compensation, resistivity can be measured in 100.0 MΩ·cm and 1000 kΩ·m ranges.) Temperature: 0 to 100°C (The number of decimals displayed can be selected between none, 1, and 2.)
Reproducibility	±0.5% FS (equivalent input)
Linearity	±0.5% FS (equivalent input)
Transmission output	No. of outputs: 1; 4 to 20 mA DC; I/O insulation type; maximum load resistance 900 Ω
Contact output	No. of outputs: 2 (R1 and R2) Contact type: Relay contact 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.
Calibration function	Resistivity: Based on the specified compensation coefficient for the cell constant (parameter input) Temperature: Calibrated by comparing with the reference thermometer
Temperature compensation	●Based on the temperature characteristics of ultra-pure water (reference temperature: 25°C) ●Based on the reference temperature and temperature coefficient user-defined (reference temperature: 5 to 95°C; temperature coefficient: ±5%/°C)
Power requirements	100 to 240 V AC ±10%, maximum 10 VA
Conforming standards	CE marking, FCC regulations
Compatible sensors	**ERF-001 series resistivity sensor (cell constant: 0.01/cm)**

For ultra-pure water **Resistivity sensor**

Responds to minute changes in the measurement water temperature

Threaded type
ERF-001 Series



Model		ERF-001
Cell constant		Approx. 0.01/cm
Wetted material	Electrode	Titanium
	Body	PVDF
	Packing	FKM
Pressure of fluid being measured		0 to 0.5 MPa
Temperature of fluid being measured		0 to 80°C
Installation		Threaded type; Thread diameter: R (PT) 3/4
Cable length		Cable-attached type: 10 m, Y terminal (standard); limit cable extensions to a max. 50 m Connector type: 10 m (CK-10M), 20 m (CK-20M), 30 m (CK-30M)
Holder to be combined		**Flow type holder EFA-30, EFA-30P, EFA-30S**
Compatible converter		**HE-480R, HE-960RW**

For ordering, refer to the model code chart on page 14.

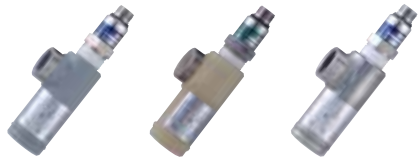
■ Accessories

Connector cable
CK-10M/20M/30M



This cable is for connecting a connector type sensor to the indication converter.

Flow type holder
EFA-30 Series



EFA-30 (PVC)
EFA-30P (PVDF)
EFA-30S (SUS-316)

Model	EFA-30	EFA-30P	EFA-30S
Liquid end materials	PVC	PVDF	SUS316
Liquid pressure range	0 to 0.1 MPa	0 to 0.1 MPa	0 to 0.5 MPa
Liquid temperature range	0 to 50°C	0 to 100°C	0 to 100°C
Liquid flow rate	0 to 10 L/min		
Connected pipe diameter	Inlet: Rc (PT) 1/2, Outlet: Rc (PT) 1/2		

For ordering, refer to the model code chart on page 15.

Carbon sensor resistivity meters

2-channel resistivity meter

HE-960RW-GC

For semiconductor wet cleaning

2 ch | Panel mount DIN96



- Carbon sensor compatible
- 2-channel simultaneous measurement
- High speed response
- Built-in array of temperature compensation functions
- 24 V DC power supply

RoHS COMPLIANT

Model	HE-960RW-GC
Measurement method	Electrode type (2-electrode method)
Sensor input	2-channel (cell constant: 0.1/cm)
Temperature sensor	Resistance thermometer: 1000 Ω/0°C
Measurement range	Resistivity: 0 to 2.00, 0 to 20.00 MΩ·cm 0 to 20.0, 0 to 200.0 kΩ·m (Without temperature compensation, resistivity can be measured in 100.0 MΩ·cm and 1000 kΩ·m ranges.) Temperature: 0 to 100°C (The number of decimals displayed can be selected between none, 1, and 2.)
Reproducibility	±0.5% FS (equivalent input)
Linearity	±0.5% FS (equivalent input)
Transmission output	No. of outputs: 2; 4 to 20 mA DC/0 to 20 mA DC; I/O insulation type; maximum load resistance 900 Ω
Contact output	No. of outputs: 4 (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, and R3 and R4 are for common use, respectively.)
Communication function	RS-485 I/O
Calibration function	Resistivity: Based on the specified compensation coefficient for the cell constant (parameter input) Temperature: Calibrated by comparing with the reference thermometer
Temperature compensation	Temperature compensation for impurities in ultra-pure water (Temperature characteristics of impurities are user-selectable.) ●Based on the temperature characteristics of NaCl (reference temperature: 5 to 95°C) ●Based on the user-defined temperature coefficient (reference temperature: 5 to 95°C; temperature coefficient: ±5%/°C)
Power requirements	24 V DC, maximum 10 W
Conforming standards	CE marking, FCC regulations
Compatible sensors	**ERF-01 carbon resistivity sensor (cell constant: 0.1/cm)**

Carbon sensor resistivity meter

HE-960R-GC

For semiconductor wet cleaning

1 ch | Panel mount DIN96



- Carbon sensor compatible
- High speed response
- Allows for setting of the reference temperature to any value
- 24 V DC power supply

RoHS COMPLIANT

Model	HE-960R-GC
Measurement method	Electrode type (2-electrode method)
Sensor input	1-channel (cell constant: 0.1/cm)
Temperature sensor	Resistance thermometer: 1000 Ω/0°C
Measurement range	Resistivity: 0 to 0.200, 0 to 2.00, 0 to 20.00 MΩ·cm 0 to 2.00, 0 to 20.0, 0 to 200.0 kΩ·m (Without temperature compensation, resistivity can be measured in 100.0 MΩ·cm and 1000 kΩ·m ranges.) Temperature: 0 to 100°C (The number of decimals displayed can be selected between none, 1, and 2.)
Reproducibility	±0.5% FS (equivalent input)
Linearity	±0.5% FS (equivalent input)
Transmission output	No. of outputs: 1; 4 to 20 mA DC; I/O insulation type; maximum load resistance 900 Ω
Contact output	No. of outputs: 2 (R1 and R2) Contact type: Relay contact 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.
Calibration function	Resistivity: Based on the specified compensation coefficient for the cell constant (parameter input) Temperature: Calibrated by comparing with the reference thermometer
Temperature compensation	●Based on the temperature characteristics of ultra-pure water (reference temperature: 25°C) ●Based on the reference temperature and temperature coefficient user-defined (reference temperature: 5 to 95°C; temperature coefficient: ±5%/°C)
Power requirements	24 V DC, maximum 5 W
Conforming standards	CE marking, FCC regulations
Compatible sensors	**ERF-01 carbon resistivity sensor (cell constant: 0.1/cm)**

World's first chemical-resistant glass carbon sensor!

●Excellent chemical resistance

Leads are made of 100% carbon and therefore exhibit excellent chemical resistance against all types of cleaning fluids such as hydrogen fluoride and hydrogen peroxide.

●Metallic contamination-free

There is no need to worry about the metallic contamination that was unavoidable with metal leads of the past. The carbon surface has been specially treated to minimize particle runoff.

●High speed response

Due to the special treatment of the carbon surface, response from chemicals and ultrapure water is the same as earlier models.

For semiconductor wet cleaning **Carbon resistivity sensor**

Applicable to single-bach cleaning systems
Glass carbon sensor offers superior resistance to chemicals

Threaded type
ERF-01-L-GC2



ERF-01-L-GC2
Cable-attached type

Model		ERF-01-L-GC2
Cell constant		Approx. 0.1/cm
Wetted material	Electrode	Glass carbon
	Body	PFA
	Packing	Kalrez®
Pressure of fluid being measured		0 to 0.05 MPa
Temperature of fluid being measured		0 to 80°C
Installation		Threaded type; Thread diameter: R (PT) 3/4
Cable length		10 m, Y terminal (standard)
Holder to be combined		Flow type holder EFA-30P, EFA-30F
Compatible converter		HE-960R-GC, HE-960RW-GC

For ordering, refer to the model code chart on page 14.

■ Accessories

Flow type holder
EFA-30 Series



EFA-30P
(PVDF)

Model	EFA-30P	EFA-30F
Liquid end materials	PVDF	PFA
Liquid pressure range	0 to 0.1 MPa	
Liquid temperature range	0 to 100°C	
Liquid flow rate	0 to 10 L/min	
Connected pipe diameter	Inlet: Rc (PT) 1/2, Outlet: Rc (PT) 1/2	

*For flow type holder, use EFA-30P(PVDF) or EFA-30F(PFA) respectively.

For ordering, refer to the model code chart on page 15.

Conductivity Meter (low concentration type)

Conductivity meters (2-electrode type)

Conductivity meter (rain-proof type)

CE-200C

1 ch | Rain-proof type | Low concentration type



- Perfect for continuous measurement of ultra-pure water.
- Automatic determination of sensor integrity
- Built-in temperature characteristics for each type of solution
- Large custom LCD
- Simultaneous display of measured values and parameter settings

Model	CE-200C			
Measurement method	Electrode type (2-electrode method)			
Sensor input	1-channel (cell constant: 0.01/cm, 0.1/cm, 1.0/cm)			
Temperature sensor	Resistance thermometer: 1000 Ω/0°C			
Measurement range	Cell constant (/cm)	0.01	0.1	1.0
	Conductivity (µS/cm)	1.00	10.0	100.0
		2.00	20.0	200
		5.00	50.0	500
		10.00	100.0	1000
	Temperature: 0 to 100°C (measurement only)			
Reproducibility	±0.5% FS			
Transmission output	No. of outputs: 1; 4 to 20 mA DC; I/O insulation type; (Transmission output of temperature is not attached.) Maximum load resistance: 500 Ω			
Contact output	No. of outputs: 2 Contact type: Relay contact SPDT (1c) Contact rating: 250 V AC 3 A (resistance load) Contact function: Upper/lower limit operation (ON/OFF control)			
Calibration function	Conductivity: Depends upon the cell constant setting Temperature: One-point calibration at a known temperature			
Temperature compensation	●Ultra-pure water (limited to 1.00 µS/cm at a cell constant of 0.01) ●NaCl (when the cell constant is 0.01, 0.1, or 1.0) ●0 to ±5%/°C (custom setting possible)			
Power requirements	100 to 115 V AC or 200 to 240 V AC (as ordered), 7 VA (max.)			
Structure	Outdoor installation: JIS C0920; Protection level: 3 (rain-proof) Installation method: 50 A pole or wall attachment			
Compatible sensors	**ESH series conductivity sensor (cell constant: 0.01/cm, 0.1/cm, 1.0/cm)**			

Conductivity meter (low concentration type)

HE-480C

1 ch | Panel mount SLIM48 | Low concentration type

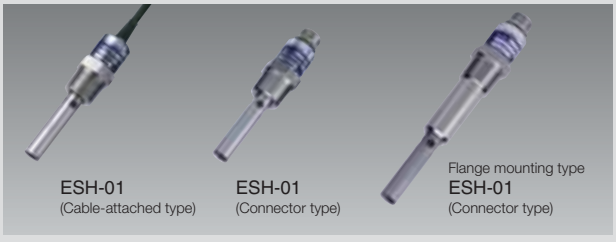


- Ideal for continuous measurement of pure water and boiler water
- High precision temperature compensation
- Automatic determination of sensor integrity
- Supports a variety of temperature compensation

Model	HE-480C			
Measurement method	Electrode type (2-electrode method)			
Sensor input	1-channel (cell constant: 0.01/cm, 0.1/cm, 1.0/cm)			
Temperature sensor	Resistance thermometer: 1000 Ω/0°C			
Measurement range	Cell constant (/cm)	0.01	0.1	1.0
	Conductivity (µS/cm)	2.000/20.00	20.00/200.0	200.0/2000
	(mS/m)	0.2000/2.000	2.000/20.00	20.00/200.0
	TDS conversion (mg/L)	2.00/20.0	20.0/200	200/2000
	Temperature: 0 to 100°C (The number of decimals displayed can be selected between none, 1, and 2.)			
Reproducibility	±0.5% FS (TDS: ±1.5% FS)			
Transmission output	No. of outputs: 1; 4 to 20 mA DC; I/O insulation type; maximum load resistance 900 Ω			
Contact output	No. of outputs: 2 (R1 and R2) Contact type: Relay contact 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.			
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 user-set coefficient (0.30 to 1.00)			
Temperature compensation	●Based on the temperature characteristics of ultra-pure water (reference temperature: 25°C) ●Based on the reference temperature and temperature coefficient user-defined (reference temperature: 5 to 95°C; temperature coefficient: ±5%/°C) ●Temperature characteristics of NaCl			
Power requirements	100 to 240 V AC ±10%, maximum 10 VA			
Conforming standards	CE marking, FCC regulations			
Compatible sensors	**ESH and FS series conductivity sensor (cell constant: 0.01/cm, 0.1/cm, 1.0/cm)**			

General-purpose **2-electrode method conductivity sensor**

Threaded type
ESH-001·01·1 Series



Model		ESH-001	ESH-01	ESH-1
Cell constant		Approx. 0.01/cm	Approx. 0.1/cm	Approx. 1.0/cm
Wetted material	Electrode	SUS-316 or Titanium		
	Body	PVDF		
	Packing	FKM		
Pressure of fluid being measured		0 to 0.5 MPa		
Temperature of fluid being measured		0 to 100°C		
Installation		Threaded type; Thread diameter: R (PT) 3/4		
Cable length		Cable-attached type: 10 m, Y terminal (standard); limit cable extensions to a max. 100 m Connector type: 10 m (CK-10M), 20 m (CK-20M), 30 m (CK-30M)		
Holder to be combined		Flow type holder EFA-30, EFA-30P, EFA-30S		
Compatible converter		CE-200C, HE-480C, HE-960CW		

For ordering, refer to the model code chart on page 15.

■ Accessories

Relay box CT-20EC



Sensor extension cable C-5C



Used for connecting the converter and the relay box.

Connector cable CK-10M/20M/30M



This cable is for connecting a connector type sensor to the indication converter.

Flow type holder EFA-30 Series



EFA-30 (PVC)

EFA-30S (SUS-316)

Model	EFA-30	EFA-30P	EFA-30S
Liquid end materials	PVC	PVDF	SUS316
Liquid pressure range	0 to 0.1 MPa	0 to 0.1 MPa	0 to 0.5 MPa
Liquid temperature range	0 to 50°C	0 to 100°C	0 to 100°C
Liquid flow rate	0 to 10 L/min		
Connected pipe diameter	Inlet: Rc (PT) 1/2, Outlet: Rc (PT) 1/2		

For ordering, refer to the model code chart on page 15.

Sanitary conductivity (2-electrode type)

2-channel conductivity meter (low concentration type)

HE-960CW

2 ch | Panel mount DIN96 | Low concentration type



- High grade type suited for monitoring of medical water quality
- 2-channel simultaenous measurement and simultaneous output
- Built-in USP<645> water quality evaluation function
- Built-in RS-485 communication output

Model	HE-960CW			
Measurement method	Electrode type (2-electrode method)			
Sensor input	2-channel (cell constant: 0.01/cm, 0.1/cm, 1.0/cm)			
Temperature sensor	Resistance thermometer: 1000 Ω/0°C			
Measurement range	Cell constant (/cm)	0.01	0.1	1.0
	Conductivity (μS/cm)	2.000/20.00	2.000/20.00/200.0/2000*	200.0/2000
	(mS/m)	0.2000/2.000	0.2000/2.000/20.00/200.0*	20.00/200.0
	*Only applicable for FS-01 series sanitary sensors.			
	Temperature: 0 to 100°C (1- or 2-digit selectable, whole numbers only)			
Reproducibility	±0.5% FS (TDS: ±1.5% FS)			
Transmission output	No. of outputs: 4; 4 to 20 mA DC, 0 to 20 mA DC; I/O insulation type; maximum load resistance 900 Ω			
Contact output	No. of outputs: 4 (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), UPS determination, error alarm, and maintenance. (R1 and R2, and R3 and R4 are for common use, respectively.)			
Communication function	RS-485 I/O			
Calibration function	Conductivity: Based on the specified compensation coefficient for the cell constant (parameter input) Temperature: Calibrated by comparing with the reference thermometer			
Temperature compensation	●Based on the temperature characteristics of NaCl (reference temperature: 5 to 95°C) ●Based on the reference temperature and temperature coefficient user-defined (reference temperature: 5 to 95°C; temperature coefficient: ±5%/°C) (Temperature compensation for pure water automatically engages in the pure water range.)			
Power requirements	100 to 240 V AC ±10%, maximum 15 VA			
Conforming standards	CE marking, FCC regulations			
Compatible sensors	**ESH and FS series conductivity sensor (cell constant: 0.01/cm, 0.1/cm, 1.0/cm)**			

For pharmaceutical / food processing

Sanitary conductivity sensor

Pharmaceutical / food processing type conductivity sensor for applications that demand high sanitary levels

Can also be used with Steam-In-Place cleaning

Flow-through sensor
FS-01 Series



Parts contacting fluids are straight and without projections.

FS-01F-C-SL-2.5S

Insertion type sensor
ESH-01-C-S-SN



ESH-01-C-S-SN-1.5S

Model	FS-01 (flow-through type)	ESH-01-C-S-SN (insert type)
Cell constant	Approx. 0.1/cm	
Wetted material	SUS316L*, PTFE, FKM	SUS316L*, PEEK, FKM
	(Compliant with MHLW Bulletin No. 20 and 85)	
Protective structure	IP67 equivalent	
Pressure of fluid being measured	0 to 1 MPa	
Temperature of fluid being measured	0 to 100°C	
Steam sterilization	140°C/0.6 MPa within 60 minutes	
Connection aperture (ferrule)	15A, 1S, 1.5S, 2S, 2.5S	1.5S
Cable length	10m (CK-10M), 20m (CK-20M), 30m (CK-30M)	
Compatible converter	HE-960CW	

* Cannot be used with fluids (hydrochloric acid, diluted sulfuric acid, seawater, etc.) that chemically react with electrode (SUS316L).

For ordering, refer to the model code chart on page 15.

Carbon sensor conductivity meter (2-electrode type)

Carbon sensor conductivity meter (low concentration type)

HE-480C-GC

For semiconductor wet cleaning

1 ch | Panel mount SLIM48 | Low concentration type



- Carbon sensor compatible
- Wide measurement range
- Simultaneous display of measured values and parameter settings
- Built-in array of temperature compensation functions

RoHS COMPLIANT

Model	HE-480C-GC			
Measurement method	Electrode type (2-electrode method)			
Sensor input	1-channel (cell constant: 0.01/cm, 0.1/cm, 1.0/cm)			
Temperature sensor	Resistance thermometer: 1000 Ω/0°C			
Measurement range	Cell constant (/cm)	0.01	0.1	1.0
	Conductivity (μS/cm)	2.000/20.00	20.00/200.0	200.0/2000
	(mS/m)	0.2000/2.000	2.000/20.00	20.00/200.0
	TDS conversion (mg/L)	2.00/20.0	20.0/200	200/2000
	When used in conjunction with the ESH-1-L-GC9, if the sensor is operated with temperature compensation unset or at a temperature of 30°C or below, measurement is possible over a range of up to a maximum of 9999 μS/cm and 999.9 mS/m.			
Reproducibility	±0.5% FS (TDS: ±1.5% FS)			
Transmission output	No. of outputs: 1; 4 to 20 mA DC; I/O insulation type; maximum load resistance 900 Ω			
Contact output	No. of outputs: 2 (R1 and R2) Contact type: Relay contact SPST (1a) 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.			
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 user-set coefficient (0.30 to 1.00)			
Temperature compensation	●Based on the temperature characteristics of ultra-pure water (reference temperature: 25°C) ●Based on the reference temperature and temperature coefficient user-defined (reference temperature: 5 to 95°C; temperature coefficient: ±5%/°C) ●Temperature characteristics of NaCl			
Power requirements	100 to 240 V AC ±10%, maximum 10 VA			
Conforming standards	CE marking, FCC regulations			
Compatible sensors	**ESH carbon conductivity sensor (cell constant: 0.1/cm, 1.0/cm)**			

For semiconductor wet cleaning

Carbon conductivity sensor

Electrodes made of highly chemical resistant glass carbon which allows for measurement in a wide range of chemicals used in semiconductor washing and other processes.

Threaded type
ESH-01-L-GC5



ESH-01-L-GC5-Y-10M

Threaded type
ESH-1-L-GC9



ESH-1-L-GC9-Y-10M

Model		ESH-01-L-GC5	ESH-1-L-GC9
Cell constant		Approx. 0.1/cm	Approx. 0.7/cm
Wetted material	Electrode	Glass carbon	
	Body	PFA	
	Packing	Kalrez®	
Pressure of fluid being measured		0 to 0.5 MPa	
Temperature of fluid being measured		0 to 80°C	
Installation		Threaded type; Thread diameter: R (PT) 3/4	
Cable length		10 m, Y terminal (standard); limit cable extensions to a max. 100 m	
Holder to be combined		Flow type holder EFA-30P, EFA-30F	
Compatible converter		HE-480C-GC	

For ordering, refer to the model code chart on page 15.

Conductivity Meter (high concentration type)

Conductivity meters (4-electrode type)

Conductivity meter (rain-proof type)

CEH-200

1 ch | Rain-proof type



- Employs five AC electrode sensors
- Automatic determination of sensor integrity
- Can continuously measure salinity and temperature of seawater
- Large custom LCD

Model	CEH-200
Measurement method	Electrode type (4-electrode method)
Sensor input	1-channel (cell constant: 1.0/cm)
Temperature sensor	Resistance thermometer: 1000 Ω/0°C
Measurement range	Conductivity: 1.00/2.00/5.00/10.0/20.0 mS/cm 1000/2000/5000 µS/cm Salinity: 0 to 4.0% (operating temperature: 0 to 40°C) (Selectable with function setting switch) Temperature: 0 to 100°C (measurement only)
Reproducibility	±0.5% FS (within ±1.0%FS at 1000 µS/cm)
Transmission output	No. of outputs: 1; 4 to 20 mA DC; I/O insulation type (Transmission output of temperature is not attached.); maximum load resistance 500 Ω
Contact output	No. of outputs: 2 Contact type: Relay contact SPDT (1c) Contact rating: 250 V AC 3 A (resistance load) Contact function: Upper/lower limit operation (ON/OFF control)
Calibration function	Conductivity, salinity: Depends upon the cell constant setting Temperature: One-point calibration at a known temperature
Temperature compensation	●Based on the reference temperature and temperature coefficient user-defined (reference temperature: 5 to 95°C; temperature coefficient: ±5%/°C) ●Temperature characteristics of NaCl
Power requirements	100 to 115 V AC or 200 to 240 V AC (as ordered), 7 VA (max.)
Structure	Outdoor installation: JIS C0920; Protection level: 3 (rain-proof) Installation method: 50 A pole or wall attachment
Compatible sensors	**FES series conductivity sensor (cell constant: 1.0/cm)**

Conductivity meter (high concentration type)

HE-480H

1 ch | Panel mount SLIM48 | High concentration type



- Wide range measurement possible to 500 mS/cm*1
- Equipped with a seawater salinity and NaCl salinity conversion function
- Supports a variety of temperature compensation
- Automatic determination of sensor integrity

*1: For measurements over 200 mS/cm, wide range type HE-960HS model is recommended. Contact the sales for details.

Model	HE-480H			
Measurement method	Electrode type (4-electrode method)			
Sensor input	1-channel (cell constant: 1.0/cm)			
Temperature sensor	Resistance thermometer: 1000 Ω/0°C			
Measurement range	Conductivity (mS/cm)	0.00 to 20.00	0.0 to 200.0	0.0 to 500.0
	(S/m)	0.000 to 2.000	0.00 to 20.00	0.00 to 50.00
	* Measurement in the 200.0 mS/cm and 20.00 S/m ranges is possible up to a custom temperature coefficient setting of ±3.5%/°C at a reference temperature of 25°C.			
	* Measurement in the 500.0 mS/cm and 50.00 S/m ranges is possible without temperature compensation. *1			
	Seawater salinity conversion: 0.00 to 4.00%			
	NaCl salinity conversion: 0.0 to 20.0%			
	Temperature: 0 to 100°C (The number of decimals displayed can be selected between none, 1, and 2.)			
Reproducibility	±0.5% FS (±1.0% for salinity conversion and the 500 mS/cm range)			
Transmission output	No. of outputs: 1; 4 to 20 mA DC; I/O insulation type; maximum load resistance 900 Ω			
Contact output	No. of outputs: 2 (R1 and R2) Contact type: Relay contact 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.			
Calibration function	Conductivity: Based on the specified compensation coefficient for the cell constant (parameter input) Temperature: Calibrated by comparing with the reference thermometer			
Temperature compensation	●Based on the reference temperature and temperature coefficient user-defined (reference temperature: 5 to 95°C; temperature coefficient: ±5%/°C) ●Temperature characteristics of NaCl			
Power requirements	100 to 240 V AC ±10%, maximum 10 VA			
Conforming standards	CE marking, FCC regulations			
Compatible sensors	**FES series conductivity sensor (cell constant: 1.0/cm)**			

General-purpose | 4-electrode method conductivity sensor

Submersible type/Threaded type

FES-100 Series



Model		FES-125F	FES-126F	FES-126FNi (for TMAH)
Cell constant		Approx. 0.1/cm		
Wetted material	Electrode	Titanium	Titanium	Nickel
	Body	PVC	PPS	PPS
	Packing	FKM	FKM	EPDM
Pressure of fluid being measured		0 to 0.5 MPa	0 to 0.5 MPa	0 to 0.5 MPa
Temperature of fluid being measured		0 to 50°C	0 to 120°C *1	0 to 120°C
Cable length		10 m, Y terminal (standard); Use the CT-20EC relay box for further extension. Maximum extension length: 50 m		
Installation		1. Submersible type 2. Threaded type Use the thread adapter EA-20.	1. Submersible type 2. Threaded type Use the thread adapter EA-40.	Threaded type Thread diameter: R (PT) 3/4
Holder to be combined		Flow type holder: EF-20, EF-20P, EF-20S		Flow type holder: EF-20P
Compatible converter		CEH-200, HE-480H, HE-960HS		HE-960TM (for TMAH)

*1. Submersible types can only be used between 0 and 50°C

For ordering, refer to the model code chart on page 15.

■ Accessories

Relay box CT-20EC



Sensor extension cable C-7E



Used for connecting the converter and the relay box.

Connector cable SK-10M/20M/30M



This cable is for connecting a connector type sensor to the indication converter.

Flow type holder EF-20 Series



Model	EF-20	EF-20P	EF-20S
Liquid end materials	PVC	PVDF	SUS 316
Liquid pressure range	0 to 50°C	0 to 100°C	0 to 100°C
Liquid temperature range	0 to 0.1 MPa	0 to 0.1 MPa	0 to 0.5 MPa
Liquid flow rate	0 to 10 L/min		
Connected pipe diameter	Inlet: Rc (PT) 1/2, Outlet: Rc (PT) 1/2		

For ordering, refer to the model code chart on page 15.

Sanitary conductivity meter (4-electrode type)

Sanitary conductivity meter (wide range type) | For pharmaceutical / food processing

HE-960HI

For Cleaning-in-Place (CIP) terminal management

1 ch | Panel mount DIN96 | Wide range type



- Measures the full range up to 500 mS/cm
- Automatic display range switching
- Equipped with nitric acid(HNO_3), phosphoric acid(H_3PO_4), and sodium hydroxide (NaOH) concentration automatic conversion function
- Built-in RS-485 communications output

Model	HE-960HI
Measurement method	Electrode type (4-electrode method)
Sensor input	1-channel (cell constant: 0.1/cm)
Temperature sensor	Resistance thermometer: 1000 Ω/0°C
Measurement range	Conductivity: 0 to 200 mS/cm (Conductivity measurement range prior to temperature compensation: 0 to 500 mS/cm) Temperature: 0 to 100°C
Concentration conversion	NaOH: 0 to 5%, HNO_3: 0 to 5%, H_3PO_4: 0 to 5% (using internal program) Custom 1: 0 to 100%, Custom 2: 0 to 100% (user-customizable conversion formula)
Reproducibility	±0.5% FS (within ±1.0%FS at 500 mS/cm ranges)
Transmission output	No. of outputs: 4; 4 to 20 mA DC; I/O insulation type; maximum load resistance 900 Ω
Contact output	No. of outputs: 5 (R1, R2, R3, R4, and RF) Contact type: Relay contacts R1 to R4: SPST (1a); RF: 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 and RF are for common use, respectively.)
Contact Input	No. of inputs: 2 Contact function: Interchangeable transmission output range, External input for holding
Communications function	RS-485 I/O
Calibration function	Conductivity: Based on the specified compensation coefficient for the cell constant (parameter input) Temperature: Calibrated by comparing with the reference thermometer
Temperature compensation	●Based on the reference temperature and temperature coefficient user-defined (reference temperature: 25°C; temperature coefficient: 0 to 5%/°C) ●Based on the temperature characteristics of NaCl (reference temperature: 25°C)
Power requirements	100 to 240 V AC ±10%, maximum 20 VA
Conforming standards	CE marking, FCC regulations
Compatible sensors	**FES-300 and FES-200 series conductivity sensor (cell constant: 0.1/cm)**

Carbon sensor conductivity meter (4-electrode type)

Carbon sensor conductivity meter (wide range type)

HE-960HC

For semiconductor wet cleaning

1 ch | Panel mount DIN96 | Wide range type



- Carbon sensor compatible
- Measures the full range up to 1000 mS/cm
- Automatic display range switching
- Equipped with the chemical concentration conversion function
- Built-in RS-485 communications output

RoHS COMPLIANT

Model	HE-960HC		
Measurement method	Electrode type (4-electrode method)		
Sensor input	1-channel (cell constant: 0.1/cm)		
Temperature sensor	Resistance thermometer: 1000 Ω/0°C		
Measurement range	Conductivity: 0 to 1000 mS/cm (Conductivity measurement range prior to temperature compensation) Temperature: 20 to 150°C		
Concentration conversion	Custom 1: 0 to 100%, Custom 2: 0 to 100% (user-customizable conversion formula)		
Reproducibility	0 to 20.00 mS/cm	Within ±0.5%FS	(equivalent input)
	20.0 to 200.0 mS/cm		
	200 to 1000 mS/cm	Within ±1.0%FS	
Transmission output	No. of outputs: 4; 4 to 20 mA DC/0 to 20 mA DC; I/O insulation type; maximum load resistance 900 Ω		
Contact output	No. of outputs: 5 (R1, R2, R3, R4, and RF) Contact type: Relay contacts R1 to R4: SPST (1a); RF: 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 and RF are for common use, respectively.)		
Contact Input	No. of input: 1 Contact function: Transmission output for holding		
Communications function	RS-485 I/O		
Calibration function	Conductivity: Based on the specified compensation coefficient for the cell constant (parameter input) Temperature: Calibrated by comparing with the reference thermometer		
Temperature compensation	●Based on the reference temperature and temperature coefficient user-defined (reference temperature: 25°C; temperature coefficient: 0 to 3%/°C)		
Power requirements	100 to 240 V AC ±10%, maximum 20 VA		
Conforming standards	CE marking, FCC regulations		
Compatible sensors	**FES-510 carbon conductivity sensor (cell constant: 1.0/cm)**		

For pharmaceutical / food processing

Sanitary conductivity sensor

Pharmaceutical / food processing type conductivity sensor for applications that demand high sanitary levels

Can also be used with Steam-In-Place cleaning

Flow-through sensor
FES-300 Series



Parts contacting fluids are straight and without projections.

FES-310-L-S-SN-3.0S

Insertion type sensor
FES-200 Series



FES-210-L-S-SN-2.0S

Model	FES-310 (flow-through type)	FES-210, 220, 230, 240 (insert type)
Cell constant	Approx. 0.1/cm	
Wetted material	SUS316L*, PPS, FKM (Compliant with MHLW Bulletin No. 20 and 85)	
Protective structure	IP67 equivalent	
Pressure of fluid being measured	0 to 1 MPa	
Temperature of fluid being measured	0 to 110°C	
Steam sterilization	140°C/0.6 MPa within 60 minutes	
Connection aperture (ferrule)	1.5S, 2.0S, 2.5S, 3.0S, 4.0S, 4.5S	1.5S, 2.0S, VARIVENT® valve, Socket attachment type
Cable length	Cable-attached type: 10 m, Y terminal (standard); limit cable extensions to a max. 50 m Connector type: 10 m (SK-10M), 20 m (SK-20M), 30 m (SK-30M)	
Compatible converter	HE-960HI	

* Cannot be used with fluids (hydrochloric acid, diluted sulfuric acid, seawater, etc.) that chemically react with electrode (SUS316L).

For ordering, refer to the model code chart on page 15.

For semiconductor wet cleaning

Carbon conductivity sensor

Electrodes made of highly chemical resistant glass carbon which allows for measurement in a wide range of chemicals used in semiconductor washing and other processes.

Flow type carbon sensor
FES-510 Series



FES-510-3/4

Model		FES-510
Cell constant		Approx. 1.0/cm
Wetted material	Electrode	Glass carbon
	Body	PFA
	Packing	Kalrez®
Pressure of fluid being measured		0 to 0.5 MPa (Within 5 to 50)
Temperature of fluid being measured		5 to 100°C
Liquid flow rate		0 to 2 L/min (1/4 in), 0 to 8 L/min (3/8 in) 0 to 10 L/min (1/2 in), 0 to 15 L/min (3/4 in) 0 to 25 L/min (1 in)
Cable length		Cable-attached type: 10 m, ring terminal (standard); limit cableextensions to a max. 50 m
Compatible converter		HE-960HC

For ordering, refer to the model code chart on page 15.

External Dimensions

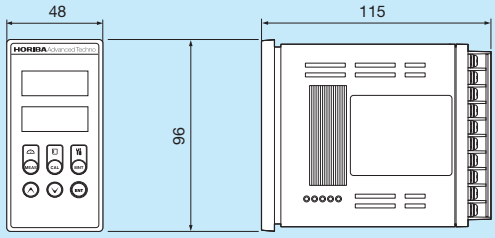
(Unit: mm)

■Indication converter

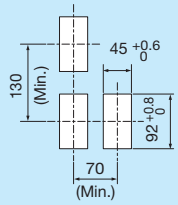
Resistivity meter / Conductivity meter

●Panel mount type

48 Series

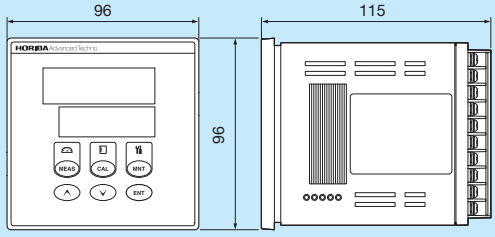


Panel cutting dimensions

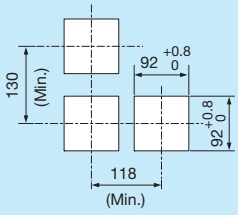


●Panel mount type

96 Series



Panel cutting dimensions



●Rain-proof type

200 Series

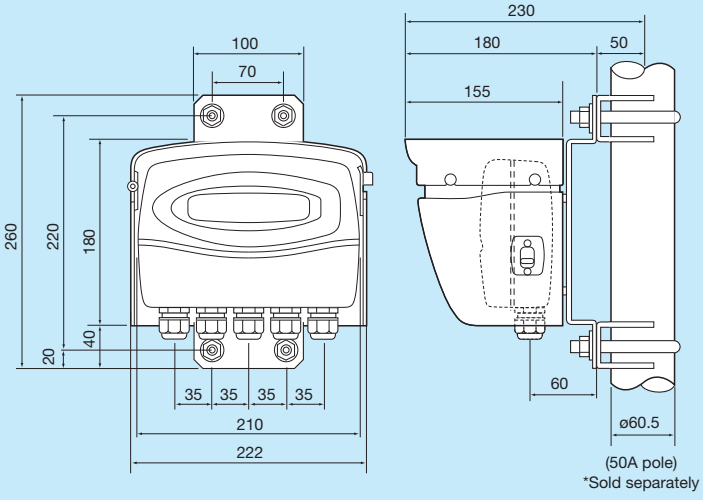
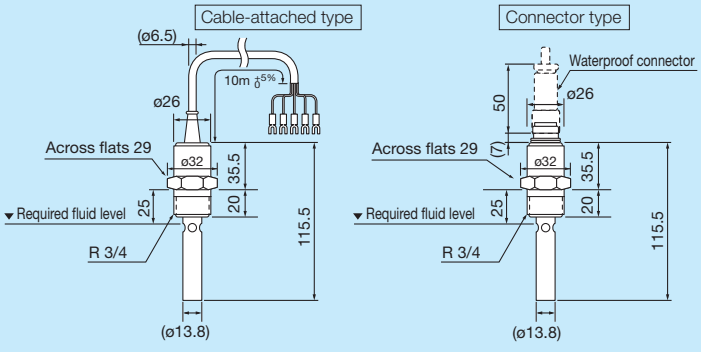


Diagram shown here is an example of a pole attachment.
Wall installation also available.

■Sensor

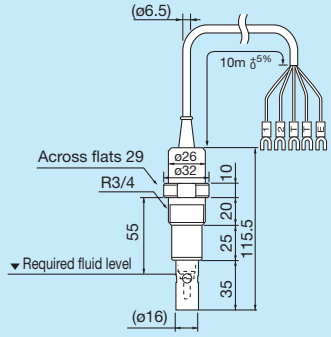
●Resistivity sensor

ERF-001 Series



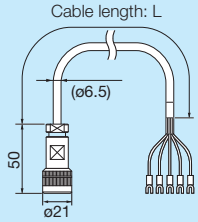
●Carbon resistivity sensor

ERF-01-L-GC2



●Connector cable

CK-□M



Model	Cable length
CK-Y10M	10 m δ±5%
CK-Y20M	20 m δ±5%
CK-Y30M	30 m δ±5%

Industrial **Conductivity/Resistivity Meter**

Selection Guide & External Dimensions







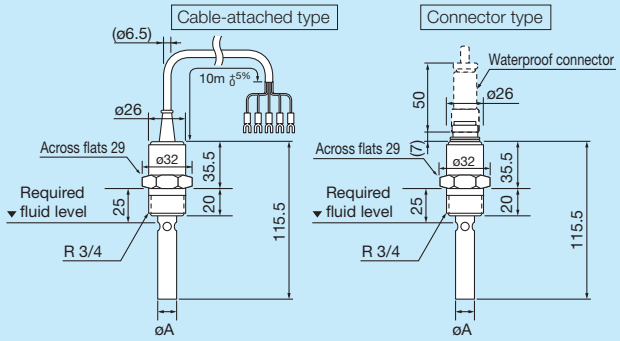




(Unit: mm)

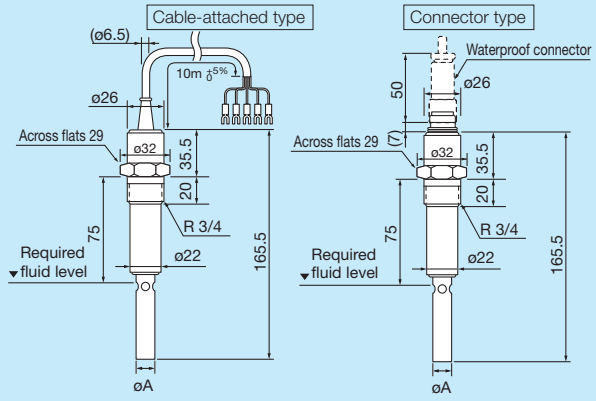
●2-electrode conductivity sensor

ERF-001 Series



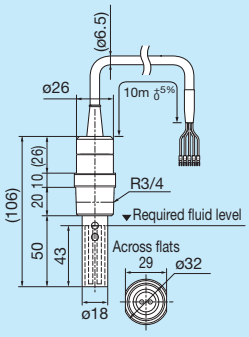
Model	øA
ESH-1	16
ESH-01	13.8
ESH-001	13.8

For flange mounting

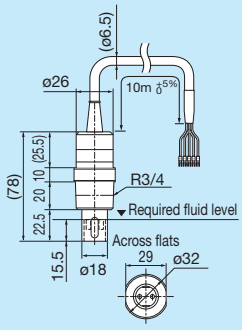


●2-electrode carbon conductivity sensor

ESH-01-L-GC5

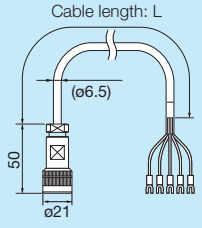


ESH-1-L-GC9



●Connector cable

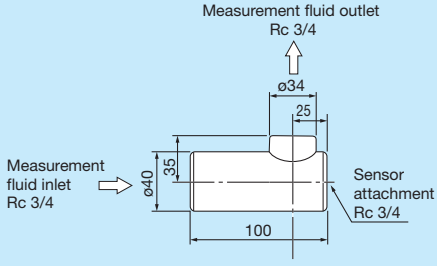
CK-□M



Model	Cable length
CK-Y10M	10 m
CK-Y20M	20 m
CK-Y30M	30 m

●Flow type holder

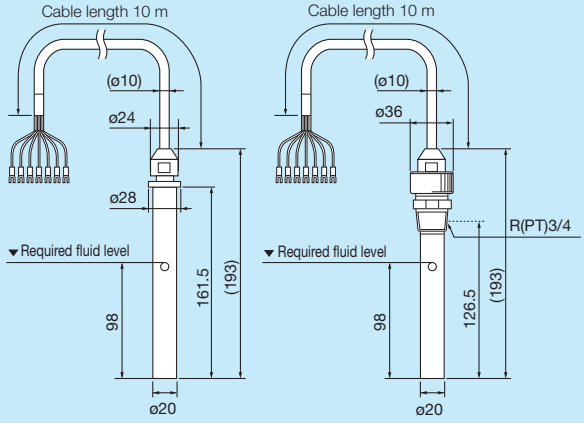
EFA-30 Series



●4-electrode conductivity sensor

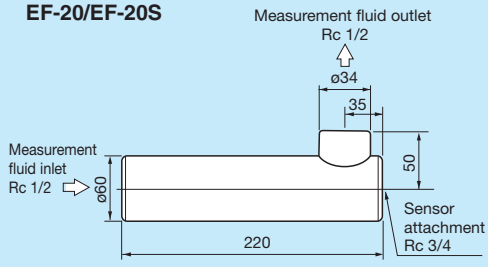
FES-125F/FES-126F

With threaded type adapter

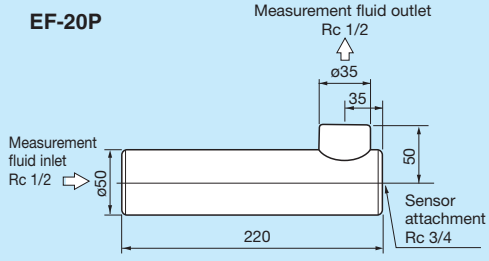


●Flow type holder

EF-20/EF-20S

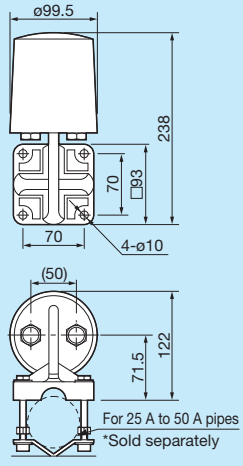


EF-20P



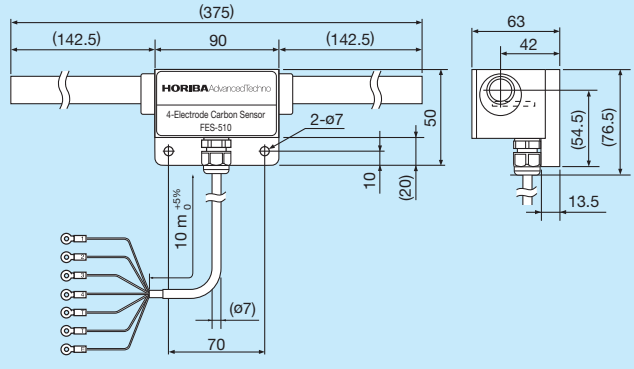
●Relay box

CT-20EC

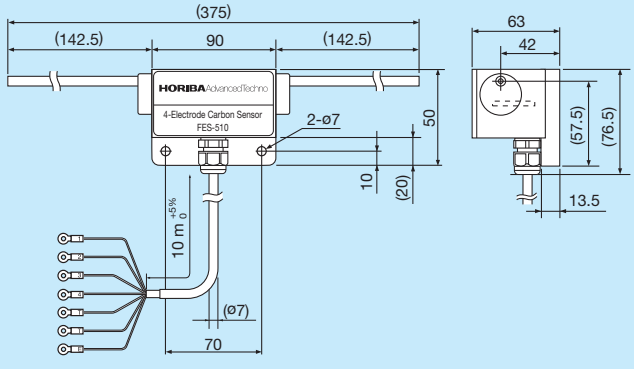


●4-electrode carbon conductivity sensor

FES-510-3/4



FES-510-1/2

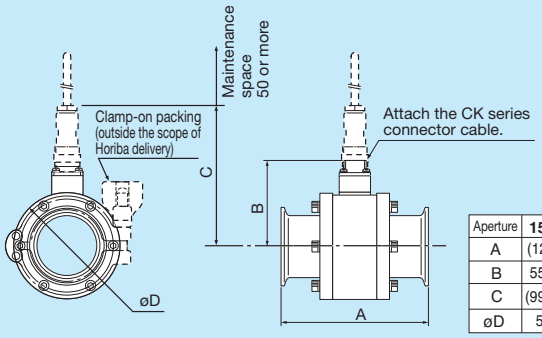


■Sensor

(Unit: mm)

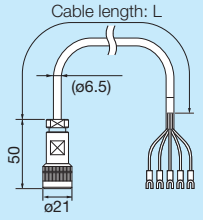
●2-electrode sanitary conductivity sensor

■Flow-through sensor
FS-01 Series



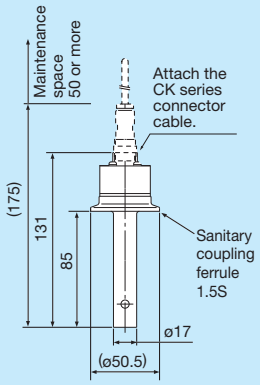
Aperture	15A	1.0S	1.5S	2.0S	2.5S
A	(120)	(120)	(120)	(120)	(140)
B	55.5	59	64.5	70	82.5
C	(99.5)	(103)	(108.5)	(114)	(126.5)
øD	55	65	75	85	110

■Connector cable
CK-□M



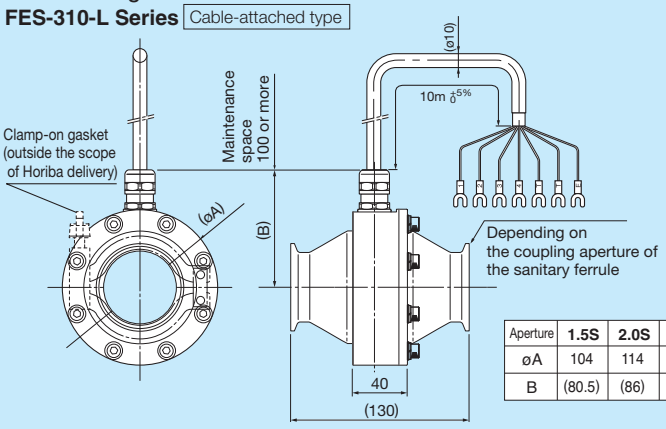
Model	Cable length
CK-Y10M	10 m ±5%
CK-Y20M	20 m ±5%
CK-Y30M	30 m ±5%

■Insertion type sensor
ESH-01-C-S-SN-1.5S



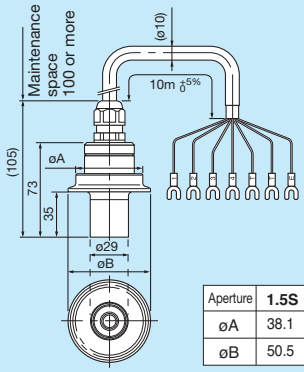
●4-electrode sanitary conductivity sensor

■Flow-through sensor
FES-310-L Series Cable-attached type



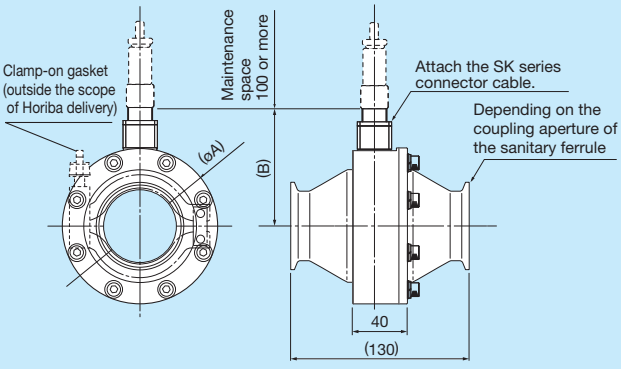
Aperture	1.5S	2.0S	2.5S	3.0S	4.0S	4.5S
øA	104	114	138	159	180	188
B	(80.5)	(86)	(98)	(109)	(119.5)	(123.5)

■Insertion type sensor
FES-210/220-L Series Cable-attached type



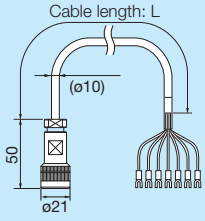
Aperture	1.5S	2.0S
øA	38.1	50.8
øB	50.5	64

■Flow-through sensor
FES-310-C Series Connector type



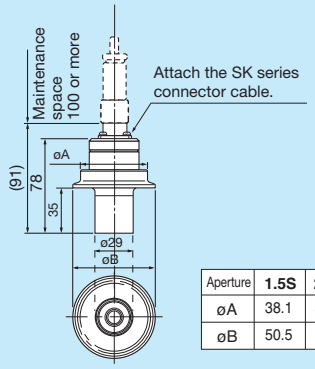
Aperture	1.5S	2.0S	2.5S	3.0S	4.0S	4.5S
øA	104	114	138	159	180	188
B	(80.5)	(86)	(98)	(109)	(119.5)	(123.5)

■Connector cable
SK-□M



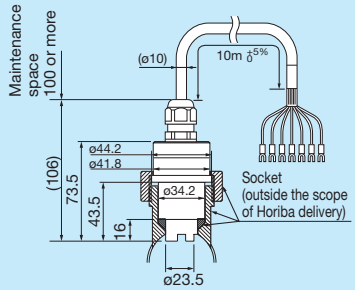
Model	Cable length
SK-Y10M	10 m ±5%
SK-Y20M	20 m ±5%
SK-Y30M	30 m ±5%

■Insertion type sensor
FES-210/220-C Series Connector type

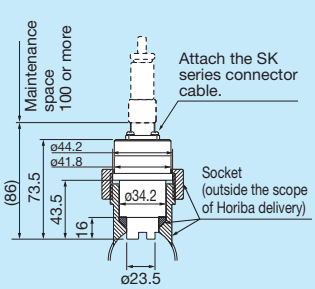


Aperture	1.5S	2.0S
øA	38.1	50.8
øB	50.5	64

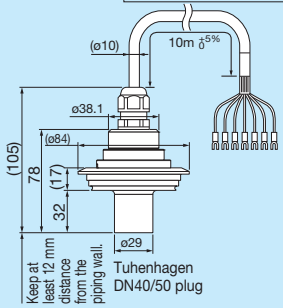
■Socket insertion type
FES-240-L Cable-attached type



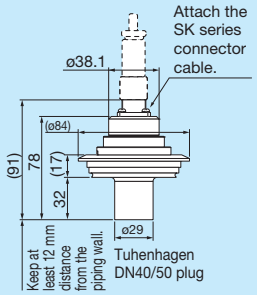
FES-240-C Connector type



■VARIVENT® valve type
FES-230-L Cable-attached type

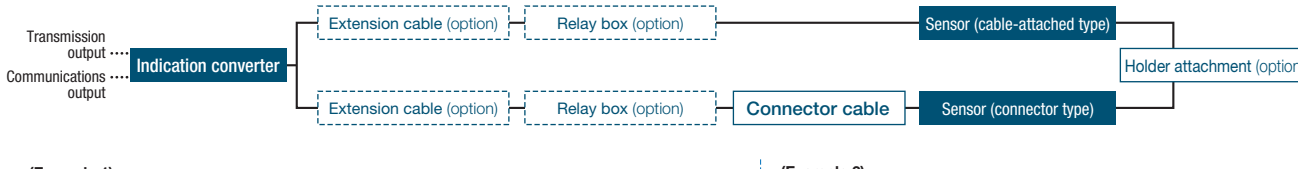


FES-230-C Connector type



Industrial Selection Guide for Conductivity Meter/Resistivity Meter

[Standard assembly]



(Example 1)

Conductivity (low concentration type)	2-electrode conductivity sensor	Connector cable	Flow type holder
	•Cell constant 0.1/cm •Connector type •Electrode material: Titanium •For dedicated holder	•10 m •Y terminal	•Material: PVC
HE-480C	+ ESH-01-C-T-ST	+ CK-10M	+ EFA-30

(Example 2)

2-channel resistivity meter	Resistivity sensor	Flow type holder
	•Cell constant 0.01/cm •Cable attached type •Electrode material: Titanium •Pair calibration •Cable: 10m, Y termial	•Material: PVC
HE-960RW	+ ERF-001-C-T-S-Y-10M	+ EFA-30

Conductivity/Resistivity indication converter

	Model	Product name				
Resistivity meter	HE-960RW	2-channel resistivity meter	2 ch	Panel mount DIN96		
	HE-480R	Resistivity meter	1 ch	Panel mount SLIM48		
	HE-960RW-GC	2-channel resistivity meter	2 ch	Panel mount DIN96		RoHS COMPLIANT
	HE-960R-GC	Carbon sensor resistivity meter	1 ch	Panel mount DIN96		RoHS COMPLIANT
Conductivity meter (2-electrode method)	CE-200C	Conductivity meter (rain-proof type)	1 ch	Rain-proof type	Low concentration type	
	HE-480C	Conductivity meter (low concentration type)	1 ch	Panel mount SLIM48	Low concentration type	
	HE-960CW	2 channel conductivity meter (low concentration type)	2 ch	Panel mount DIN96	Low concentration type	
	HE-480C-GC	Carbon sensor conductivity meter (low concentration type)	1 ch	Panel mount SLIM48	Low concentration type	RoHS COMPLIANT
Conductivity meter (4-electrode method)	CEH-200	Conductivity meter (rain-proof type)	1 ch	Rain-proof type		
	HE-480H	Conductivity meter (high concentration type)	1 ch	Panel mount SLIM48	High concentration type	
	HE-960HS	Conductivity meter (wide range type)	1 ch	Panel mount DIN96	Wide range type	
	HE-960HI	Sanitary conductivity meter (wide range type)	1 ch	Panel mount DIN96	Wide range type	
	HE-960HC	Carbon sensor conductivity meter (wide range type)	1 ch	Panel mount DIN96	Wide range type	RoHS COMPLIANT

Resistivity sensor ERF series

■Resistivity sensor (For ultra-pure water)

ERF-001 Series (**Compatible converters: HE-960RW, HE-480R**)

Model	Cell constant	Connection	Electrode material	Temperature testing	Terminal type	Cable length	Specifications
ERF							Resitivity sensor
	-001						Cell constant 0.01/cm
		-L					Cable-attached type
		-C					Connector type*3
			-T				Titanium*4
				-N			No temperature testing (standard)
				-R			With 0ºC temperature testing (option)
				(-S)			With pair calibration*1
					-Y		Y terminal (standard)
					-O		Ring terminal (option)
					N/A		When the connector type sensor is selected
						-10	10 m (standard)
						-XX	Designated cable length (option) *2
						N/A	When the connector type sensor is selected

■Carbon resistivity sensor (For semi-conductor and FPD manufacturing)

ERF-01 Series (**Compatible converters: HE-960RW-GC, HE-960R-GC**)

Model	Cell constant	Connection	Material	Temperature testing	Terminal type	Cable length	Specifications
ERF							Resistivity sensor
	-01						Cell constant 0.1/cm
		-L					Cable-attached type
			-GC2				Electrode: Glass carbon; Body: PFA*5
				-N			No temperature testing (standard)
				-R			With 0ºC temperature testing (option)
					-Y		Y terminal (standard)
					-O		Ring terminal (option)
						-10	10 m (standard)
						-XX	Designated cable length (option) *2

*1 The sensor and converter are calibrated together before shipping. Contact your sales representative separately.
Calibration accuracy (HE-960RW+ERF-001 sensor)

Resistivity	Within ±0.01 MΩ·cm	Against reference device/ At same temperature
Temperature	Within ±0.02ºC	

*2 Limit cable extensions to a max. 50 m. (Relay boxes cannot be used.)
*3 A connector cable (CK-10M/20M/30M, etc.) is separately required for connector type sensors.
*4 Use a flow type holder (EFA-30/30P/30S) sold separately, if needed.
*5 Use a flow type holder (EFA-31P/31F) sold separately, if needed.

2-electrode conductivity sensor ESH, FS series

■2-electrode conductivity sensor (General-purpose)

(Compatible converters: CE-200C, HE-480C, HE-960CW)

Model	Cell constant	Connection	Electrode material	Cell length	Terminal type	Cable length	Specifications
ESH							Conductivity sensor (2-electrode method)
	-1						Cell constant 1.0/cm
	-01						Cell constant 0.1/cm
	-001						Cell constant 0.01/cm
		-L					Cable-attached type
		-C					Connector type*2
			-S				SUS-316
			-T				Titanium
				-ST			For flow type holder*3
				-LG			For flange mounting
					-Y		Y terminal (standard)
					-O		Ring terminal (option)
					N/A		When the connector type sensor is selected
						-10	10 m (standard)
						-XX	Designed cable length (option)*1
						N/A	When the connector type sensor is selected

■Carbon conductivity sensor (For semi-conductors and FPD manufacturing)

(Compatible converter: HE-480C-GC)

Model	Cell constant	Connection	Material	Cell length	Terminal type	Cable length	Specifications
ESH							Conductivity sensor (2-electrode method)
	-01						Cell constant 0.1/cm
		-L					Cable-attached type
			-GC5				Electrode: glass carbon, Body: PFA
			-GC6				Electrode: glass carbon, Body: PP
				N/A			*4
					-Y		Y terminal (standard)
					-O		Ring terminal (option)
						-10M	10 m (standard)
						-XX	Designed cable length (option)*1
	-1						Cell constant: 1/cm
		-L					Cable-attached type
			-GC9				Electrode: glass carbon, Body: PFA
				N/A			*4
					-Y		Y terminal (standard)
					-O		Ring terminal (option)
						-10M	10 m (standard)
						-XX	Designed cable length (option)*1

■Sanitary conductivity sensor (For food and pharmaceutical manufacturing)

[Insertion type] **(Compatible converters: HE-480C, HE-960CW)**

Model	Cell constant	Connection	Material	Structure	Size	Specifications
ESH						Conductivity sensor (2-electrode method)
	-01					Cell constant: 0.1/cm
		-C				Connector type*2
			-S			Electrode: SUS 316L, Electorde insulation: PEEK
				-SN		Sanitary type (Structure: compliant with IP67)
					-1.5S	IFD/ISO 1.5S ferrule

[Flow-through type] **(Compatible converters: HE-480C, HE-960CW)**

Model	Cell constant	Connection	Material	Size	Specifications
FS					Conductivity sensor (2-electrode method)
	-01F				Cell constant: 0.1/cm
		-C			Connector type*2
			-SL		Electrode: SUS 316, Electorde insulation: PEEK
				-15A	IFD/ISO 15 ferrule
				-1S	IFD/ISO 1S ferrule
				-1.5S	IFD/ISO 1.5S ferrule
				-2S	IFD/ISO 2S ferrule
				-2.5S	IFD/ISO 2.5S ferrule

Accessories

Flow type holder (For resistivity sensors and 2-electrode conductivity sensors)

EFA-30 Series (Compatible sensors: ERF, ESH Series)

Model	Cell constant	Connection	Specifications
EFA			Flow type holder
	-30		For 2-electrode method
		N/A	PVC
		-P	PVDF
		-S	SUS-316
		F	PFA Made by order

Model	Product name
CT-20EC	Relay box
C-5C	Exclusive-use extension cable (for 2-electrode conductivity sensors)
CK-5M	Connecter cable 5 m (for 2-electrode conductivity sensors)
CK-10M	Connecter cable 10 m (for 2-electrode conductivity sensors)
CK-20M	Connecter cable 20 m (for 2-electrode conductivity sensors)
CK-30M	Connecter cable 30 m (for 2-electrode conductivity sensors)

*1 Limit cable extensions to max. 100 m. Relay box usage is recommended for cable extensions exceeding 30 m.
*2 Separate connector cable (CK-10M/20M/30M etc.) required for connector type sensors.
*3 Use a flow type holder (EFA-30/30P/30S) sold separately, if needed.
*4 Use a flow type holder (EFA-31P/31F) sold separately, if needed.

4-electrode conductivity sensor FES series

■4-electrode conductivity sensor (General-purpose)

FES-100 Series **(Compatible converter: CEH-200, HE-480H, HE-960HS)**

Model	Connection	Electrode material	Connection	Specifications
FES				4-electrode conductivity sensor
-125F				Submersible type (Body: PVC)
-126F				Submersible type (Body: PPS)
	N/A			Cable-attached type*1
		N/A		Electrode: Titanium; Packing: FKM (standard)
		-Ni		Electrode: Nickel; Packing; EPDM (option)
			N/A	Threaded type adaptor required separately*4

■Sanitary conductivity sensor (For food and pharmaceutical manufacturing)

FES-200/300 Series **(Compatible converter: HE-960HI)**

[Insertion type]

Model	Connection	Electrode material	Structure	Size	Specifications
FES					4-electrode conductivity sensor
-210					Insertion type (Ferrule attachment material: resin)
-220					Insertion type (Ferrule attachment material: SUS)
	-L				Cable-attached type*1
	-C				Connector type*2
		-S			SUS316L, PPS, FKM
			-SN		Sanitary type (Structure: IP67 equivalent)
				-1.5S	IFD/ISO 1.5S ferrule
				-2.0S	IFD/ISO 2.0S ferrule

[Custom insertion type]

Model	Connection	Electrode material	Structure	Size	Specifications
FES					4-electrode conductivity sensor
-230					Insertion type (VARIVENT® valve attachment
	-L				Cable-attached type*1
	-C				Connector type*2
		-S			SS316L, PPS, FKM
				-DN50	VARIVENT® valve
-240					Insertion type (Socket attachment)
	-L				Cable-attached type
	-C				Connector type
					Socket attachment type

*1 For cable extensions, use relay box CT-20EC and limit extension to a max. of 50 m.
*2 Separate connector cable (SK-10M etc.) required for connector type sensors.
*3 Use a flow type holder (EFA-30/30P/30S) sold separately, if needed.
*4 Separate threaded type adaptors EA-20 (for FES-125 sensors) and EA-40 (for FES-126 sensors) required.

■Carbon conductivity sensor (For semi-conductor and FPD manufacturing)

FES-510 Series **(Compatible converter: HE-960HC)**

[Flow type]

Model	Size	Specifications
FES		4-electrode conductivity sensor
-510		In-line flow type
	-1/4	Piping size: 1/4 in. (standard)
	-3/8	Piping size: 3/8 in. (substandard)
	-1/2	Piping size: 1/2 in. (substandard)
	-3/4	Piping size: 3/4 in. (standard)
	-1	Piping size: 1 in. (substandard)
	-6_4	Piping size: ø6/ø4 mm Made by order
	-10_8	Piping size: ø10/ø8 mm

[Flow-through type]

Model	Connection	Electrode material	Structure	Size	Specifications
FES					4-electrode conductivity sensor
-310					In-line flow-through type
	-L				Cable-attached type*1
	-C				Connector type*2
		-S			SUS316L, PPS, FKM
			-SN		Sanitary type (Structure: IP67 equivalent)
				-1.5S	IFD/ISO 1.5S ferrule
				-2.0S	IFD/ISO 2.0S ferrule
				-2.5S	IFD/ISO 2.5S ferrule
				-3.0S	IFD/ISO 3.0S ferrule
				-4.0S	IFD/ISO 4.0S ferrule
				-4.5S	IFD/ISO 4.5S ferrule

Accessories

Flow type holder (For 4-electrode conductivity sensor)

EF-20 Series (Compatible sensor: FES Series)

Model	Cell constant	Connection	Specifications
EF			Flow type holder
	-20		For 4-electrode method
		N/A	PVC
		-P	PVDF
		-S	SUS-316

Model	Product name
CT-20EC	Relay box
C-7E	Exclusive-use extension cable (for 4-electrode conductivity sensors)
SK-10M	Connecter cable 10 m (for 4-electrode conductivity sensors)

Threaded type adaptor

Model	Product name
EA-20	Threaded type adaptor (for FES-125 sensor); Material: PVC
EA-40	Threaded type adaptor (for FES-126 sensor); Material: PVDF

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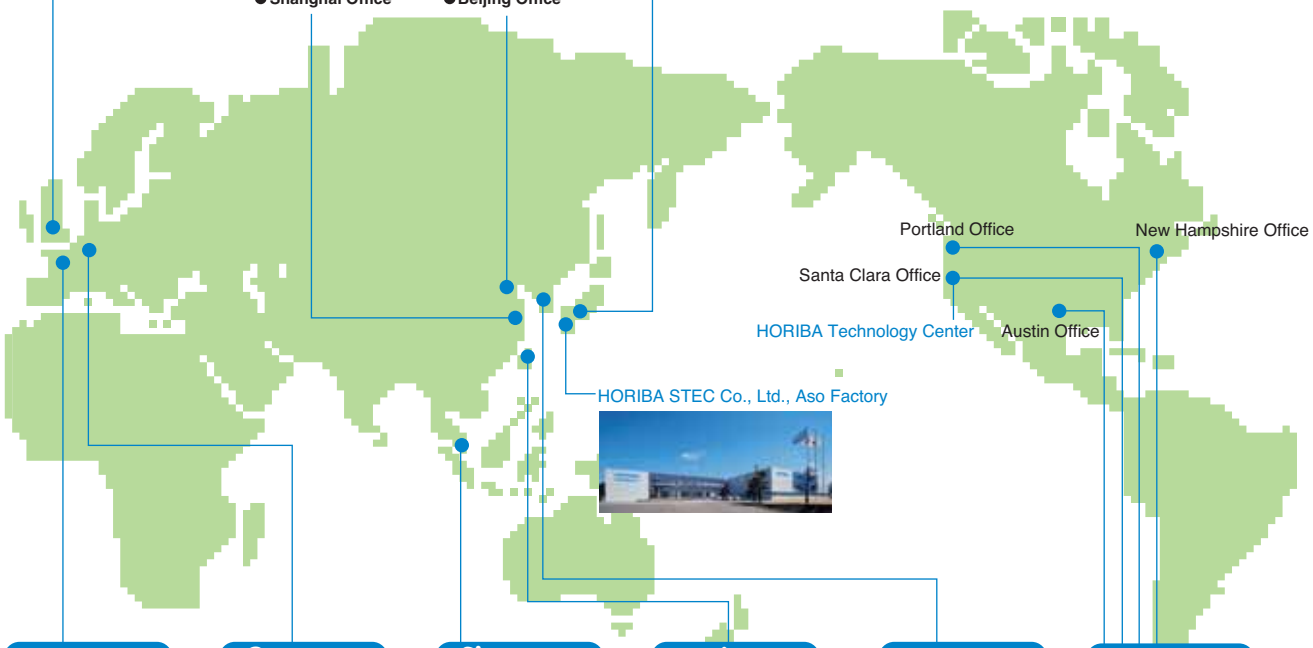


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