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ABB MEASUREMENT & ANALYTICS | DATA SHEET | DS/ATS430-EN REV. I

## **Aztec ATS430**

Turbidity and total suspended solids sensor





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## Measurement made easy

Certified turbidity measurement for regulatory effluent discharge consent monitoring

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### Easy to use

- EZLink plug-and-play digital sensor connection
- Automatic sensor recognition and set-up
- Advanced predictive maintenance diagnostics
- Supplied factory-calibrated ready for use

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### Accurate and reliable

- Robust construction in stainless steel or titanium
- Scratch-resistant sapphire windows
- Adaptive TSS calibration feature for improved process control
- MCERTS approved

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### Low cost-of-ownership

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

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### Flexible installation options

- Suitable for pipe, tank, open channel or flowcell installation
- Suitable for use in salt water



## The Aztec 400 range

The Aztec 400 range of advanced digital sensors are designed for monitoring the key parameters in municipal and industrial water / wastewater treatment.

Featuring ABB's EZLink technology, the sensors offer plug-and-play measurement with ABB's latest digital transmitters to create the easiest-to-use and maintain monitoring systems on the market today.

Analysis and signal conditioning is conducted within the robust sensor housing and transmitted digitally to the transmitter.

The Aztec 400 range of digital sensors with EZLink offer:

- plug-and-play digital sensor connection
- automatic sensor recognition and set-up
- advanced predictive maintenance diagnostics
- enhanced measurement accuracy due to minimal electrical noise interference

ABB's latest range of digital transmitters featuring EZLink offer:

- multiple sensor connection
- data logging and graphical process trending
- full audit trail capability
- SD card/USB stick data download capability
- flexible communications including Ethernet, PROFIBUS®, MODBUS® and analog outputs



Figure 1 AWT440 transmitter

## Aztec ATS430 turbidity and TSS sensor

The ATS430 is a compact, yet extremely robust turbidity sensor capable of measuring turbidity and total suspended solids (TSS) concentrations up to 4,000 NTU or 100,000 mg/L.

Available in stainless steel or titanium these rugged sensors are suitable for use in a wide range of process control applications. The stainless steel version with optional integral cleaning is ideal for general water and wastewater applications, whereas the titanium version can be used in aggressive or corrosive environments, including brine, seawater or high salinity media.

Analysis and signal conditioning is conducted within the robust sensor housing and transmitted digitally to the transmitter.

Featuring ABB's EZLink technology, simplified calibration and service-free design, users of this system benefit from simple operation, enhanced accuracy and the lowest cost-of-ownership.

### Applications

Typical applications for the Aztec ATS430 turbidity and TSS sensor include:

- potable water treatment
- municipal/industrial wastewater treatment
- food and beverage process control
- pulp & paper process control
- marine applications

## Accurate and reliable measurement

The Aztec ATS430 turbidity and TSS sensor uses the latest advancements in optical measurement technology to provide an extremely stable and accurate measurement system that maintains calibration and operates without drift.

### Measurement principle

The ATS430 uses nephelometric measurement technology in accordance with EN ISO 7027 (DIN EN 27027 or ISO 7027). Providing accurate measurement of turbidity concentrations up to 4000 NTU and can also be used to determine the total suspended solids (TSS) content in the sample.

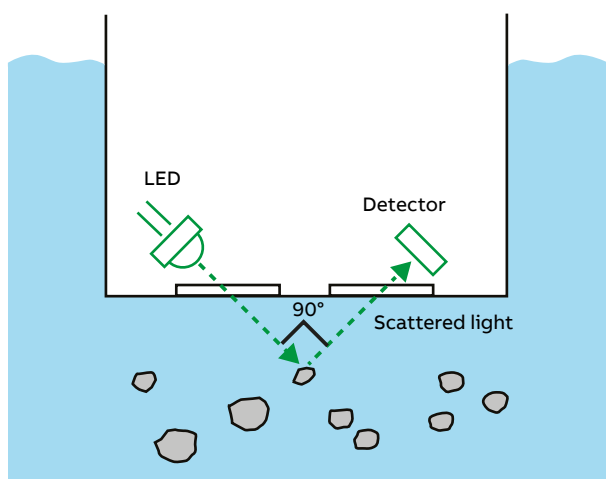


Figure 2 ATS430 probe uses internationally approved nephelometric measurement to provide accurate turbidity measurement

### Adaptive TSS Calibration

Obtaining a reliable calibration for suspended solids from laboratory measurement data is not necessarily a straightforward task. The 'Adaptive TSS Calibration' feature within the ATS430 overcomes this issue and provides a smooth TSS conversion based on process history. It uses a weighted cumulative average to approximate the accuracy of a linear fit over a large set of data. This avoids sudden changes in TSS calibration coefficients often caused by non-representative sampling or erroneous lab results.

### Rugged design

The robust ATS430 sensors are available in polished stainless steel or titanium and feature scratch-resistant sapphire optical windows to withstand harsh environments up to 60 °C (140 °F) and pressures up to 10 bar (145 psi).

### Automatic cell cleaning

The ATS430 is available with an auto-clean system to maintain accuracy in high-fouling environments. The integral wiper assembly that is available on the stainless steel models physically wipes the optical surfaces at user-programmable intervals.

The highly efficient automatic cleaning process overcomes the problem of optical fouling and ensures that performance can be maintained for extended periods without the need for manual intervention.



Figure 3 Auto-clean system overcomes optical fouling

### Trusted performance

The ATS430 has been certified by the UK Environment Agency under its Monitoring Certification Scheme (MCERTS).



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## Easy-to-use and maintain

The Aztec ATS430 turbidity and suspended solids sensor features ABB's EZLink technology to provide plug-and-play measurement with ABB's latest digital transmitters.

### EZLink

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

### Factory-calibrated

Each sensor is precisely calibrated at the factory so it is ready to use straight out of the box.

### No servicing for the lifetime of the sensor

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

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.

### Simple to calibrate

The ATS430's performance can be easily verified with ABB's sensor verification and calibration kit. Each kit is provided with a range of different calibration discs that have been calibrated against primary turbidity standards at the factory.

Simple, safe and cost-effective. The ATS430 sensor verification and calibration kit removes the need for the use of chemical standards that can be difficult to prepare, costly and hazardous.

Furthermore, as the kit can be used across different ATS430 sensors and each calibration disk can be reused, it is extremely cost effective.



Figure 4 EZLink sensor connection



Figure 5 ATS430 sensor verification and calibration kit

The benefits of using the ATS430 sensor verification and calibration kit include:

- Minimum analyzer downtime
  - Simple and fast procedure to verify analyzer performance.
- Low cost-of-ownership
  - Reduce usage of consumable chemical standards and the time taken to prepare such standards.
- Minimize employee's exposure to Formazine
  - Formazin is highly toxic and a suspected carcinogen.
- Repeatable and reliable
  - Removes any chemical standard preparation errors.
- Simple to use
  - Simply place the appropriate calibration disc into the holder, add a small droplet of optical coupling agent to the optical window of the turbidity sensor and insert into the holder.



Figure 6 ATS430 easy calibration procedure

## Mounting options

ABB offer a range of mounting options for the Aztec ATS430 sensor.

Item	Mounting option
(A)	Open channel mounting kit: ATS4000768, suitable for floor/wall (surface) mounting (ATS4000720 chain mounting kit available separately)
(B)	Wall mounting accessory: ATS4000700, suitable for 40 mm/1.25 in dia. dip pole
(C)	Dip pole assembly (supplied with 40 mm dia. pole): ATS4000750: 2.5 m (8.2 ft) straight ATS4000716: 2.5 m (8.2 ft) 90° bend ATS4000719: 2.5 m (8.2 ft) 45° bend Dip pole mounting adaptor kits (to attach to user-supplied pole) ATS4000751: for attachment to 40 mm dia. or 1.25 in NB pole (straight) ATS4000710: for attachment to 1.25 in NB pole (90° bend) ATS4000711: for attachment to 1.25 in NB pole (45° bend) ATS4000714: for attachment to 40 mm dia pole (90° bend) ATS4000715: for attachment to 40 mm dia pole (45° bend) <b>Note.</b> Handrail mounting brackets are not supplied with this kit and must be purchased separately.
(D)	Open tank flanged dip mount: ATS4000785, for mounting on user-supplied mounting bracket
(E)	Wiper arm protective shroud assembly: ATS4000725
(F)	Flow cell pipeline mount kit: ATS4000765, suitable for wall/surface mounting (includes wall mounting clip)
(G)	Handrail mounting bracket – swivel/tilt action: ATS4000762 for 1.25 in NB dip pole, suitable for 42 or 51 mm (1.7 or 2.0 in) dia. handrail ATS4000763 for 40 mm dia. dip pole, suitable for 42 or 51 mm (1.7 or 2.0 in) dia. handrail
(H)	Handrail mounting bracket – tilt action: ATS4000760 for 40mm or 1.25 in dia. dip pole, suitable for 42 or 51 mm (1.7 or 2.0 in) dia. handrail
(I)	Retractable insertion assembly: ATS4000780, maximum pressure 10 bar (145 psi), for mounting on user-supplied flange: BS EN 1092-1, Type 01B, DN50, PN16, stainless steel 316L or similar. Maximum distance from flange sealing face to pipe ID must not exceed 70 mm (2.75 in).

Table 1 ATS430 sensor mounting/cleaning options



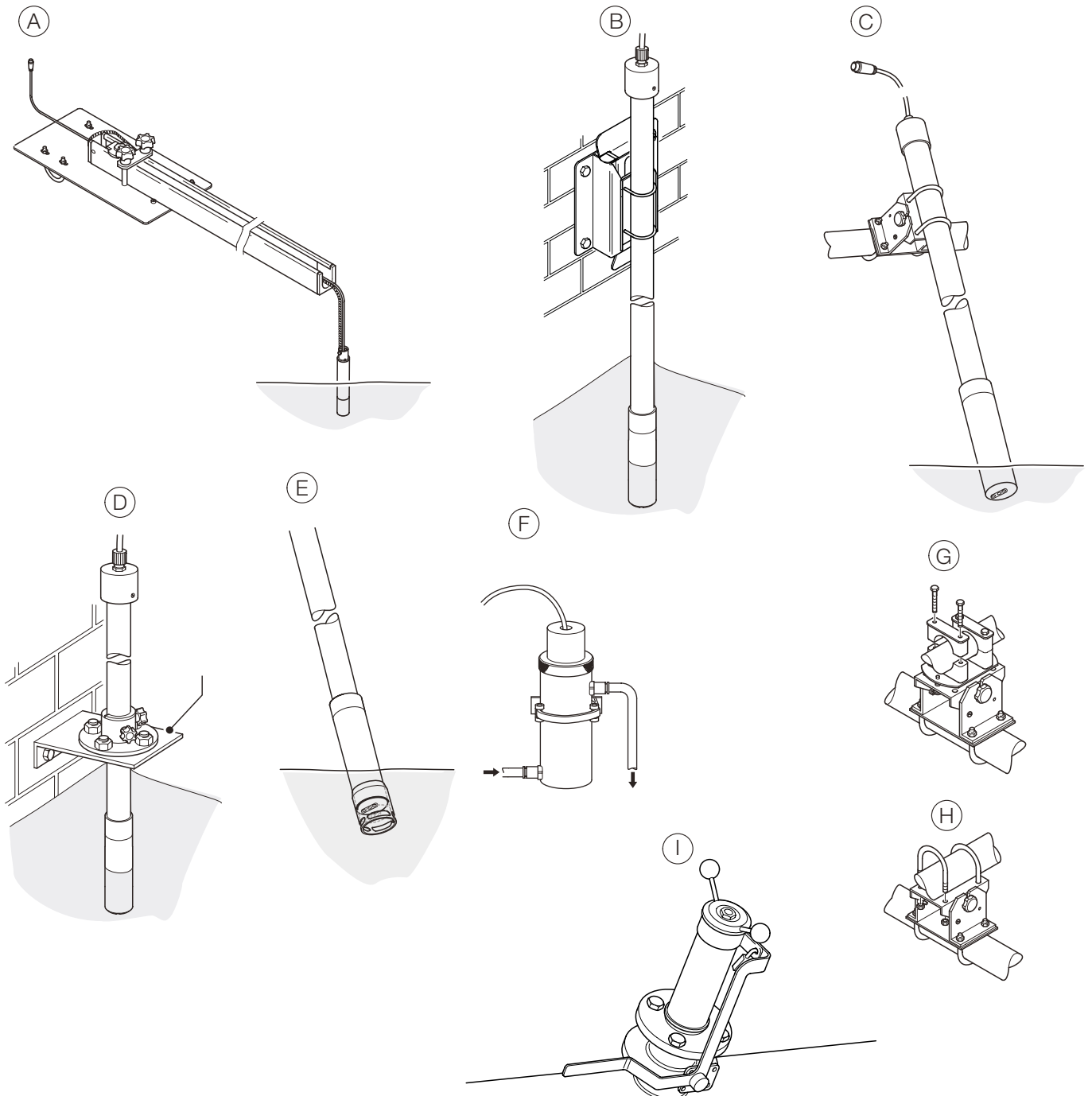


Figure 7 Mounting options

## Specification

### Sensor type

Optical nephelometric turbidity and suspended solids sensor

### Sensor

#### IP rating

IP68

#### Range

Turbidity: 0 to 4,000 NTU

Suspended solids: dependent on sample:

- up to 5,000 mg/L kaolin
- up to 15,000 mg/L Fullers earth
- up to 100,000 mg/L SiO<sub>2</sub>

#### Accuracy<sup>1,2</sup>

- Turbidity:  $\pm 2\%$  measured value
- Suspended solids: dependent on sample

#### Repeatability and limit of detection

- Repeatability<sup>1</sup>:  $< 1\%$
- Limit of detection<sup>3</sup>: 0.006 NTU

#### Display resolution

- Turbidity: 0.001 NTU
- Suspended solids: 0.001 mg/L

#### Response time

T<sub>90</sub> < 30 s with filtering disabled

#### Storage conditions

-5 to 70 °C (23 to 158 °F)

#### Operating temperature

0 to 60 °C (32 to 140 °F)

#### Operating pressure

Up to 10 bar (145 psi) for metal versions

#### Dimensions

- 40 mm (1.57 in) diameter
- 180 mm (7.08 in) length

#### Weight

- Stainless steel: approx. 0.65 kg (1.43 lb) without cable
- Titanium: approx. 0.4 kg (0.88 lb) without cable

### Power

#### Consumption (maximum)

100 mA @ 24 V DC

### Cable

#### Fixed length

1 or 10 m (3.28 or 32.8 ft)

#### EZLink digital sensor connector IP rating

IP67 (when connected)

#### Extension cable (options)

1, 5, 10, 15, 25, 50 m (3.2, 16.4, 32, 49.2, 82, 164 ft)

#### Maximum length (including optional extension cable)

Up to 210 m (689 ft)

### Methods

ISO7027:1999, Water Quality – Determination of turbidity

### Materials of construction

#### Stainless steel version

316 Stainless Steel, Viton, Noryl (wiper version only), Sapphire and F08 Epoxy

#### Titanium version

Titanium grade 2, Sapphire and F08 epoxy

#### Sensor flow cell body

ABS

### Retractable insertion assembly

#### Parts in contact with sample

Stainless steel (316/1.4408), Viton, TFM™1600

<sup>1</sup> Tested in accordance with MCERTS: Performance Standards and Test Procedures for Continuous Water Monitoring Equipment. Version 3.1: Environment Agency 2010.

<sup>2</sup>  $\pm 0.1$  NTU for measurement below 5 NTU, provided an accurate calibration is performed to compensate for environmental interferences. To achieve the best accuracy at low levels a two-point calibration is advised.

<sup>3</sup> Tested in accordance with BS ISO 15839: 2003.



## Dimensions

All dimensions in mm (in)

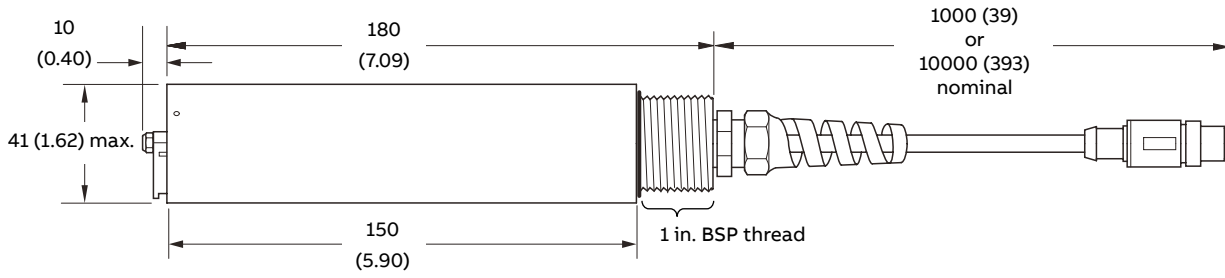


Figure 8 Sensor

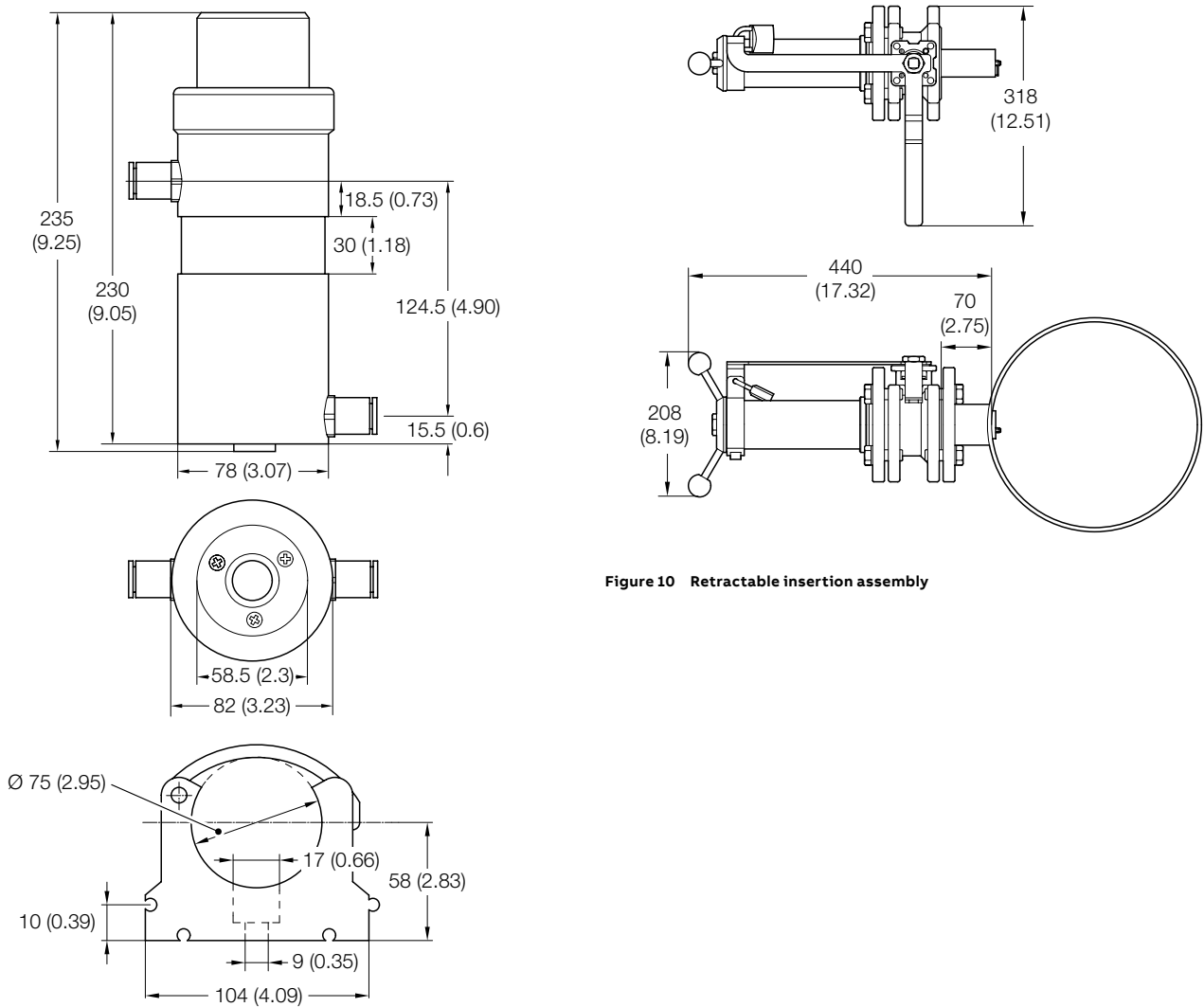


Figure 9 Flowcell

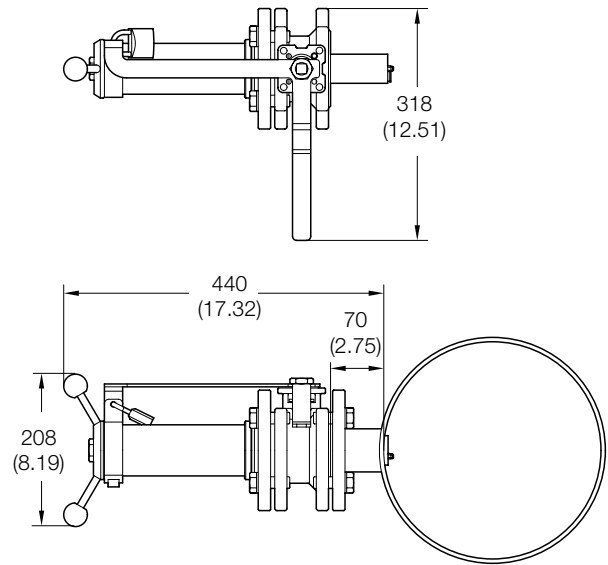


Figure 10 Retractable insertion assembly

## Ordering information

	Main code				Options			
	ATS430/	X	X	XX	XX	XXX	XX	XXX
<b>Aztec ATS430 turbidity sensor</b>								
<b>Build revision</b>								
Reserved	A							
<b>Sensor type</b>								
Stainless steel		1						
Stainless steel with wiper		2						
Titanium		3						
<b>Cable length</b>								
1 m (3.2 ft.) cable				A1				
10 m (32.8 ft.) cable				A2				
<b>Documentation language</b>								
German							M1	
Italian							M2	
Spanish							M3	
French							M4	
English							M5	
<b>Optional ordering code</b>								
Add one or more of the following codes after the standard ordering information to select any additional options if required.								
<b>Accessories</b>								
Sensor verification and calibration kit								A4
Calibration pot for use with formazine								A5
Wiper arm protection shroud								A6
<b>Mounting options</b>								
<b>Dip pole assemblies</b>								
Dip pole assembly (straight), metric 2.5 m (8.2 ft)								BA1
Dip pole assembly (90° bend), metric 2.5 m (8.2 ft)								BA4
Dip pole assembly (45° bend), metric 2.5 m (8.2 ft)								BA5
<b>Dip pole mounting adaptor kits (to attach to user-supplied pole)</b>								
Pole mounting adaptor kit (Straight) for attachment to 40 mm or 1.25 in. NB pole								BD1
Pole mounting adaptor kit (90°) for attachment to 1.25 in. NB pole								BD2
Pole mounting adaptor kit (45°) for attachment to 1.25 in. NB pole								BD3
Pole mounting adaptor kit (90°) for attachment to 40 mm pole								BD4
Pole mounting adaptor kit (45°) for attachment to 40 mm pole								BD5
<b>Dip pole mounting brackets</b>								
Wall mounting bracket for dip pole (40 mm or 1.25 in. NB)								BB1
Handrail mounting bracket (Tilt) for dip pole (40 mm or 1.25 in. NB), suitable for 42 or 51 mm (1.7 or 2.0 in.) dia. handrail								BB2
Handrail mounting bracket (Swivel & Tilt) for dip pole (1.25 in. NB), suitable for 42 or 51 mm (1.7 or 2.0 in.) dia. handrail								BB5
Handrail mounting bracket (Swivel & Tilt) for dip pole (40 mm), suitable for 42 or 51 mm (1.7 or 2.0 in.) dia. handrail								BB6
Open tank flanged mount for dip pole (40 mm or 1.25 in. NB)								BT1
<b>Chain mount options</b>								
Open channel mounting kit supplied with 3 m (9.8 ft.) chain								BB3
Chain fitting adaptor kit supplied with 3 m (9.8 ft.) chain								BB4
<b>Pipe mount options</b>								
Flow cell								BF1
Retractable insertion assembly								BH1
<b>Certification</b>								
Calibration certificate								CD
<b>EZLink digital sensor extension cable</b>								
1 m (3.2 ft)								E01
5 m (16.4 ft)								E05
10 m (32.8 ft)								E10
15 m (49.2 ft)								E15
25 m (82 ft)								E25
50 m (164 ft)								E50

## Acknowledgements

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Sales



Service







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