

Triton® TR86 Series Turbidity Sensors

Triton® TR86



Turbidity Measurement

Drinking Water, Industrial Water, Water Treatment

Suspended Solids

Waste Water Treatment Paper and Pulp Processing
Environmental Run-Off



ELECTRO-CHEMICAL DEVICES

Triton® TR86 Series Turbidity/SS Sensors

Applications

Clear Water Sensor

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

Suspended Solids Sensor

- 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. Interfaces with T80 Universal Transmitter with Modbus, HART, 4 to 20 mA and/or Relay outputs.
- **Multiple Installation Methods**
Immersion assembly
Flow through assembly
Gas debubbler assembly
- **Self Cleaning Design**
Right angle or parallel sensor surface to enhance self cleaning with moderate flow
Sensor spray cleaning option or
Flow cells can be fitted with spray cleaner

Description

The Triton®TR86 sensor is designed for the continuous measurement of turbidity and suspended solids in various ranges. The sensor emits a beam of 850 nm near infrared light into the sample where it is scattered by particles suspended in the water. The amount of back scattered light returning to the sensor is measured and correlated to the amount of turbidity and suspended solids in the sample. The TR86 response depends on the size, shape and composition of the suspended particles. For this reason, mg/L, ppm and % Solids measurements must be calibrated with suspended solids from the waters to be monitored. Turbidity measurements (NTU, FNU) can be calibrated with calibration standards such as Formazin, StablCal or SDVB beads.

The Triton®TR86 is available in two optical configurations, one with side mounted optics. These design options address the fact that reflective surfaces in the emitted lights range will yield artificially high readings. The side mounted optical configuration minimizes interference from surfaces below the sensor while the axially mounted optics avoid interference from surfaces around the sensor. A daylight rejection filter blocks sun light and reduces

ambient-light interference. The axial front mounted optics are surrounded with a copper ring that inhibits the growth of algae and other biological films.

The Triton®TR86 sensors are available in (4) different ranges. The sensors are 10 inches long by 1 inch diameter with a reference line scored into the PVC body. This indicates the proper insertion depth of the sensor when used with the ECD compression fitting on the flow through Tee. Triton® TR86 sensor ranges are;

< 40 NTU

0-1000 NTU

0-2000 NTU

0-4000 NTU

5000-10,000 mg/l (MUD)

50,000-100,000 mg/l (SAND)

For other ranges please contact the factory

The Triton®TR86 sensors are designed to work with the T80 transmitter. The T80 is a single or dual channel transmitter with one or two 4-20 mA outputs with MODBUS RTU and optional (3) Alarm Relays or HART 7 communication. The T80 Transmitter allows the suspended solids measurement to be combined with any of it's other standard measurements using the S80 pH, S80 ORP, S80 plon, S80 Conductivity or S80 Dissolved Oxygen or DO 82 sensors.

Triton® TR86 Series Turbidity/SS Sensors



Immersion Holder



Flow Through Assembly



Debubbler Assembly

The Triton TR86 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. Designed for use in environmental water, the Triton TR86 is suitable for most aqueous applications. It is not suitable for use in organic solvents or in solutions with an extreme pH value, only use when the pH is between 2-12 pH. The temperature range for the sensor is 0° to 50°C. 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.

TR86 Installation is accomplished with a 1" stand pipe for immersion service, PVC flow cell for an in line flow through application, or De-Bubbler for Micro air bubble applications. Either optical configuration is suitable for immersion service while only the Side Mounted optical configuration is suitable for in line service. Applications of < 40 NTU range must use the Side Mounted optical configuration, and for best accuracy, must be calibrated in a Flow Cell or De-Bubbler Assembly. The standard cable is a water resistant 4 conductor cable. It is

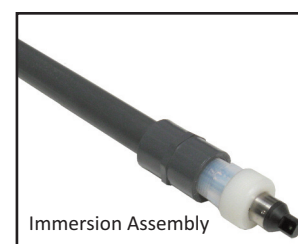
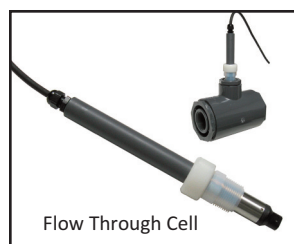
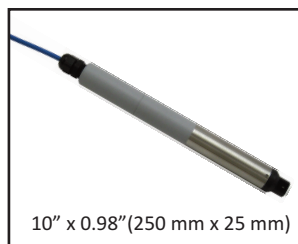
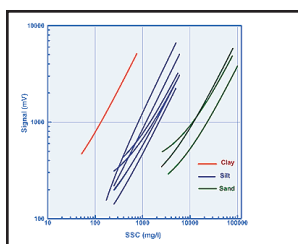
available with 10 ft, 20 ft or 30 ft (9.1 meters) lengths.

The Optical Surface must remain clean for accurate measurements. The included sensor face of the TR86 should be oriented into the flow cell for optimum self cleaning. Periodic cleaning is required for all turbidity sensors, which could entail simply removing the sensor and wiping the optical surface with a soft cloth to remove any dirt or biofilms. 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 TR86 sensors are factory calibrated in formazine, NTU (Nephelometric Turbidity 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 TR86 Turbidity Sensor is easy to install, it is easy to use with NTU 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 TR86 Turbidity sensor is reliable, accurate and requires minimal maintenance, it is the solution.



Triton® TR86 Series Turbidity/SS Sensors

Specifications

Measuring principle:

Particle caused back scattering of 850 nm near infrared light with sunlight rejection filter

Measuring Range:

-1 sensor,

0.00-1000 mg/l or 0 ... 1000 NTU, FNU

-2 sensor

0.00-2000 mg/l or 0 ... 2000 NTU, FNU

-3 sensor

0.00-5000 mg/l or 0 ... 4000 NTU, FNU, ppm, mg/L and %solids

-4 sensor

0.00-40 mg/l or 0 ... 40 NTU, FNU

Process Temperature Range:

-5 ... 50°C

Temperature Compensation:

Internal Temperature compensation

Process pressure range:

50 psi max. in Flow Cell. Vacuum operation is not permitted,

Wetted Materials

Sensor body: stainless steel AISI 316 Ti

Sensing end: epoxy

Process Connection:

1" NPT Nylon compression fitting

Electrical connection

Water Resistant 5-wire measuring cable(Standard)

Cable Length:

10 ft (3.0 m), 20 ft (6.1 m), 30 ft(9.1 m) cables

Model Triton®TR86 Turbidity Sensor, Part # Guide				
TR86	Sensor Style (optical configuration)			
	1	Front Mounted Optics, for use with Immersion Assembly		
	2	Side Mounted Optics, for Immersion or use with Flow Through Cell		
	3	Side Mounted Optics, For De-Bubbler		
	Process Connection			
	0	None		
	1	1" MNPT Nylon Gland Fitting		
	2	Flow Through Cell, 2 x 2" FNPT entries, 1 x 1" FNPT sensor port		
	5	Flow Through Cell, 2 x 2" FNPT entries, 1 x 1" FNPT sensor port with spray cleaner		
	8	De-Bubbler 3/4" FNPT entries		
	Cable Length			
	04	10 ft (3.0 m)		
	05	20 ft (6.1 m)		
	06	30 ft (9.1 m)		
	Measurement Ranges			
0	0-1000 NTU			
1	0-2000 NTU			
2	0-4000 NTU			
4	<40 NTU (Calibration in Flow Cell/DB)			
TR86-	1	0	01	2
Model Triton® TR6 Installation Assemblies				
Part #	Description			
1000260-5	Immersion Assembly, 5 ft x 1"OD standpipe, with 1" compression fitting and T-Handle			
1000260-99	Immersion Assembly, User supplied standpipe, with 1" Compression fitting and T-Handle			
1000280-1	Flow Through Tee, 4" PVC tee base reduced to 2" FNPT entries			
3600066.NY	1" MNPT Nylon Gland Fitting			

Specifications subject to change without notice.

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