

# Inductive Conductivity Sensors

Conductivity

## Features and Benefits

### Wide Measuring Range

Hach's Inductive Conductivity Sensors measure from 0-200 up to 0-2,000,000 microSiemens/cm. A built-in Pt 1000 RTD compensates the measured conductivity for changes in process temperature.

### Low-maintenance Design

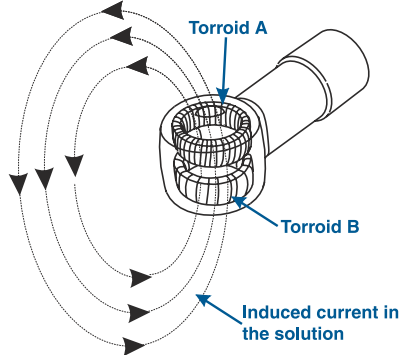
The inductive sensor design eliminates polarization and electrode coating problems that commonly affect conventional contacting electrode-type conductivity sensors.

### Complete Digital System

All 3700 sc sensors come complete with a Digital Gateway for use with the Hach sc100 Controller.

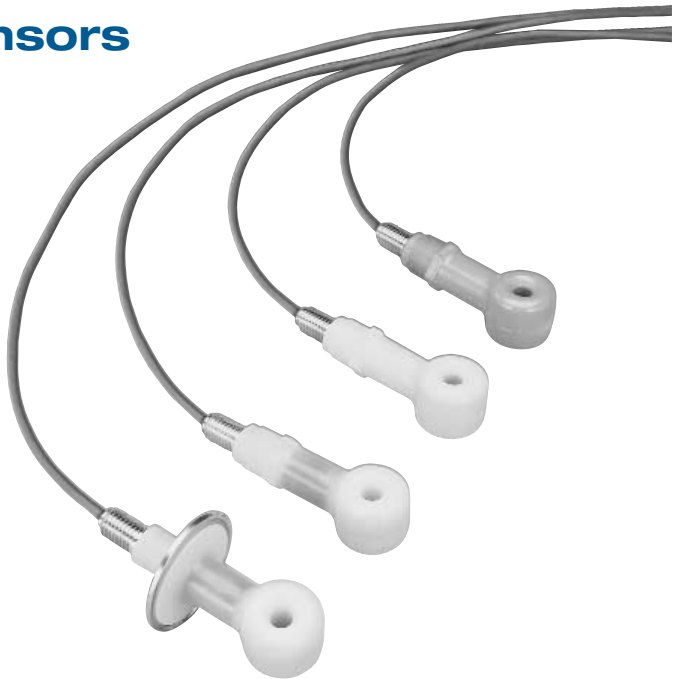
### Principal of Operation

Inductive conductivity sensors induce a low current in a closed loop of solution, then measure the magnitude of this current to determine the solution's conductivity. The conductivity analyzer drives Torroid A, inducing an alternating current in the solution. This current signal flows in a closed loop through the sensor bore and surrounding solution. Torroid B senses the magnitude of the induced current which is proportional to the conductance of the solution. The analyzer processes this signal and displays the corresponding reading.



### Versatile Mounting Styles

Sensors can be installed using a choice of four mounting styles—immersion, insertion, union, and sanitary. Please turn to page 6 for more information.



*The innovative technology of Hach's Inductive Conductivity Sensors eliminates polarization and electrode coating problems in harsh environments. Available in sanitary (CIP) flange style and convertible styles in PFA Teflon®, polypropylene, PEEK®, and PVDF.*



*Use the Digital Gateway to make any Hach analog conductivity sensor compatible with the Hach sc100 Controller.*

DW

WW

PW

IW

### Full Featured "Plug and Play" sc100 Digital Controller

There's no complicated wiring or set up procedures with the Hach sc100 controller. Just plug in any Hach digital sensor and it's ready to use—it's "plug and play."

**One or two sensors**—Use the sc100 Digital Controller to receive data from up to two Hach digital sensors in any combination.

**Communications**—Multiple alarm/control schemes are available using three relays and two PID control outputs. Communications use analog 4-20 mA and digital MODBUS®/RS485, MODBUS®/RS232 protocols. (Other digital protocols are available. Contact your Hach representative for details.) Every sc100 controller is equipped with wireless communication through an infrared port.

**Data logger**—A built-in data logger collects measurement data, calibration, verification points, and alarm history for up to 6 months.

DW = drinking water WW = wastewater municipal PW = pure water / power  
IW = industrial water E = environmental C = collections FB = food and beverage



Be Right™

## Specifications\*

### Measuring Range

From 0-200 microSiemens/cm up to 0-2,000,000 microSiemens/cm

### Operating Temperature Range

-10 to 200°C (14 to 392°F); limited only by sensor body material and mounting hardware; see below

### Flow Rate

3 m (10 ft.) per second, maximum

### Temperature Compensator

Pt 1000 RTD

### Sensor Cable

Polypropylene and PVDF Sensors:  
5 conductor (plus two isolated shields) cable with XLPE (cross-linked polyethylene) jacket; rated to 150°C (302°F); 6 m (20 ft.) long

PEEK® and PFA Teflon® Sensors:  
5 conductor (plus two isolated shields) cable with Teflon-coated jacket; rated to 200°C (392°F); 6 m (20 ft.) long

### Wetted Materials

Polypropylene, PVDF, PEEK® or PFA Teflon®

Model 3700 sc-series Material Compatibility

	Polypropylene	PVDF	PEEK®	Teflon®
Calcium Chloride		•	•	•
Hydrochloric Acid		•		•
Hydrofluoric Acid		•		•
Nitric Acid			•	•
Phosphoric Acid		•	•	•
Potassium Hydroxide	•		•	•
Seawater	•	•	•	•
Sodium Hydroxide	•		•	•
Sulfuric Acid				•
Water	•	•	•	•

NOTE: Compatibilities are valid for temperatures up to 115°C. For other applications or conditions, please contact Hach Technical Support.

### Temperature/Pressure Limits

Sensor Only (no hardware):

*Polypropylene*

6.9 bar at 100°C (100 psi at 212°F)

*PVDF*

6.9 bar at 120°C (100 psi at 248°F)

*PEEK®*

13.8 bar at 200°C (200 psi at 392°F)

*PFA Teflon®*

13.8 bar at 200°C (200 psi at 392°F)

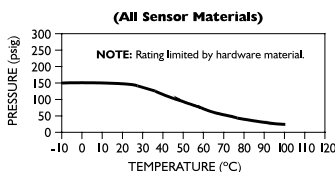
### Temperature/Pressure Limits (continued)

Sensor with Hardware:

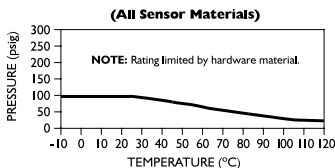
*Immersion and Union†*

See graphs below for specific Hach sensor and mounting hardware combinations

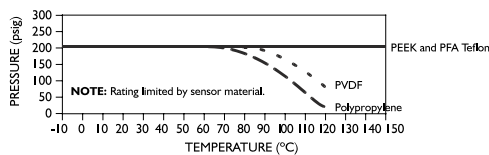
#### CPVC Mounting Hardware



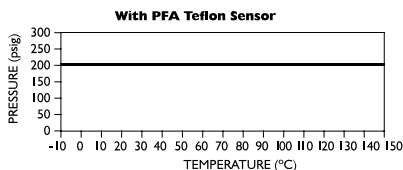
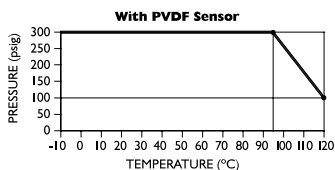
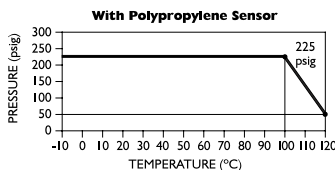
#### PVDF Mounting Hardware



#### 316 Stainless Steel Mounting Hardware



#### 304 Stainless Steel Sanitary Mounting Hardware††



†Ratings for the above Hach sensor and mounting hardware combinations are based upon water service. More severe service may require a correction factor.

††Sanitary hardware ratings are for MH018S8SZ hardware. Other hardware and clamp combinations may reduce the listed ratings.

### Insertion Hardware only:

Temperature Range\*\*

MH118M9NZ

-5 to 95°C (23 to 203°F) supported or unsupported

MH138M9NZ

-5 to 80°C (23 to 176°F) unsupported if installed vertically; -5 to 95°C (23 to 203°F) when supported with bracket

Maximum Pressure\*\*

5.5 bar at 95°C (80 psig at 203°F)

3.5 bar at 90°C (50 psig at 194°F)

Wetted Materials

316 stainless steel, Teflon® valve seats, and Viton® O-rings

CPVC, brass, Teflon® valve seats, and Viton® O-ring seals

\*\*These sensor/hardware temperature and pressure ratings are limited by the hardware material, maximum pressure, and whether the assembly is supported or unsupported.

\*Specifications subject to change without notice.

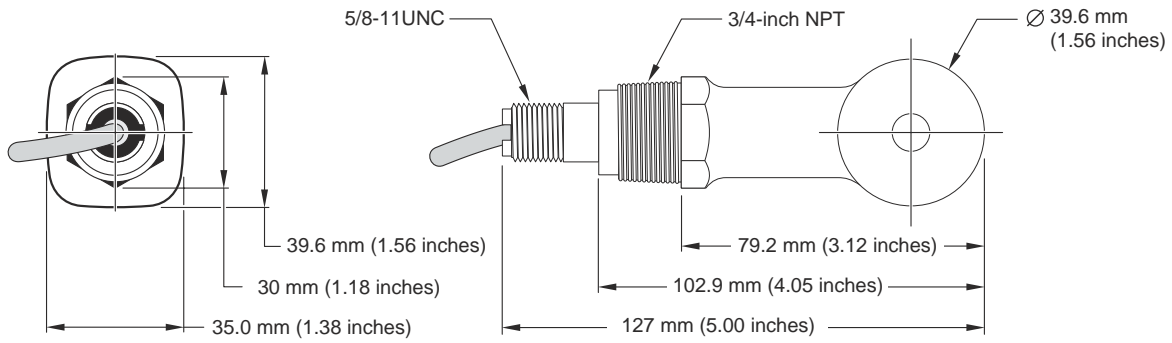
PEEK® is a registered Trademark of ICI Americas, Inc.; Teflon® is a registered Trademark of DuPont Co.; Viton® is a registered trademark of E.I. DuPont de Nemours + Co.

## Engineering Specifications

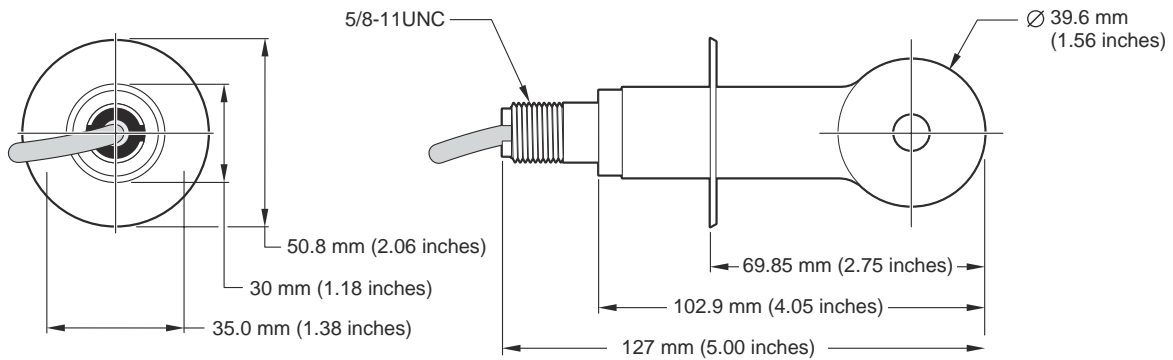
1. The electrodeless conductivity sensor shall measure from 0-200 to 0-2,000,000 microSiemens/cm, and shall have a built-in Pt 1000 RTD element to compensate measured conductivity for changes in process temperature.
2. The sensor shall be constructed of only one wetted body material which shall be polypropylene, PVDF, PEEK® or PFA Teflon®.
3. The sensor cable shall be water resistant and rated to 150°C (302°F) for polypropylene and PVDF sensors or 200°C (392°F) for PEEK® and PFA Teflon® sensors.
4. The sensor shall have a 1/2-inch nominal diameter bore for operation in slurries.
5. The sensor shall be a:
  - a) Convertible style that can be directly fastened onto the end of a pipe for immersion mounting or, by using a special Hach union-mount adapter, mounted into any 2-inch NPT fitting (tee, weldolet, pipe saddle, etc.). The convertible style sensor can also be insertion mounted into a 2-inch ball valve assembly.
  - b) Sanitary style with materials that conform to the provisions of 3-A Sanitary Standards to withstand CIP cleaning, and with an integral 2-inch sanitary-mount flange to mount into a standard 2-inch sanitary tee.
6. Sensor shall come complete with a digital gateway.
7. The sensor shall be Hach Company 3700 sc or 3700 Inductive Conductivity Sensor.

## Dimensions

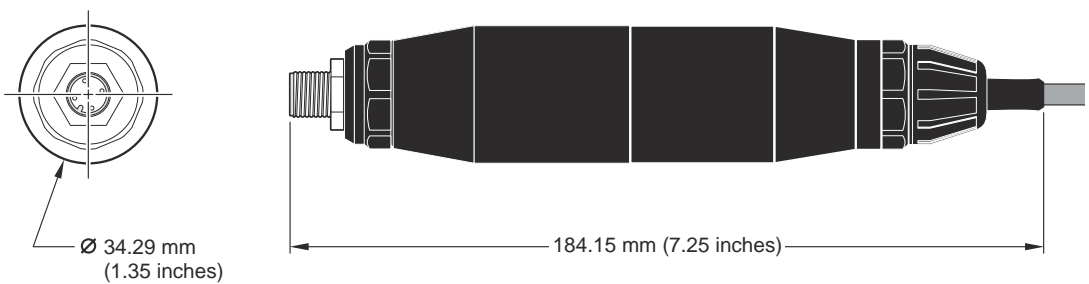
### Convertible Style



### Sanitary Style



### Digital Gateway



## Ordering Information

### 3700 sc Digital Inductive Conductivity Sensors

All digital inductive sensors come complete with standard sensor cable length of 6 m (20 ft.), digital gateway, and a 1 m (3.3 ft.) digital extension cable.

Choice of body styles:

- *Convertible – 2-inch NPT, designed for tee, other flow through, insertion, and pipe mountings for immersion.*
- *Sanitary (CIP) –2-inch flange, special cap, and EPDM compound gasket. Conforms to provisions of 3-A Sanitary Standards.*



<u>Product Number</u>	<u>Body Style</u>	<u>Body Material</u>
<b>D3705E2T</b>	Sanitary	Polypropylene
<b>D3706E2T</b>	Sanitary	PVDF
<b>D3708E2T</b>	Sanitary	PFA Teflon
<b>D3725E2T</b>	Convertible	Polypropylene
<b>D3726E2T</b>	Convertible	PVDF
<b>D3727E2T</b>	Convertible	PEEK
<b>D3728E2T</b>	Convertible	PFA Teflon

### Digital Gateway

**6120800** Use the Digital Gateway to connect analog Hach 3700 inductive conductivity sensors to the Hach sc100 digital controller

### 3700 Analog Inductive Conductivity Sensors

All Analog sensors come complete with standard sensor cable length of 6 m (20 ft.).

Choice of body styles:

- *Convertible – 2-inch NPT, designed for tee, other flow through, insertion, and pipe mountings for immersion.*
- *Sanitary (CIP) –2-inch flange, special cap, and EPDM compound gasket. Conforms to provisions of 3-A Sanitary Standards.*



<u>Product Number</u>	<u>Body Style</u>	<u>Body Material</u>
<b>3705E2T</b>	Sanitary	Polypropylene
<b>3706E2T</b>	Sanitary	PVDF
<b>3708E2T</b>	Sanitary	PFA Teflon
<b>3725E2T</b>	Convertible	Polypropylene
<b>3726E2T</b>	Convertible	PVDF
<b>3727E2T</b>	Convertible	PEEK
<b>3728E2T</b>	Convertible	PFA Teflon

### Accessories

#### Cables

Digital cables are used only with digital sensors or gateways when connecting to the sc100 digital controller.

- 6122400** Digital Extension Cable, 1 m (3.2 ft.)
- 5796000** Digital Extension Cable, 7.7 m (25 ft.)
- 5796100** Digital Extension Cable, 15 m (50 ft.)
- 5796200** Digital Extension Cable, 31 m (100 ft.)

Analog cables are used only with analog sensors, junction box, and controller.

- 1W1100** Analog Interconnect Cable (order per foot)

#### Digital Termination Box

Used with digital extension cables when the desired cable length between the digital sensor/digital gateway and sc100 controller is between 100 m (328 ft) and 1000 m (3280 ft).

- 5867000** Digital Termination Box

#### Analog Junction Box

Used with analog interconnect cable when the desired cable length between analog sensor and analog controller is greater than the standard length of sensor cable. Each junction box includes terminal strip and gasket.

- 60A2053** Junction Box, Surface-mount, aluminum (includes mounting hardware)
- 60A9944** Junction Box, Pipe-mount, PVC for 1/2-inch diameter pipe (includes mounting hardware)
- 60G2052** Junction Box, Pipe-mount, PVC for 1-inch diameter pipe (includes mounting hardware)
- 76A4010-001** Junction Box, NEMA 4X (no mounting hardware included)

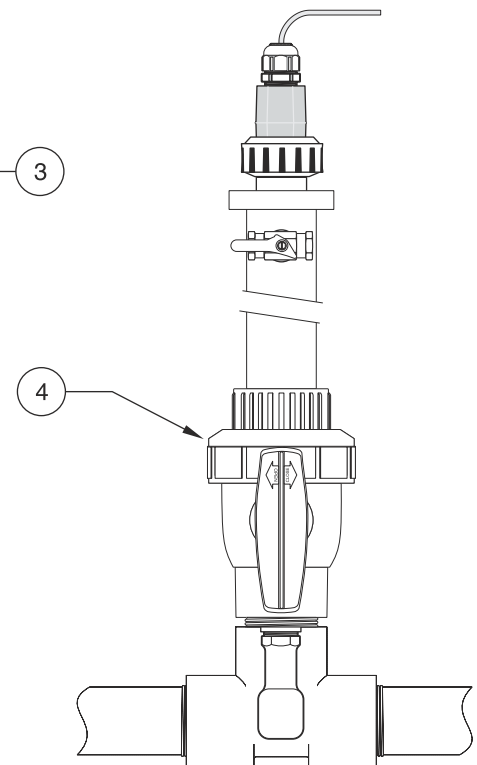
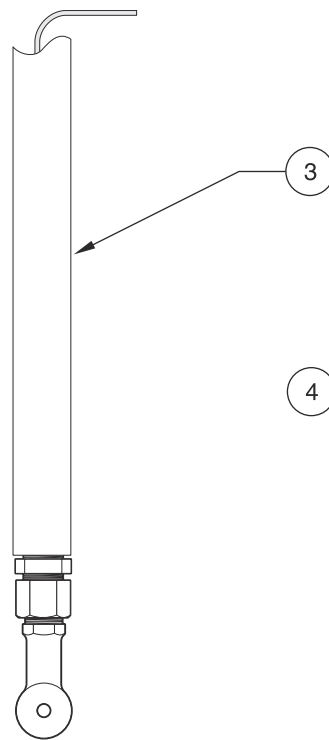
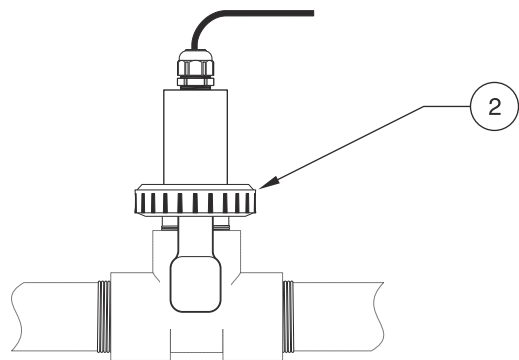
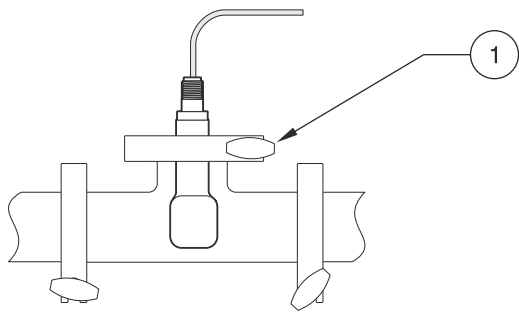
### Conductivity Reference Solutions

Please specify the desired conductivity value when placing your order.

<u>Product Number</u>	<u>Description</u>	<u>Volume</u>
<b>25M3A2000-119</b>	100-1000 $\mu\text{S}/\text{cm}$	1 liter
<b>25M3A2050-119</b>	1000-2000 $\mu\text{S}/\text{cm}$	1 liter
<b>25M3A2100-119</b>	2000-150,000 $\mu\text{S}/\text{cm}$	1 liter
<b>25M3A2200-119</b>	200,000-300,000 $\mu\text{S}/\text{cm}$	1 liter

## Ordering Information *continued*

### Mounting Hardware



1. Sanitary Style sensor  
sanitary clamp mounting

2. Convertible Style sensor  
union mounting

3. Convertible Style sensor  
immersion mounting

4. Convertible Style sensor  
ball valve mounting

#### Sanitary Mount

**MH018S8SZ** 316SS  
Includes 316 SS sanitary 2-inch tee, heavy-duty clamp, special cap, and EPDM compound gasket.

#### Union Mount

**MH518N3NZ** 316 SS  
**MH538N3NZ** CPVC  
**MH568N3NZ** PVDF  
Includes adapter and a 2-inch pipe tee. Union adapters are used with convertible style sensors that are to be union or flange mounted into a standard 2-inch NPT pipe tee or insertion mounted into a 2-inch ball valve assembly.

#### Immersion Mount

**MH432G** CPVC Pipe  
**MH462G** PVDF Pipe  
Includes 1/2-inch diameter x 4-foot pipe, 1/2- x 3/4-inch NPT coupling, and plastic pipe-mount junction box with terminal strip.

#### Insertion Mount

**MH138M9NZ** CPVC  
**MH118M9NZ** 316 SS  
Includes 2-inch NPT insertion assembly with ball valve.

## Common Applications

Refer to page 2 for sensor temperature and pressure limits.

Industry	Application	Recommended Sensor Style (and Material)
Metals Finishing and Mining	Plating bath monitoring Alkaline/caustic wash Rinse water Pickling processes Metals recovery Copper floatation Scrubbers	Convertible (polypropylene) Convertible (polypropylene) Convertible (polypropylene) Convertible (PVDF) Convertible (PEEK) Convertible (PEEK) Convertible (polypropylene)
Chemicals and Refining	Acid production Caustic production Phosphates Fertilizers Detergents Glycerin Moisture detection Scrubbers Wastewater Oil well drilling mud Leak detection Alkylation Spill detection	Convertible (PFA Teflon) Convertible (PFA Teflon) Convertible (PFA Teflon) Convertible (PFA Teflon) Convertible (PFA Teflon) Convertible (PVDF) Convertible (PVDF or PFA Teflon) Convertible (PVDF) Convertible (PVDF) Convertible (PEEK) Convertible (PEEK) Convertible (PFA Teflon) Convertible (PEEK)
Food and Beverage	Brine concentration Desalting Cheese production Caustic peeling Pickle making CIP applications Rinse water control Sugar carbonation	Convertible (polypropylene) Convertible (polypropylene) Sanitary (PFA Teflon) Convertible (PFA Teflon) Sanitary (polypropylene) Sanitary (PFA Teflon) Convertible (polypropylene) Convertible (PFA Teflon)
Pulp and Paper	White, black and green liquor Stock washing Wash and cooking liquor control Scrubbers Spill detection	Convertible (PEEK) Convertible (PEEK) Convertible (PEEK) Convertible (PEEK) Convertible (PEEK)
Textile Manufacturing	Rinse water Dye baths Bleaching Mercerizing Acid washing Carbonizing and scouring baths	Convertible (polypropylene) Convertible (polypropylene) Convertible (polypropylene) Convertible (polypropylene) Convertible (polypropylene) Convertible (polypropylene)
Natural Waters, Lakes, Streams, and Sea Water	Water pollution monitoring Salt intrusion Salinity	Convertible (polypropylene) Convertible (polypropylene) Convertible (polypropylene)
Clean Water Treatment	Ion exchange regeneration Reverse osmosis concentrate monitoring Softener regeneration Acid/caustic concentration control	Convertible (polypropylene) Convertible (polypropylene) Convertible (polypropylene) Convertible (PVDF)
Wastewater Treatment	Acid/caustic concentration control Spill detection	Convertible (PEEK) Convertible (PEEK)
Steam Generation	Boiler blowdown Flue gas scrubbers	Convertible (polypropylene) Convertible (polypropylene)



## To complete your conductivity measurement system, choose the sc100 or the sc1000 controller...

### Model sc100 Controller

(see Lit. #2463)

- LXV401.52.00002** sc100 Controller Standard  
**LXV401.52.01002** sc100 Controller with RS-232 MODBUS®  
**LXV401.52.02002** sc100 Controller with RS-485 MODBUS®



### Model sc1000 Controller

(see Lit. #2403)

- LXV402.99.00002** sc1000 Display Module  
**LXV400.99.1R572** sc1000 Probe Module, 4 sensors, 4 mA Out, 4 mA In, 4 Relays, 110-230V  
**LXV400.99.1B572** sc1000 Probe Module, 4 sensors, 4 mA Out, 4 mA In, 4 Relays, RS-485 (MODBUS), 110-230V  
**LXV400.99.1F572** sc1000 Probe Module, 4 sensors, 4 mA Out, 4 mA In, 4 Relays, PROFIBUS DP, 110-230V  
**LXV400.99.1R582** sc1000 Probe Module, 6 sensors, 4 mA Out, 4 mA In, 4 Relays, 110-230V



*At Hach, it's about learning from our customers and providing the right answers. It's more than ensuring the quality of water—it's about ensuring the quality of life. When it comes to the things that touch our lives...*

*Keep it pure.*

*Make it simple.*

*Be right.*

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 U.S.A.  
 Telephone: 800-227-4224  
 Fax: 970-669-2932  
 E-mail: [orders@hach.com](mailto:orders@hach.com)  
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 U.S.A.  
 Telephone: 970-669-3050  
 Fax: 970-461-3939  
 E-mail: [intl@hach.com](mailto:intl@hach.com)  
**[www.hach.com](http://www.hach.com)**

*In Europe, the Middle East, and Mediterranean Africa, contact:*

HACH + LANGE Europe  
 Dr. Bruno Lange GmbH & Co. KG  
 Willstätterstraße 11  
 D-40549 Düsseldorf  
 GERMANY  
 Tel: +49 (0) 211 5288-0  
 Fax: +49 (0) 211 5288-143  
 E-mail: [info@hach-lange.de](mailto:info@hach-lange.de)  
**[www.hach-lange.com](http://www.hach-lange.com)**

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