# TSS sc Suspended Solids Family of Sensors



*TSS sc probes measure online suspended solids from spring water to corrosive chemicals under the strictest regulatory conditions. With twelve different versions, it is possible to measure Suspended Solids over a wide range of concentrations with just one sensor.*

## Features and Benefits

### One Family for All Applications

With twelve instrument versions and thirty different mounting styles, the Hach TSS sc probes can measure on-line Suspended Solids in virtually all applications under the strictest regulatory conditions.

**TSS sc and TSS W sc** probes are made of polished stainless steel with a scratch resistant and easy to clean sapphire window design to withstand harsh environments and keep particles from sticking to the surface. For high solids environments, the Hach TSS W sc is equipped with a wiper to maintain accuracy.

**TSS HT sc** optics and electrical systems are coated with a special material to withstand operating temperatures of 90°C and pressures of up to 10 Bar. The ability to withstand these conditions without the hassle of flow-through cells or cooling lines makes it the probe of choice for process control.

**TSS XL sc and TSS VARI sc** probes have been specially designed for measurement of Suspended Solids under the high hygienic requirements of the food, beverage, and pharmaceutical industry. An aseptic process connection is achieved with the installation of the Varivent® or XL in-line-housing and the acid, alkali-proof, and high temperature stable materials facilitate the use of the probe under CIP conditions.

**TSS TITANIUM sc** is the only titanium suspended solids probe in the market designed to provide process control in the most difficult environments. While offering the same high quality measuring properties as the TSS sc, its special titanium body enables it to perform in the most extreme applications.

**TSS EX1 sc** probes have been designed for measurement in hazardous locations with Class I Div 2 requirements. Depending on the application, it is possible to select either an immersion style or insertion style probe.

### Two Parameters in One Instrument

The Hach TSS sc probes can measure both on-line Suspended Solids and Turbidity in one instrument. This flexibility enables the measurement of both parameters under the same application.

### Method of Detection

The Hach TSS sc probes have a double optical system with two pulsating infrared LEDs and four receivers. As the transmitted light is scattered, the receivers pick up the incident light at 90° and 120° angles effectively doubling the accuracy of the instrument. This eight channel measurement system, with an integrated bubble and temperature compensating software, enables the instrument to have a wide measuring range that effectively covers most applications, from the darkest pre-treated water to the freshest of spring waters, with one instrument.

IW

FB

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

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### Stainless Steel

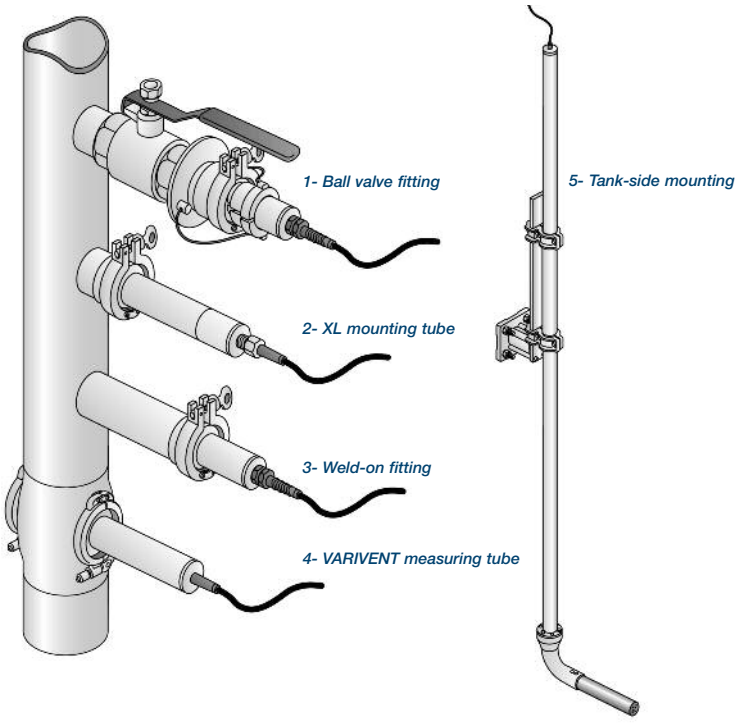
| | Description | Type of Mounting |
|---|---|---|
| **TSS sc** | All purpose standard probe for Suspended Solids measurement. | Tank-side mounting - 5 |
| **TSS sc TriClamp** | All purpose probe with TriClamp. | Weld-on fitting - 3 |
| **TSS sc In-line** | All purpose probe for simple in-line installation. | Ball valve fitting - 1 |
| **TSS W sc** | Same performance and functionality as the TSS sc but with a wiper for use in high solids environments. | Tank-side mounting - 5 |
| **TSS W sc TriClamp** | TSS W probe with TriClamp. | Weld-on fitting - 3 |
| **TSS W sc In-line** | Standard probe with wiper for simple in-line installation. | Ball valve fitting - 1 |
| **TSS HT sc** | Suspended Solids probe for use in high temperature environments of up to 90 °C and 95 °C for short intervals. | Tank-side mounting - 5 |
| **TSS HT sc TriClamp** | High temperature probe with TriClamp. | Weld-on fitting - 3 |
| **TSS HT sc In-line** | High temperature probe for simple in-line installation. | Ball valve fitting - 1 |
| **TSS VARI sc** | Suspended Solids probe with flush installation for use in food, pharmaceutical sectors, or in any VARIVENT industrial environment. | VARIVENT measuring tube - 4 |
| **TSS XL sc** | Suspended Solids probe designed for use in the beverage and food industries. | XL measuring tube - 2 |
| **TSS EX1 sc** | Suspended Solids and Turbidity probe designed for use in hazardous locations (Class I Div 2). | Tank-side mounting - 5 |
| **TSS EX1 sc TriClamp** | Suspended Solids and Turbidity probe designed for use in hazardous locations (Class I Div 2). | Weld-on fitting - 3 |
| **TSS EX1 sc In-line** | Class I Div 2 certified probe for simple in-line installation. | Ball valve fitting - 1 |

### Titanium

| | Description | Type of Mounting |
|---|---|---|
| **TSS TITANIUM2 sc** | Suspended Solids probe for use in aggressive or corrosive environments. | User defined |
| **TSS TITANIUM2 sc TriClamp** | Titanium2 probe with TriClamp for simple inline installation and quick access for maintenance. | User defined |
| **TSS TITANIUM7 sc** | Suspended Solids probe for use brine, seawater, or high salinity environments. | User defined |
| **TSS TITANIUM7 sc TriClamp** | Titanium7 probe with TriClamp for simple inline installation and quick access for maintenance | User defined |

## Types of Mounting

Whether tank-side mounting, inline installation, or hygienic fittings are required, the TSS sc family of probes has suitable mounting solution for any situation.



## Specifications*

### Measurement Method
Combined multiple beam alternating light method with infrared diode system and beam focusing
*Turbidity (TRB):* 2-channel 90° scattered light measurement in accordance with DIN/EN 27027/ISO 7027, wavelength = 860 nm
*Solids (TS):* 90° and 120° scattered light measurement, wavelength = 860 nm

### Hazardous Locations
TSS EX1 sc Class I Div 2 certified

### Measuring Range
*Turbidity (TRB):* 0.001 to 4,000 FNU
*Solids (TS):* 0.001 to 500 g/L
With $SiO_2$ standard solution

### Measurement Accuracy
Turbidity (TRB): Up to 1,000 FNU/NTU: <5% of measured value ±0.01 FNU/NTU

### Reproducibility
*Turbidity (TRB):* <3%
*Solids (TS):* <4%

### Response Time
1 s < T90 < 300 s (adjustable)

### Calibration
*Turbidity (TRB):* Factory calibrated
*Solids (TS):* To be calibrated by customer on site
Zero point: Permanently calibrated in the factory

### Pressure Range
*<6 bar:* TSS W sc
*<10 bar:* TSS sc, TSS HT sc, TSS TITANIUM2 sc, TSS TITANIUM2 sc
*<16 bar:* TSS VARI sc, TSS XL sc
*<=10 bar:* TSS EX1 sc

### Flow rate
3 m/s maximum

### Ambient Temperature
*0 to 50°C:* TSS W sc
*0 to 60°C:* TSS sc, TSS TITANIUM2 sc, TSS TITANIUM7 sc
*0 to 80°C:* TSS VARI sc, TSS XL sc
*0 to 90°C*: TSS HT sc
*0 to 50°C:* TSS EX1 sc

### Dimensions
*Basin Sensor:* D×L 40 × 330 mm
*TSS EX1 sc:* D×L 48.5 mm × 385 mm
*Inline Sensor (TriClamp):* D×L 40 × 332 mm
*TSS VARI sc, TSS XL sc:* D×L 40 × 232 mm

### Weight
*Tank Sensor, Inline Sensor (TriClamp):* Approx. 1.6 kg
*TSS EX1 sc:* Approx. 2.7 kg
*TSS VARI sc, TSS XL sc:* Approx. 1.5 kg

**Specifications subject to change without notice.*

## Engineering Specifications

1. The suspended solids and/or turbidity sensor shall consist of a digital sensor designed to connect to a universal controller.
2. The suspended solids and/or turbidity sensor shall use a double optical system with two pulsating infrared LEDs and four receivers effectively doubling the accuracy of the instrument.
3. As the transmitted light is scattered, the receivers pick up the incident light at 90° and 120° angles for suspended solids and at 90° for turbidity in accordance with DIN/EN 27027/ISO 7027. The wavelength for both parameters is 860nm.
4. The eight channel measurement system, with a integrated bubble and temperature compensating software enables the instrument to have a wide measuring range that effectively cover most applications, from the darkest pre-treated water to the freshest of spring waters, with one instrument.
5. All versions have a high polished head to use the self cleaning effect and scratch-resistant sapphire window to withstand harsh environments
6. All sensors shall be capable of immersion in a tank or insertion into a pipe depending on the sensor selection.
7. The materials of construction shall be stainless steel or titanium, depending on the sensor selection.
8. The sensor shall have an operating range of 0.001 to 400 g/L for suspended solids and 0.001 to 4000 NTU for turbidity depending.
9. The sensor shall have an operating temperature from >0–50°C–90°C depending on the model.
10. The initial response time shall be 1 second and user-adjustable up to 300 seconds.
11. Up to 1000 FNU/NTU the accuracy shall be less than 5% of measurement value reading or ±0.01 FNU/NTU, whichever is greater for turbidity.

## Ordering Information

### TSSsc Turbidity and Suspended Solids Sensors

*Immersion in Open Tanks Applications*

| | | |
|---|---|---|
| **LXV323.99.10002** | TSS sc | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) without wiper |
| **LXV324.99.10002** | TSS W sc | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) with wiper |
| **LXV325.99.10002** | TSS HT sc | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) without wiper |
| **LXV329.99.10002** | TSS TITANIUM2 sc | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) without wiper |
| **LXV330.99.10002** | TSS TITANIUM7 sc | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) without wiper |
| **LXV328.99.10002** | TSS EX1 sc | Turbidity and Suspended Solids for hazardous locations (Class I Div 2) |

*TriClamp Applications*

| | | |
|---|---|---|
| **LXV323.99.20002** | TSS sc TriClamp | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) without wiper |
| **LXV324.99.20002** | TSS W sc TriClamp | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) with wiper |
| **LXV325.99.20002** | TSS HT sc TriClamp | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) without wiper |
| **LXV329.99.20002** | TSS TITANIUM2 sc TriClamp | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) without wiper |
| **LXV330.99.20002** | TSS TITANIUM7 sc TriClamp | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) without wiper |
| **LXV328.99.20002** | TSS EX1 sc TriClamp | Turbidity and Suspended Solids for hazardous locations (Class I Div 2) |
| **LXV326.99.10002** | TSS VARI sc | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) without wiper |
| **LXV327.99.10002** | TSS XL sc TriClamp | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) without wiper |

*Inline Applications*

| | | |
|---|---|---|
| **LXV323.99.30002** | TSS sc Inline | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) without wiper |
| **LXV324.99.30002** | TSS W sc Inline | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) with wiper |
| **LXV325.99.30002** | TSS HT sc Inline | Turbidity and Suspended Solids (0.001-4,000 FNU & 0.001-500 g/L) without wiper |
| **LXV328.99.30002** | TSS EX1 sc Inline | Turbidity and Suspended Solids for hazardous locations (Class I Div 2) without wiper |

*Continued on next page.*

## Ordering Information *continued*

### Accessories

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|---|---|
| **LZY634** | Wiper set TSS sc (for 5 changes with screws and screwdriver) |
| **LZY635** | Maintenance set wiper (consisting of wiper, wiper axis 2-parts and gaskets) |
| **LZY653** | Gasket Silicon for TriClamp mounting |
| **LZY654** | Gasket PTFE for TriClamp mounting |
| **LZY655** | Gasket FPM for TriClamp mounting |
| **LZY656** | Clamp 2-parts, with screw type clamp for TriClamp mounting |
| **LZY657** | Clamp 3-parts, with screw type clamp for TriClamp mounting (to use with PTFE gasket) |

### Mounting Hardware for All TSS sc InSitu Probes

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|---|---|
| **LZX414.00.10000** | Standard mounting hardware for all TSS sc InSitu probes |

### Mounting Hardware for All TSS sc InLine Probes

*Ball Valves**

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|---|---|
| **LZY630.00.10000** | Ball valve armature for TSS sc, TSS W sc and TSS HT sc Inline probes including non-coped stainless steel welding flange LZX660 |
| **LZY630.00.11000** | Ball valve armature for TSS sc, TSS W sc and TSS HT sc Inline probes including non-coped carbon steel welding flange LZX661 |
| **LZY630.00.12000** | Ball valve armature for TSS sc, TSS W sc and TSS HT sc Inline probes without welding flange |
| **LZY630.00.20000** | Ball valve armature for TSS EX1 sc Inline probe including non-coped stainless steel welding flange LZX660 |
| **LZY630.00.21000** | Ball valve armature for TSS EX1 sc Inline probe including non-coped carbon steel welding flange LZX661 |
| **LZY630.00.22000** | Ball valve armature for TSS EX1 sc Inline probe without welding flange |
| **LZX660** | Non-coped stainless steel welding flange for ball valve in-line armature |
| **LZX661** | Non-coped carbon steel welding flange for ball valve in-line armature |
| **LZY441** | Hand wheel for ball valve in-line armature |
| **LZY462** | Gasket for mounting flange of ball valve in-line armature |

*Measuring Tubes*

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|---|---|
| **LZU304.99.00010** | Measuring tube DN65 for TSS VARI sc |
| **LZU304.99.00020** | Measuring tube DN80 for TSS VARI sc |
| **LZU304.99.00030** | Measuring tube DN100 for TSS VARI sc |
| **LZU304.99.00040** | Measuring tube DN125 for TSS VARI sc |
| **LZU304.99.10010** | Measuring tube DN65 for TSS XL sc |
| **LZU304.99.10020** | Measuring tube DN80 for TSS XL sc |
| **LZU304.99.10030** | Measuring tube DN100 for TSS XL sc |
| **LZU304.99.10040** | Measuring tube DN125 for TSS XL sc |
| **LZU304.99.10050** | Measuring tube DN150 for TSS XL sc |
| **LZU304.99.10060** | Measuring tube DN200 for TSS XL sc |
| **LZU304.99.10070** | Measuring tube DN250 for TSS XL sc |

*Welded Branch Pieces*

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|---|---|
| **LZU302.99.00000** | Welded branch piece raw for all TSS sc TriClamp probes** |
| **LZU302.99.00010** | Welded branch piece DN65 for all TSS sc TriClamp probes** |
| **LZU302.99.00020** | Welded branch piece DN80 for all TSS sc TriClamp probes** |
| **LZU302.99.00030** | Welded branch piece DN100 for all TSS sc TriClamp probes** |
| **LZU302.99.00040** | Welded branch piece DN125 for all TSS sc TriClamp probes** |
| **LZU302.99.00050** | Welded branch piece DN150 for all TSS sc TriClamp probes** |
| **LZU302.99.00060** | Welded branch piece DN200 for all TSS sc TriClamp probes** |
| **LZU302.99.00070** | Welded branch piece DN250 for all TSS sc TriClamp probes** |
| **LZU302.99.10000** | Welded branch piece raw for TSS XL sc |
| **LZU302.99.10010** | Welded branch piece DN65 for TSS XL sc |
| **LZU302.99.10020** | Welded branch piece DN80 for TSS XL sc |
| **LZU302.99.10030** | Welded branch piece DN100 for TSS XL sc |
| **LZU302.99.10040** | Welded branch piece DN125 for TSS XL sc |
| **LZU302.99.10050** | Welded branch piece DN150 for TSS XL sc |
| **LZU302.99.10060** | Welded branch piece DN200 for TSS XL sc |
| **LZU302.99.10070** | Welded branch piece DN250 for TSS XL sc |
| **LZU303.99.00000** | Screwed branch piece for all TSS sc TriClamp probes** |

** Maximum operating pressure: 6 bar. ** Beside VARI & XL.*

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***Keep it pure.***

***Make it simple.***

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*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***

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