

ABB MEASUREMENT & ANALYTICS

ATS430 Turbidity and TSS sensor system

The simple answer to turbidity and suspended solids measurement



Measurement made easy

Today's stringent water quality legislation demands ever more accurate measurement to help protect the world's aquatic environment.

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ABB ATS430 Turbidity and TSS probe

The impact of rising populations and growing pollution from industrial activity are making it more important than ever to keep a check on what's entering the world's watercourses.

Excessive levels of turbidity and total suspended solids in both human and industrial waste can have a major effect on aquatic environments. The potential damage that can be caused by depletion of dissolved oxygen levels caused by excessive turbidity and suspended solids means that effluent discharges from both municipal and industrial sources are tightly regulated and need to be carefully monitored to ensure limits are maintained.

ABB's Aztec analyser family has established a reputation for combining the latest technologies with internationally-approved measurement principles, opening up new opportunities for the collection of up-to-the-minute data across a wide range of parameters.

By accurately measuring turbidity and total suspended solids (TSS) levels in treated wastewater discharged to the environment, the ATS430 plays a vital role in helping to ensure the health of rivers and streams.

Coupling an advanced optical sensor with internationally-approved turbidity measurement technology, and incorporating an extensive range of features for easy operation and maintenance, the ATS430 is the ideal solution for meeting tough environmental legislation around water discharge quality.



The simple solution for regulatory effluent discharge consent monitoring

Introducing the ATS430, the high performance sensor that makes turbidity and Total Suspended Solids (TSS) measurement easy.

The ATS430 is part of ABB's Aztec family of advanced digital sensors for monitoring the key parameters in municipal and industrial water and wastewater treatment.

Compact and robust, it uses the latest advances in optical measurement technology to deliver precise and ultra-stable measurement of turbidity and suspended solids concentrations up to 4000 NTU (Nephelometric Turbidity Units) or 100,000 mg/l.

The lowest cost-of-ownership

Certified by MCERTS for measuring turbidity, and featuring ABB's innovative adaptive TSS calibration technology, the ATS430 provides improved control of turbidity and suspended solids. Its service-free design, plus features including in-situ cleaning, easy calibration and verification and predictive maintenance diagnostics, enables it to offer the lowest cost of ownership of any device on the market.

One device for multiple industries

The ATS430 can be used in a wide range of utility and industrial applications, including:

- Potable water treatment
- Municipal/industrial wastewater treatment
- Produced and flowback wastewater treatment
- Pulp & Paper
- Marine
- Mining



The ATS430 – key features at a glance

Easy to use

- EZLink automatic sensor recognition and set-up
- Advanced predictive maintenance diagnostics
- Supplied factory-calibrated, ready for use

Accurate and reliable

- Choice of stainless steel or titanium sensor bodies
- Scratch-resistant sapphire windows
- Adaptive TSS calibration for improved control
- MCERTS approved

Lowest cost-of-ownership

- No servicing for the lifetime of the sensor
- In-situ cleaning
- Easy calibration and verification

Flexible installation options

- Pipe, tank, open channel or flow-cell options
- Suitable for use in salt water and corrosive media

Compact design

- 40 mm probe diameter, ideal for a range of installations



Ready to use straight from the box

It only takes minutes to start enjoying lifelong accurate measurement

When it comes to getting started, there's nothing easier than the ATS430. Simple set up means you can be up and running in minutes.

We've incorporated a number of features into the ATS430 to make it as easy to set up, operate and own as possible. Supplied fully factory calibrated, it can be operational in minutes thanks to ABB's EZLink 'plug and play' technology.

Using advanced automatic sensor recognition and set-up, EZLink enables the ATS430 to be quickly matched up with our digital transmitters, with no wiring or additional set-up or fine-tuning required. Once operational, all analysis and signal conditioning is performed within the sensor, with the resulting data relayed digitally to the transmitter.



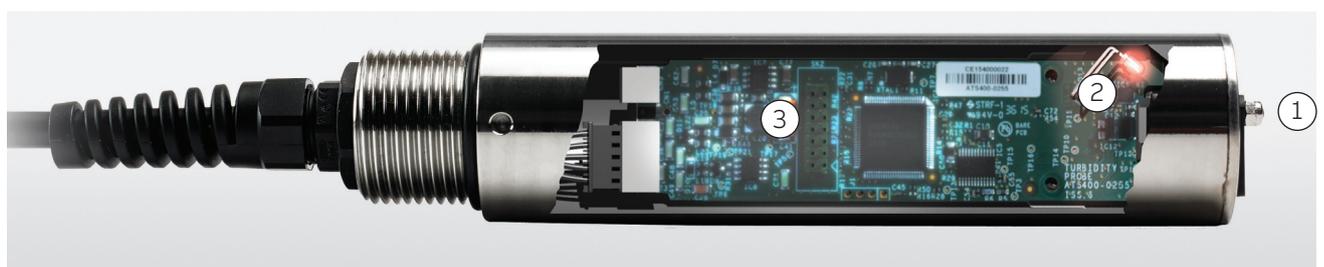
How it works

- 1 The sensor uses internationally-approved nephelometric measurement technology to measure both high level turbidity and total suspended solids (TSS) content in the sample.

The sensor directs a beam of infra-red light into the sample, using an LED emitting at a wavelength of 850 nm.

The light beam is scattered by particles in the sample, and the scattered light intensity is measured by the sensor's photodetector positioned at 90 degrees to the light beam.

- 2 The scattered light is collected by a photodiode. The scattered light detected is directly proportional to the turbidity of the sample
- 3 Analysis and signal conditioning is conducted within the robust sensor housing and relayed to the transmitter. As there is a known relationship between the amount of solids in suspension and the turbidity of a sample, the turbidity reading can be used to provide real time estimate of the level of suspended solids in the sample.



Innovative thinking brings improved control

Error-free performance with adaptive TSS calibration

Enjoy the application of innovative thinking to help you solve the problem of obtaining reliable TSS measurement data.

Obtaining a reliable turbidity to suspended solids calibration can be a laborious and time consuming process. In most cases, several measurements over a period of time will be needed to obtain a good estimate of the relationship between the suspended solids content and the turbidity of a water sample.

Traditional techniques have relied on the user to obtain a good representative calibration coefficient based on grab sample analysis. In reality, this is not practical, as it relies on historical data that may not match the current sample composition. This can cause sudden jumps in the inferred values of TSS when the change in coefficient is applied.

How Adaptive TSS calibration works

ABB's Adaptive TSS function technology addresses this by updating the coefficient progressively every time an in-process calibration is performed. In this way, the calibration coefficient follows changes in the sample composition, avoiding sudden shifts caused by non-representative sampling or incorrect laboratory results.

In Figure 1, the line shown is the reading for the turbidity of the sample as gathered by the sensor. The ATS430's Adaptive TSS calibration function uses this data to calculate an equivalent TSS value based on a weighted average of the historical coefficient plus the new co-efficient. The resulting TSS value is shown in Figure 2.

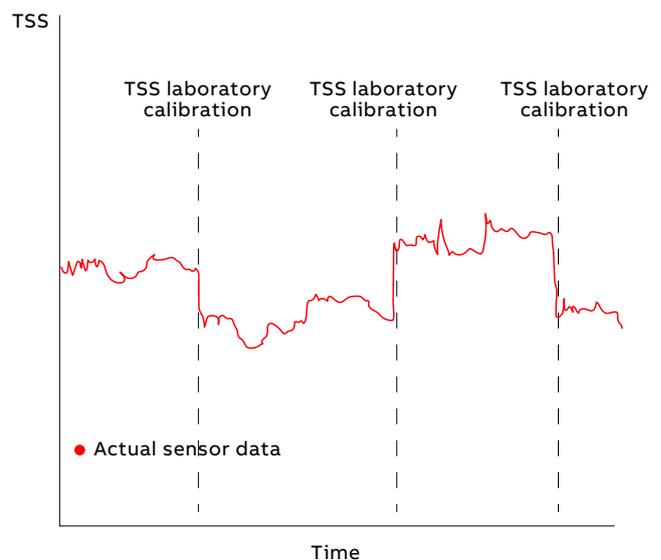


Figure 1 Actual sensor data

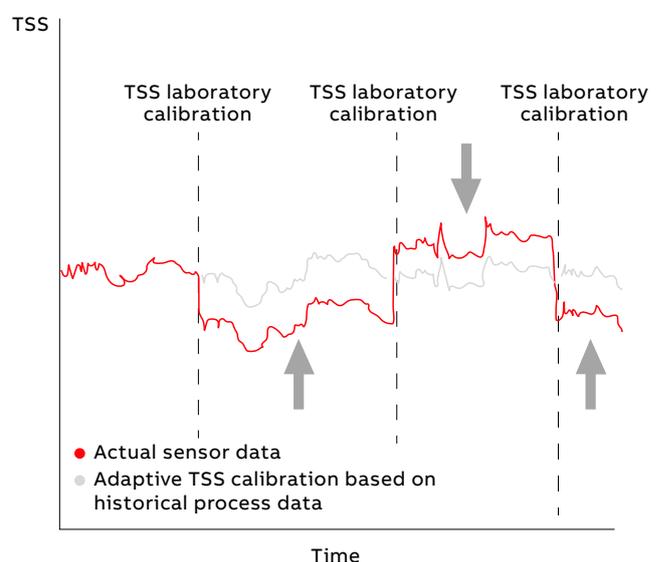


Figure 2 Actual sensor data with equivalent

Designed for the harshest applications

Reliable performance, wherever you need it

The ATS430 has been designed to withstand the hostile operating conditions inherent in many utility and industrial wastewater treatment processes. The sensor boasts a wide range of features aimed at eliminating the problems that can typically affect measurement performance such as fouling, corrosion and high ambient pressures and temperatures.

We've used our extensive experience in continuous water analysis in general and turbidity measurement in particular to develop a sensor that can handle the very worst that an application can throw at it. The result is a device that offers long-term reliability, stability and accuracy in a service-free package, giving you a device that you can count on without having to pay more for throughout its life. Take a look at some of the key features that have been built into the probe:

A choice of probe materials

The robust ATS430 probes are available in polished stainless steel or titanium, preventing particles from sticking to the surface. The titanium version offers resistance to aggressive media and corrosive environments such as salt water.



Proven performance

The ATS430 has been certified by the UK Environment Agency under its Monitoring Certification Scheme (MCERTS). Based on international standards, the certification scheme is formally recognized within the UK and is acceptable internationally.



Resistant to high temperatures and pressures

The ATS430 is able to withstand temperatures up to 60°C and pressures up to 10 bar making it the best choice for most process control applications.



Automatic wiper function

For high fouling environments an automatic wiper is used to maintain accuracy. If a wiper system is fitted the ATS430 monitors usage and alerts the user when replacement is due. Wiper replacement is simple and takes a matter of seconds.



Fully sealed design

The ATS430 features a fully encapsulated and hermetically sealed design. This means that there are no O-rings, seals or gaskets to periodically replace.



Scratch-proof optical windows

Scratch-resistant sapphire optical windows help the probe to withstand prolonged use in harsh environments.

Quick, safe and cost-effective calibration

Continued accuracy made easy

The ATS430's performance can be easily verified with ABB's sensor verification and calibration kit, without the need for the use of chemical standards that can be difficult to prepare, costly and hazardous.

Our sensor verification and calibration kit gives you everything you need to help ensure the continued accuracy of your device.

Benefits:

- Minimum analyzer downtime – simple and fast procedure makes calibration quick and easy
- Low cost of ownership – precise calibration helps reduce usage of consumable chemical standards and the time taken to prepare them
- Cost effective - reusable across different sensors
- Safe – the kit helps minimize employee exposure to formazine, which can have adverse health effects
- Repeatable and reliable – the kit helps remove any chemical standard preparation errors

What's included?

The ATS430 verification and calibration kit comes with everything you need including:

- Pre-calibrated calibration discs
- Coupling agent
- Probe holder
- Instructions

Simple to use



1. Insert the disc



2. Add the coupling agent



3. Insert the probe

Flexible installation

Unlock new installation opportunities

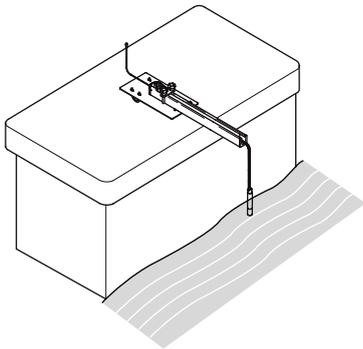
With its compact design and range of mounting options, the ATS430 opens up a raft of new possibilities for measuring turbidity and suspended solids.

With its range of mounting options, the ATS430 is easy to install almost anywhere in a municipal or industrial wastewater process. The probe's compact 40 mm diameter size, combined with its wide measuring range and ability to withstand temperatures up to 60 °C and pressures up to 10 bar make it suitable for a wide range of applications where accurate turbidity or TSS (total suspended solids) is required.

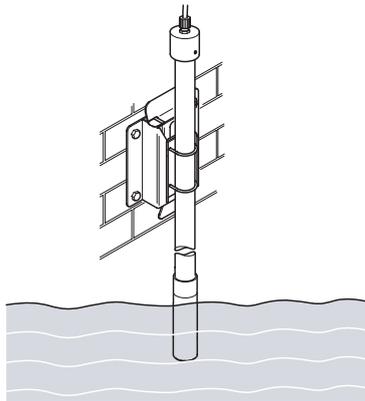
A choice of mounting options

The ATS430 can be installed however you want it, giving you a flexible solution to your measurement needs.

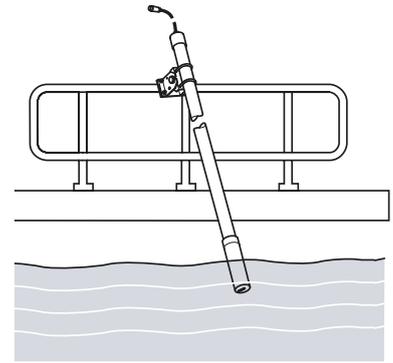
Options include:



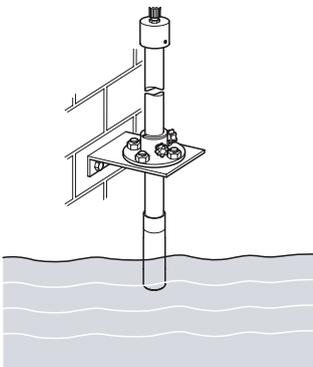
1. Open channel mounting – suitable for floor/wall (surface) mounting



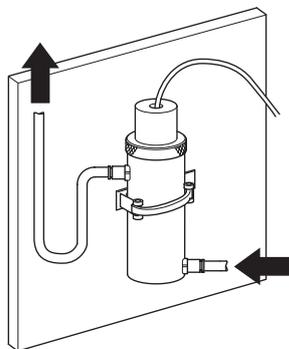
2. Wall mounting – suitable for mounting dip pole



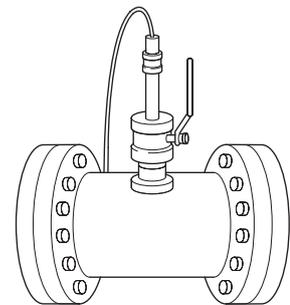
3. Dip pole mounting – suitable for handrail or wall mounting



4. Open tank flanged dip mount



5. Flow cell pipeline mount – suitable for wall/surface mounting



6. In-pipe mounting – suitable for installation in pressurized systems

Introducing the AWT440 multi-channel transmitter

One transmitter, many possibilities

ABB's AWT440 digital transmitter with EZLink lets you get more from your turbidity and suspended solids measurements.

Designed for use with ABB's Aztec 400 range of advanced digital sensors, the AWT440 can be used in a range of municipal and industrial water and wastewater treatment applications.

Key features at a glance:

Install anyhow, anywhere

The robust AWT440 enclosure can be installed in a variety of configurations to meet all application requirements, with options including wall, field and pipe mounting.

Simple to integrate

Optional PROFIBUS DP V1.0 or Modbus RS485 communications enable integration with distributed control systems. The AWT440's embedded web-server also provides access to measurement readings and active diagnostics

Full audit trail

The AWT440 transmitter records all data continuously to its internal memory. This includes both event log data and configuration data in addition to measurement data.

Keep your data secure

Process data and historical logs can be archived securely to a removable SD card or USB stick. Archived data can be transferred easily to a PC and analyzed using ABB's DataManager Pro data review software.

Simple operation

Easy-to-use menus make set-up and operation straightforward, with options for setting parameters and viewing diagnostic information. Measurement trends from multiple sensors can be easily and clearly viewed on the graphical color display.

Get up and ready with EZLink

No wiring, no complicated sensor set-up or configuration, just connect the sensor using the EZLink connection and the transmitter automatically configures the sensor set-up.

Reduce cost with multiple sensor connection

Able to be connected to up four Aztec 400 digital sensors, the AWT440 lets you monitor at multiple points without the costs associated with purchasing and installing separate transmitters.



Specification at a glance

ATS430 sensor

ATS430 Turbidity and total suspended solids sensor

Measurement range

Turbidity: 0 to 4000 NTU

Suspended solids: 0 to 100,000 mg/l SiO₂ (100 g/l)

Method

90° scattered light measurement in accordance with
DIN/EN 27027/ISO 7027

Operating temperature

0 to 60 °C (32 to 140 °F)

Operating pressure

Up to 10 bar (145 psi)

IP rating

IP68

Material options

316 Stainless Steel

Titanium grade 2

Dimensions

40 mm (1.57 in) diameter

180 mm (7.08 in) length



...Specification at a glance

AWT440 digital transmitter

AWT440 multi-input digital transmitter

No. of inputs

Up to 4 sensors

Language

English, German, French, Italian, Spanish

Protection

IP66/NEMA 4X

Power100 to 240 V AC $\pm 10\%$, 50/60 Hz

24 V DC (optional)

Dimensions

194 mm (7.64 in) x 214 mm (8.42 in) x 98 mm (3.85 in)

Analog outputs

2 standard + 2 optional

Relay outputs

4 standard + 2 optional

Digital inputs/Outputs

6 standard, user-programmable as input or output

Connectivity/Communications (optional)

Ethernet, Profibus, MODBUS



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