

# Triton® TR8 Series Turbidity Sensors

## Triton® TR8



### Turbidity Measurement

Drinking Water, Industrial Water, Water Treatment

### Suspended Solids

Waste Water Treatment Paper and Pulp Processing

Environmental Run-Off



**ELECTRO-CHEMICAL DEVICES**

# Triton® TR8 Series Turbidity/SS Sensors

## Applications

### Clear Water Sensor (-1)

- All phases of drinking water processing
- Control of Clear Rinse Water
- Filter rupture or backwash
- Monitoring WWTP discharge
- Monitoring Surface Waters

### Suspended Solids Sensor (-2)

- Activated sludge WWTP
- Return & Digested Sludge WWTP
- Filtrate in paper manufacturing
- Blending Mixing Applications
- Monitoring Environmental runoff

## Features and Benefits

- Intelligent Sensor Technology
  - Factory Calibration Stored in Sensor
  - Self Monitoring Diagnostics
  - Integrated Temperature Measurement
- Multiple Installation Methods
  - Immersion assembly
  - Flow through assembly
  - Gas debubbler assembly
- Digital Data Transmission
  - 200 m between sensor and transmitter
  - Insensitive to electromagnetic interference
- Self Cleaning Design
  - Inclined sensor surface to enhance self cleaning with moderate flow
  - Sapphire measuring windows for improved scratch resistance
  - Wiper Unit can be retrofitted

## General Description

The Triton TR8 is a nephelometric turbidity sensor designed for use in water and wastewater. Turbidity, the cloudiness or haziness of a water sample, is caused by particles suspended in the water, typically clay and silt. Since bacteria and viruses can be attached to these particles, turbidity has become a critical indicator of the overall water quality.

The Triton TR8 uses an optical method for determining the turbidity, a light beam is directed into the sample where it is scattered by suspended particles in the water. The amount of scattering depends on the amount of material in the water, the wavelength of light used and the size and composition of the suspended particles.

The Triton TR8 uses a long lived near infrared LED light source (880 nm) and the 90° scattered light method in accordance with ISO 7027 / EN 27027 to assure accurate turbidity values under standardized and comparable conditions. The 90° scattered light detection method is the most common sensor design for turbidity. This sensor has the advantage of a high sensitivity at low levels of turbidity, a simple optical configuration and a balanced sensitivity to all particle

sizes. Three detectors monitor the light beam at an angle of 90°. The first detector, inside the sensor, (see Figure 1) is the reference detector that compensates for changes in the LED light source caused by aging or other variations. The second detector measures a short path length, which is best for high concentration measurements, % concentration and g/L. The third detector measures the longer path length which is best for lower concentrations, FNU and ppm. The turbidity signal is constantly adjusted versus the reference detector and digital filter functions help to suppress interfering signals while the self monitoring diagnostics assure a highly reliable measurement.

The Optical Surface must remain clean for accurate

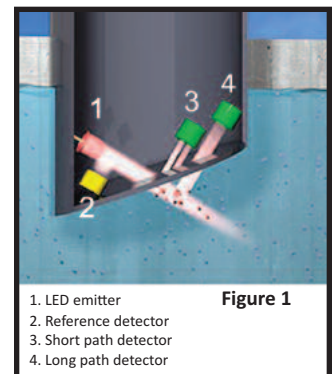


Figure 1  
1. LED emitter  
2. Reference detector  
3. Short path detector  
4. Long path detector

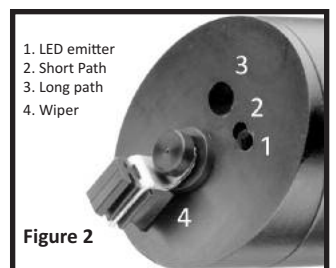
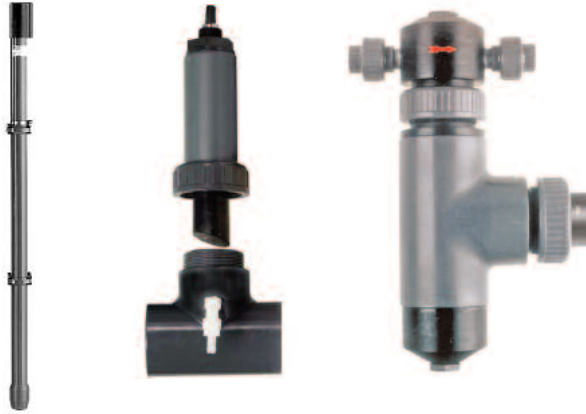


Figure 2  
1. LED emitter  
2. Short Path  
3. Long path  
4. Wiper

# Triton® TR8 Series Turbidity/SS Sensors



Immersion Holder    Flow Through Assembly    Debubbler Assembly

measurements. The inclined sensor face of the TR8 should be oriented into the flow for optimum self cleaning. Periodic cleaning is required for all turbidity sensors. In most cases this entails simply removing the sensor and wiping the optical surface with a soft cloth to remove any dirt or biofilms. An optional automated mechanical wiper is available for installations where manual wiping is inadequate. This option should be ordered on the TR8 sensor in order to maximize the accuracy and minimize the maintenance requirement coating applications. The Flow Through Assembly provides a port for accommodating a spray cleaning capability.

Air bubbles in the water reflect light and will interfere with the measurement. Micro air bubbles can form

when a water sample is depressurized. Care must be taken to ensure the water sample at the measurement point has a higher head pressure than the incoming sample. Water siphoning out from the measurement point can release dissolved gases in the flow cell and create noisy erratic readings. If air bubbles cannot be removed from the sample then the optional wiper assembly effectively removes air bubbles that form on or cling to the optical window. The De-Bubbler flow cell removes air bubbles that are entrained in the sample flow.

The Triton TR8 sensors are factory calibrated in formazine, FNU (Formazine Nephelometric units) and are ready to use in most clean water applications. The factory calibration is permanently stored in the sensor's memory and these values are also used for diagnostic purposes throughout the sensor's life. Two other nonvolatile memory banks are available to store user initiated calibration data.

The TR8 Turbidity Sensor is easy to install, it is easy to use with FNU factory calibration, it is Plug and Play. With the rugged construction including a tough sapphire optical window, self monitoring diagnostics with plausibility checking and an automatic wiper based cleaner the TR8 Turbidity sensor is reliable, accurate and requires minimal maintenance, it is the solution.

## Specifications

### Measurement Principle

Nephelometric 90° NIR scattered light, ISO 7027

### Light source and wavelength

LED, 880 nm

### Optical Reference Compensation

Reference Photodiode

### Measurement Range

- 1 Low Range Version
- (-2) High Range version (Turbidity > 500 NTU)
  - 0.000- 9999 FNU, (0.00- 9999 FNU)
  - 0.00- 3000 ppm (0.00 - 9999 ppm)
  - 0.0 - 3.0 g/l (0-300g/l), 0 - 20% (0-200%)

### Accuracy

Maximum error < 5% of reading

### Repeatability

<1% of reading

### Temperature Range

Operating: -5° - 50°C  
Storage: -20° - 60°C

### Temperature Sensor

NTC, 30 k-ohm @ 25°C

### Pressure/Temperature Rating

6 bar @ 25°C 1 bar @ 50°C

### Wetted Materials

PVC, PPS GF40, Sapphire (wiper, rubber)

### Sensor Cable

Shielded 7 core cable  
7 meter (23 ft) or 15 meter (49 ft) lengths

### Process Connection

G1 Thread, ¾" FNPT

### Maximum Cable Length

200 m maximum from C-22 controller

### Dimensions

Length 8.7" (220 mm)  
Diameter 1.6" (40 mm)

### Weights

Cable length 7 m (23 ft): 0.7 kg (1.5 lbs)  
Cable length 15 m (49 ft): 1.1 kg (2.4 lbs)

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## Ordering Information

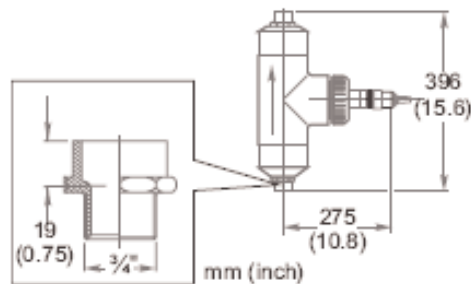
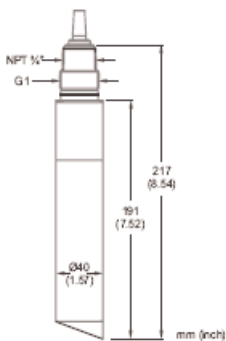
Part #	Model and Description
1398000-1 or (-2)	Triton TR8 Turbidity (SS) Sensor with 7 meter cable
1398001-1 or (-2)	Triton TR8 Turbidity (SS) Sensor with 15 meter cable
1398010-1 or (-2)	Triton TR8 Turbidity (SS) Sensor with 7 meter cable & Automatic Wiper
1398011-1 or (-2)	Triton TR8 Turbidity (SS) Sensor with 15 meter cable & Automatic Wiper
1398100-1	Triton TR8 Turbidity Sensor with 7 meter cable & Flow Through Assembly
1398101-1	Triton TR8 Turbidity Sensor with 15 meter cable & Flow Through Assembly
1398110-1	Triton TR8 Turbidity Sensor with 7 meter cable, Automatic Wiper & Flow Through Assembly
1398111-1	Triton TR8 Turbidity Sensor with 15 meter cable, Automatic Wiper & Flow Through Assembly
1398200-1	Triton TR8 Turbidity Sensor with 7 meter cable & De-Bubbler Assembly
1398201-1	Triton TR8 Turbidity Sensor with 15 meter cable & De-Bubbler Assembly
1398210-1	Triton TR8 Turbidity Sensor with 7 meter cable, Automatic Wiper & De-Bubbler Assembly
1398211-1	Triton TR8 Turbidity Sensor with 15 meter cable, Automatic Wiper & De-Bubbler Assembly
1290100-1	Triton TR8 Turbidity Analyzer, 115 VAC, (1) 0/4-20 mA output, (1) Failure Alarm Relay*
1290100-2	Triton TR8 Turbidity Analyzer, 230 VAC, (1) 0/4-20 mA output, (1) Failure Alarm Relay*
1290100-3	Triton TR8 Turbidity Analyzer, 24 VDC, (1) 0/4-20 mA output, (1) Failure Alarm Relay*
1290100-*	Consult factory for optional dual 0/4-20 mA outputs and multiple relays up to (4) additional relays

(-2) = High Range Turbidity Sensor, recommended for turbidity > 500 FNU

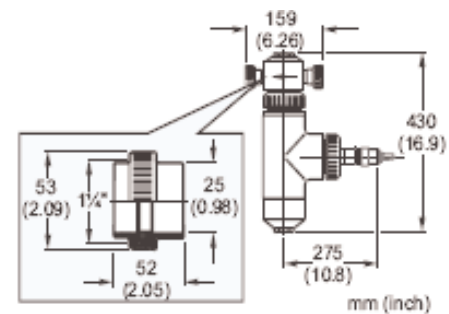
## Accessories

Part #	Model and Description
1000223	Immersion Assembly ( Cap/Cable feed-through, 1 meter down pipe)
2000278	Rail Mounting Brackets, (2) Quick Release "U" clamps for 2" Guard Rail mounting
9640004.cond	TR8 5 Conductor Cable, per meter
1000222	NEMA 4X Junction Box, (2) cable glands, terminal strip, PVC box, 6"x3"x2", LWD
1000228-1	Service Kit, for Wiper Arm, rubber and mounting material (3 sets)
1000227	TR8 Check Unit, used to check Stability of the sensor, (calibration cup)
1000232	Flow Through Assembly, Triton TR8 (-2) High Range only
1000300-1	4-20 mA USB Data Logger

## Dimensions



Flow Through Assembly



De-Bubbler Assembly

Specifications subject to change without notice.

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