

## The Digital Advantage

- On-board statistical functions
- Long cable runs without signal degradation
- All calibration coefficients are stored in the sensor so datalogger reprogramming is not required when sensors are changed
- Compatible with all dataloggers that support the SDI-12 standard

## Laser Based Optics

- The DTS-12 turbidity sensor uses optical backscatter technology with a 780-nm laser emitter with automatic power control.
- It measures suspended solids with an infrared measurement system incorporating optical feedback and synchronous detection to reject ambient light. The DTS-12 features high accuracy, excellent thermal and long-term stability, and nearly linear response over three orders of magnitude.



*The DTS-12 is the result of four years of research, engineering development and product testing. Customer requests to build a durable, self cleaning, digital turbidity sensor effective in low water levels and sensitive to low levels of turbidity while still retaining a wide absolute range, have been the impetus behind the DTS-12 Turbidity Sensor from FTS.*

*Founded in 1980, FTS is a leading manufacturer of environmental sensors and remote site monitoring systems. The DTS-12 Turbidity Sensor was developed under the leadership of FTS in collaboration with D&A Instruments, a world leader for in-situ turbidity measurement, and the award winning Mechanical Engineering Department of the University of Victoria.*

## Technical Specifications

Range:	0 to 1600 NTU
Resolution	0.01 NTU
Accuracy - Turbidity:	
Accuracy	±2% (0-499), ±4% (500-1600)
Zero Offset	±0.2 NTU
Temp Coefficient(0-40°C)	< -0.3%/°C
Accuracy - Temperature:	±0.5 °C
Supply Voltage Range:	9.6 to 16V
Current Consumption(typical):	
Standby	< 0.5 mA
Operating	< 75 mA
Motor Wiping	< 250 mA
Depth Rating:	98ft (30m)
Wipe Time:	5 sec Nominal
Operating Temp:	+32° to +104° F (0° to +40°C)
Communications Protocol:	SDI-12 version 1.1
Measurements Returned:	Instantaneous Turbidity
Raw data consists of 16-bit samples taken 20 times per Second.	100 sample Mean and Variance 100 sample Median 100 sample BES 100 sample Min 100 sample Max
Dimensions:	length 12in (30.48cm) diameter 2in (5.08cm) shell thickness 0.129in (0.38cm)



### Options Include:

- Titanium version for salt water deployment.
- Connectorized quick disconnect cable.

## Advanced Technology Engineered for the **Real** World

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MAR-BRO-DTS12-131103

Advancing the science of turbidity measurement in streams and rivers.



- SDI-12 digital sensor
- Shallow water capability
- Superior accuracy
- Self-cleaning wiper
- Turbidity and Temperature

# The DTS-12 Digital Turbidity Sensor from FTS

## Self-cleaning wiper

The DTS-12 wiper system is the culmination of a comprehensive research and development program evaluating over 40 different cleaning technologies, lab and field tests, and years of field-based knowledge.

The humble wiper's combination of effectiveness, reliability, and low power requirements made it the best choice over more exotic approaches. However, traditional wipers have short life spans and can become soiled, repeatedly dragging abrasive materials and organic matter across the lens optics.

The DTS-12 wiper blade 'parks' in two grooves cut into the sensor face. These grooves extend the long term flexibility of the wiper, allow increased wiping pressure and clean the blade between wipes. Wiper changes are simple and inexpensive.

## SDI-12 Protocol

The DTS-12's built-in microprocessor handles statistical data processing, eliminating complex data logger programming. In addition to instantaneous turbidity values, the sensor calculates and returns the values for Mean, Variance, Median, Min, Max, and BES based on 100 readings taken over 5 seconds, increasing your ability to obtain the most meaningful data from any water system.

The SDI-12 digital protocol provides easy connection to any SDI-12 compatible data logger and eliminates the need to enter calibration coefficients, simplifying sensor installation and maintenance. SDI-12 also supports long cables and assures your data integrity.

## Shallow water capability

The DTS-12 was explicitly designed to avoid the viewing problems of other turbidity sensors. Some have large viewing volumes for a good water sampling average but are not capable of shallow-water deployment while others have shallow water capability but have a very small sampling volume.

The approximately tennis ball sized view of the DTS-12 provides a good sampling volume and near-bottom deployment.

## Superior accuracy

The DTS-12 eliminates the frustrating trade-off between low end accuracy and wide dynamic range, with an accuracy of:  
 $\pm 2\%$  (0-499 NTU)  
 $\pm 4\%$  (500-1600 NTU)

The sensor also offers excellent thermal and long term stability and nearly linear response over three orders of magnitude.



## Saltwater Rated version available

Featuring Titanium housing and hardware, the DTS-12Ti is designed for salt water conditions. Shown with optional quick-disconnect connector.

## The Angled Head

The unusual geometry of the sensor head was designed after detailed analysis demonstrated significant advantages for an angled sensor face. Lab tests showed that an angled head did the best job of shedding the bubbles that can form on the face of a sensor and give false turbidity readings. The angled head also allowed us to combine 90° backscatter sensing technology and our target sampling volume with a downward looking 'view', thereby significantly simplifying mounting and siting requirements.



**Built-in temperature sensor**  
 The DTS-12 sensor includes a built-in temperature sensor accurate to  $\pm 0.5^\circ \text{C}$

Sensor face showing optic lenses and wiper cleaning grooves

## Optical System

The optical system, lens face and wiper blades have been designed for extended field life, even in high abrasive-load waters. After accelerated wear testing simulating five years of operation in abrasive enriched waters, wiper function remained within factory specifications and sensor readings were offset by only 2.9%, requiring only a simple recalibration.

## Quick disconnect option

A connectorized quick-disconnect version is available for convenient on-site service.



## Constructed and Designed to Run 24/7 for Many Years

- Metal components are stainless steel, anodized aluminum, or titanium
- "O" ring sealed
- Extended duty cycle motor for many years of trouble free wiper operation
- Heavy duty miniature stainless steel universal joint for maximum life span
- Thick walled sensor housing designed to minimize damage from accidental blows or clamping pressure
- Depth rated to 98 feet
- Plastic components from Delrin™ or Noryl™, selected for field proven durability, longevity, and thermal stability



Stainless Steel Universal Joint



Wiper Bracket



Aluminum Shell 0.129in