

Inductive Conductivity Sensors

Conductivity

Features and Benefits

Wide Measuring Range

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

Low-maintenance Design

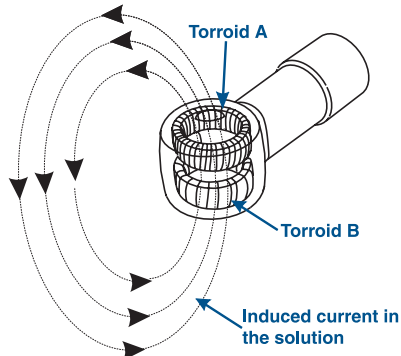
The inductive sensor design eliminates polarization and electrode coating problems that commonly affect conventional contacting electrode-type conductivity sensors.

Complete Digital System

All 3700 sc sensors come complete with a Digital Gateway for use with a Hach sc Digital 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, polypropylene, PEEK®, and PVDF.

DW

WW

PW

IW

Full-Featured "Plug and Play" Hach sc Digital Controllers

There are no complicated wiring or set up procedures with any Hach sc controller. Just plug in any combination of Hach digital sensors and it's ready to use—it's "plug and play."

One or multiple sensors—The sc controller family allows you to receive data from up to eight Hach digital sensors in any combination using a single controller.

Communications—Multiple alarm/control schemes are available using the relays and PID control outputs. Available communications include analog 4-20 mA, digital MODBUS® (RS485 and RS232) or Profibus DP protocols. (Other digital protocols are available. Contact your Hach representative for details.)

Data logger—A built-in data logger collects measurement data, calibration, verification points, and alarm history.

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

DASTECS S.R.L.

Distribuidores Autorizados

Buenos Aires, Argentina

Tel.: (54-11) 5352-2500

E mail: info@dastecsrl.com.ar

Web: www.dastecsrl.com.ar



Be Right™

Specifications*

Measuring Range

From 200 microSiemens/cm up to 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 Sensors:
5 conductor (plus two isolated shields) cable with PFA-coated jacket; rated to 200°C (392°F); 6 m (20 ft.) long

Wetted Materials

Polypropylene, PVDF, PEEK® or PFA

Model 3700 sc-series Material Compatibility

	Polypropylene	PVDF	PEEK®	PFA
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

13.8 bar at 200°C (200 psi at 392°F)

Temperature/Pressure Limits (continued)

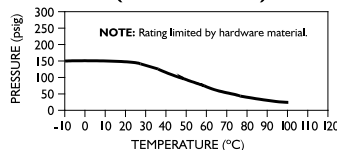
Sensor with Hardware:

Immersion and Union†

See graphs below for specific Hach sensor and mounting hardware combinations

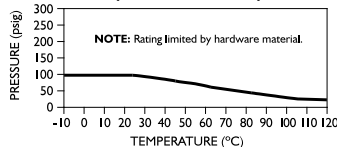
CPVC Mounting Hardware

(All Sensor Materials)

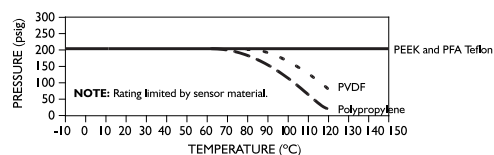


PVDF Mounting Hardware

(All Sensor Materials)

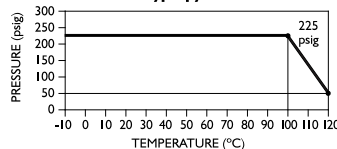


316 Stainless Steel Mounting Hardware

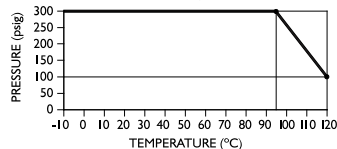


304 Stainless Steel Sanitary Mounting Hardware††

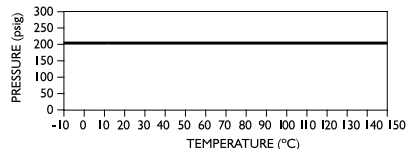
With Polypropylene Sensor



With PVDF Sensor



With PFA Teflon Sensor



†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, PFA valve seats, and Viton® O-rings

CPVC, brass, PFA 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.

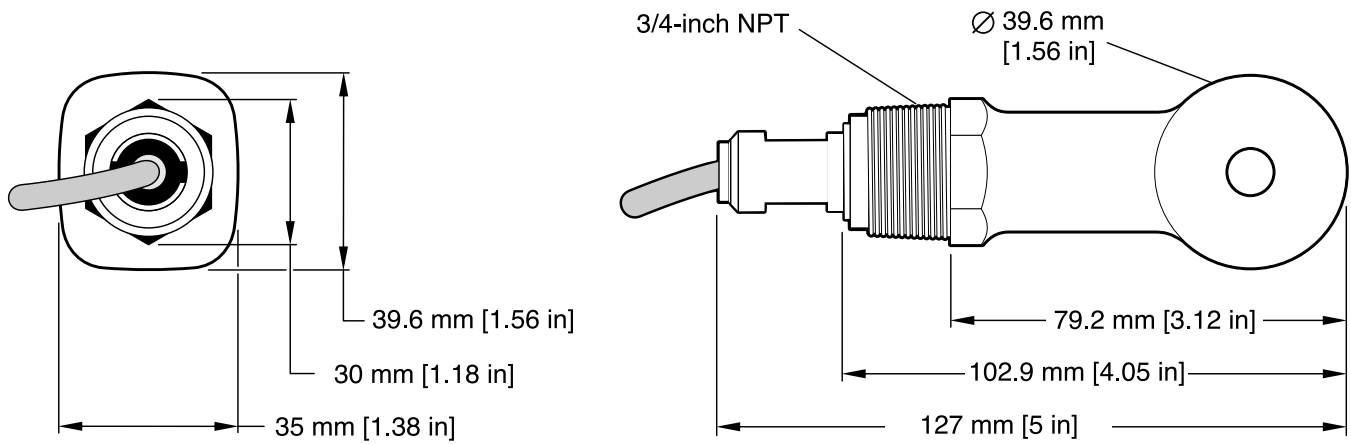
PEEK® is a registered Trademark of ICI Americas, Inc.; Viton® is a registered trademark of E.I. DuPont de Nemours + Co.

Engineering Specifications

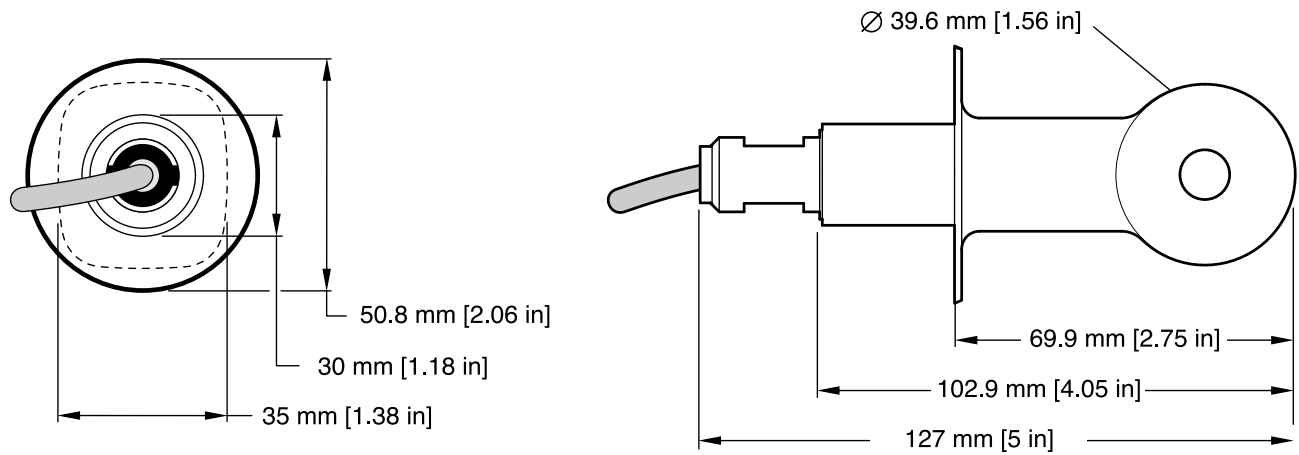
1. The electrodeless conductivity sensor shall measure from 0-200 to 0-2,000,000 microSiemens/cm, and shall have a built-in Pt 1000 RTD element to compensate measured conductivity for changes in process temperature.
2. The sensor shall be constructed of only one wetted body material which shall be polypropylene, PVDF, PEEK® or PFA.
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 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. An optional sensor module or Digital Gateway shall be available for connecting to a Hach sc Digital Controller.
7. The sensor shall be Hach Company 3700 sc or 3700 Inductive Conductivity Sensor.

Dimensions

Convertible Style



Sanitary Style



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>
D3705E2T	Sanitary	Polypropylene
D3706E2T	Sanitary	PVDF
D3708E2T	Sanitary	PFA
D3725E2T	Convertible	Polypropylene
D3726E2T	Convertible	PVDF
D3727E2T	Convertible	PEEK
D3728E2T	Convertible	PFA

Digital Gateway

6120800 Use the Digital Gateway to connect analog Hach 3700 inductive conductivity sensors to the Hach sc1000 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>
3705E2T	Sanitary	Polypropylene
3706E2T	Sanitary	PVDF
3708E2T	Sanitary	PFA
3725E2T	Convertible	Polypropylene
3726E2T	Convertible	PVDF
3727E2T	Convertible	PEEK
3728E2T	Convertible	PFA

Accessories

Cables

Digital cables are used only with digital sensors or gateways when connecting to a Hach sc 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 sc Digital 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)

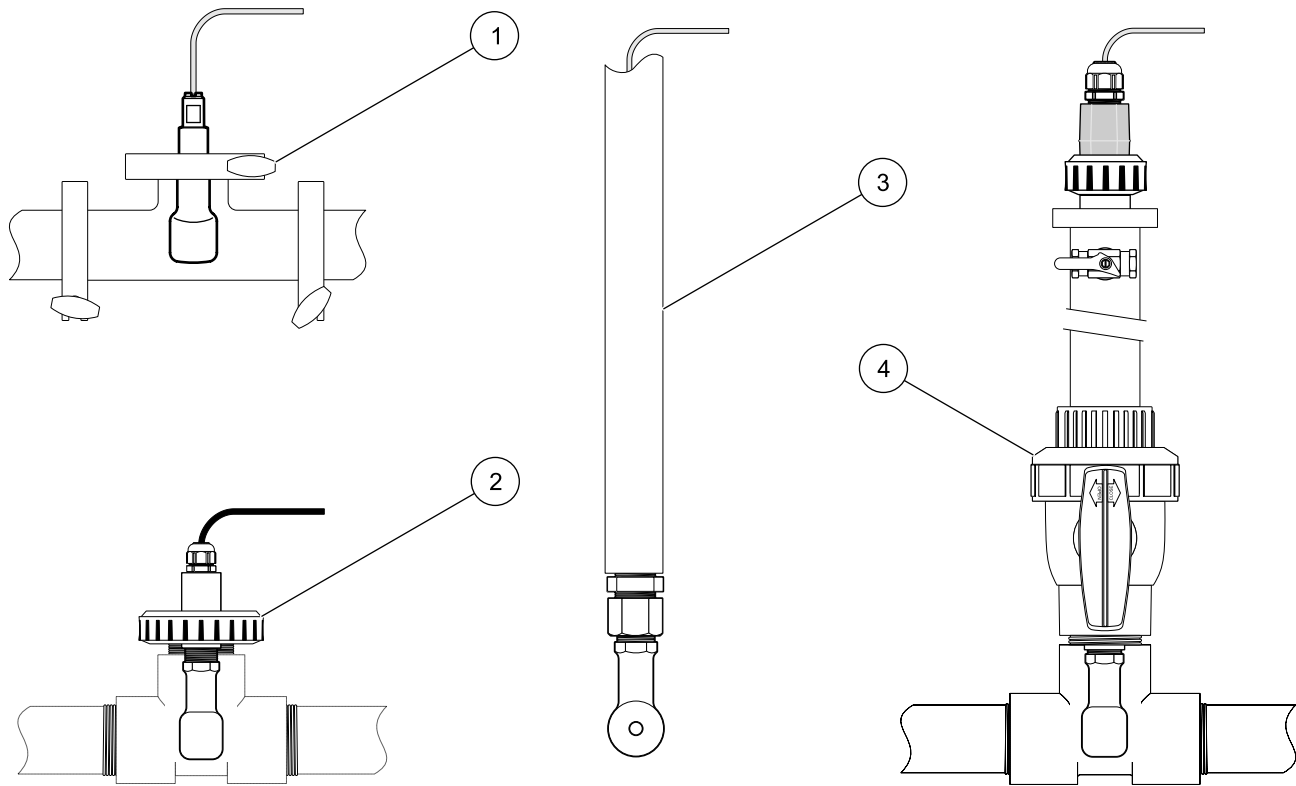
Conductivity Reference Solutions

Please specify the desired conductivity value when placing your order.

<u>Product Number</u>	<u>Description</u>	<u>Volume</u>
25M3A2000-119	100-1000 $\mu\text{S/cm}$	1 liter
25M3A2050-119	1000-2000 $\mu\text{S/cm}$	1 liter
25M3A2100-119	2000-150,000 $\mu\text{S/cm}$	1 liter
25M3A2200-119	200,000-300,000 $\mu\text{S/cm}$	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
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) Convertible (PFA) Convertible (PFA) Convertible (PFA) Convertible (PFA) Convertible (PVDF) Convertible (PVDF or PFA) Convertible (PVDF) Convertible (PVDF) Convertible (PEEK) Convertible (PEEK) Convertible (PFA) 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) Convertible (PFA) Sanitary (polypropylene) Sanitary (PFA) Convertible (polypropylene) Convertible (PFA)
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 from these Hach controllers...

Model sc200 Controller

(see Lit. #2665)

The sc200 controller platform can be configured to operate either 2 Digital Sensor Inputs, or 1 or 2 Analog Sensor Inputs, or a combination of Digital and Analog Sensor Inputs. Customers may choose their communication options from a variety of offerings ranging from MODBUS RTU to Profibus DPV1.

sc200 for Hach Digital Sensors

LXV404.99.00552	sc200 controller, 2 channel, digital
LXV404.99.00502	sc200 controller, 1 channel, digital
LXV404.99.00542	sc200 controller, 2 channel, digital & mA input
LXV404.99.00512	sc200 controller, 2 channel, digital & pH/DO
LXV404.99.00522	sc200 controller, 2 channel, digital & Conductivity
LXV404.99.00532	sc200 controller, 2 channel, digital & Flow

sc200 for Hach Analog Sensors

LXV404.99.00102	sc200 controller, 1 channel, pH/DO
LXV404.99.00112	sc200 controller, 2 channel, pH/DO
LXV404.99.00202	sc200 controller, 1 channel, Conductivity
LXV404.99.00222	sc200 controller, 2 channel, Conductivity
LXV404.99.00212	sc200 controller, 2 channel, pH/DO & Conductivity
LXV404.99.00302	sc200 controller, 1 channel, Flow
LXV404.99.00332	sc200 controller, 2 channel, Flow
LXV404.99.00312	sc200 controller, 2 channel, Flow & pH/DO
LXV404.99.00322	sc200 controller, 2 channel, Flow & Conductivity

Note: Other sensor combinations are available. Please contact Hach Technical Support or your Hach representative.

Note: Communication options (MODBUS and Profibus DPV1) are available.

Model sc1000 Controller

(see Lit. #2403)

Each sc1000 Probe Module provides power to the system and can accept up to 8 digital sensors/expansion boards. Probe Modules can be networked together to accommodate up to 32 digital sensors/expansion boards attached to the same network.

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

si792 2-wire Transmitter (for 3700 Analog Inductive Conductivity Sensors)

(see Lit. #2605)

The Hach si792 2-wire electrochemistry transmitters are full-featured, intuitive to operate, and work with Hach's world-class water quality sensors. Rugged construction is designed for Class I, Division 2 (C1, D2) respectively Class I, Division 1 (C1, D1) application. Digital communication capabilities are available.

LXV503.99.70002	si792 E; Class 1 Division 2; HART
LXV503.99.70102	si792x E; Class 1 Division 1; HART
LXV503.99.76102	si792x E-PA; Class 1 Division 1; PROFIBUS PA
LXV503.99.77102	si792x E-FF; Class 1 Division 1; FOUNDATION FIELDBUS

LIT2465 Rev 3

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In the interest of improving and updating its equipment, Hach Company reserves the right to alter specifications to equipment at any time.

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.

For current price information, technical support, and ordering assistance, contact the Hach office or distributor serving your area.

In the United States, contact:

HACH COMPANY World Headquarters
P.O. Box 389
Loveland, Colorado 80539-0389
U.S.A.
Telephone: 800-227-4224
Fax: 970-669-2932
E-mail: orders@hach.com
www.hach.com

U.S. exporters and customers in Canada, Latin America, sub-Saharan Africa, Asia, and Australia/New Zealand, contact:

HACH COMPANY World Headquarters
P.O. Box 389
Loveland, Colorado 80539-0389
U.S.A.
Telephone: 970-669-3050
Fax: 970-461-3939
E-mail: intl@hach.com
www.hach.com

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

HACH LANGE GmbH
Willstätterstraße 11
D-40549 Düsseldorf
GERMANY
Tel: +49 (0) 211 5288-0
Fax: +49 (0) 211 5288-143
E-mail: info@hach-lange.de
www.hach-lange.com

DASTEC S.R.L.

Distribuidores Autorizados

Buenos Aires, Argentina

Tel.: (54-11) 5352-2500

E mail: info@dastecsr.com.ar

Web: www.dastecsr.com.ar



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