

CROSS SMART SENSOR

SA9L: Dual-Wavelength Detecting Sensor

Digital technology for optimized measures

FEATURES & BENEFITS

- LED light source, long life and low power consumption
- Dual-wavelength detection
- Choice of LEDs for different parameters
- Auto Temp. compensation for stable light emission
- In-situ and Real-time measurement
- Turbidity/SS compensation ensures good accuracy
- Optical path length: 1mm, 2mm, 5mm or 10mm
- LED ring on probe indicates working status
- Smart sensor with RS485/Modbus digital communication
- 316L SS housing standard, optional Titanium housing
- Compact construction, fully submersible
- Built-in wiper, very low maintenance

TYPICAL APPLICATIONS

Surface/Ground Water

- Environmental monitoring
- Water source of WTP

Waste Water

- Influent monitoring
- Biological Tanks
- Effluent monitoring
- Drainage System monitoring

Process water

- Reclaimed water
- Discharge monitoring for industrial facilities
- Cooling water or condensing water monitoring



GENERAL

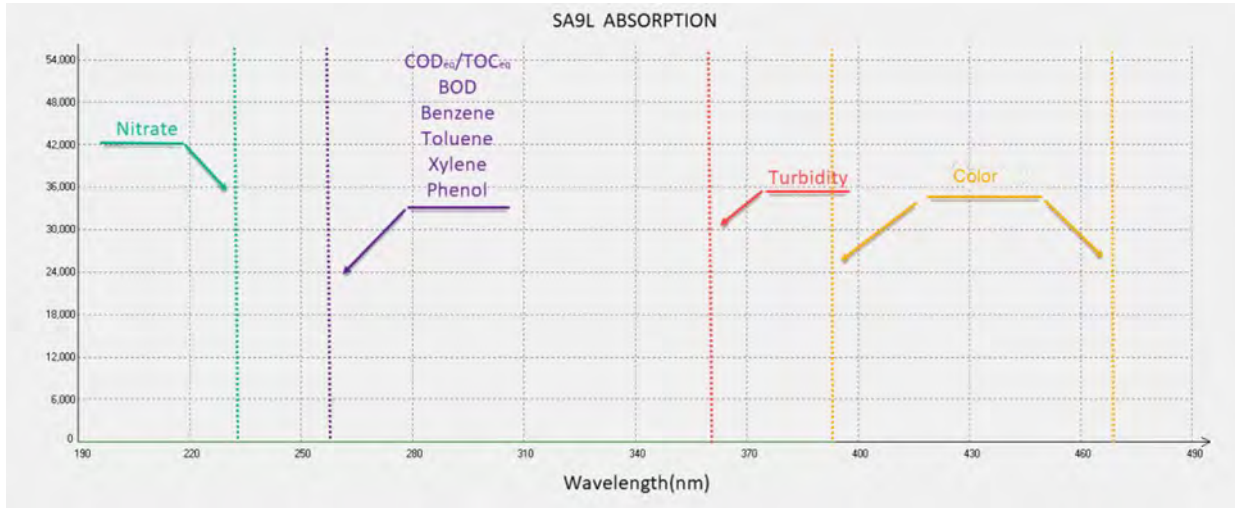
The newly redesigned SA9L series sensors enable reliable low-cost, accurate measurements of parameters like: COD, BOD, TOC, DOC, UV254/SAC254, NO₃, Color, Turbidity etc. Utilizing state-of-the-art LED light sources mated to highly sensitive photodetectors, the SA9L is a Dual-Wavelength Absorption Detecting Sensor designed for long-term, low-drift monitoring of water quality. All SA9L sensors have an embedded temperature sensor for automatic temperature compensation (ATC) to ensure stable light emission from the LEDs. The two wavelengths are selected according to the specific parameters and application requirements.

There are basically three kinds of sensors. For SA9L, one wavelength represents the primary target parameter, such as COD and the second wavelength represents the reference parameter like Turbidity or SS (suspend solid). Built-in corrections for Turbidity minimize interference of suspend solid in water environments. For example, to measure COD, 254 nm corresponds to absorption by dissolved organic matter (DOC) and 360 nm is used to compensate for turbidity/SS. Automatic turbidity/SS compensation is used to calculate organic matter concentration expressed as COD by the Beer-Lambert law.

For SA9LN, one wavelength represents the target parameter Nitrate (NO₃⁻) and the second wavelength represents the reference of Turbidity or Suspend Solid. The sensor can measure Nitrate in wastewater (Turbidity less than 200 NTU).

For SA9LC, one wavelength represents the target parameter Color (Hazen-t) and the second wavelength represents the reference of Turbidity/SS. Please note SA9LC can be used for clean water only (Range up to 50 Pt-Co, turbidity must be less than 20 NTU).

Following diagram for the relation between wavelengths and parameters.



The SA9L Sensors are available with several optical paths. Standard path lengths cover most applications: 1mm, 2mm, 5mm, 10mm. Different path length meet the requirements of different parameters and measuring ranges.

The SA9L adopts extremely durable sapphire windows that are very resistant to abrasion. An embedded wiper which can be programmed by a controller for automatic cleaning is helpful to remove the buildup of materials coating the windows. The standard probe is totally submersible with 316L stainless steel housing and there is an optional Titanium housing for special applications like sea water. Such features create a sensor that is low maintenance even under harsh conditions. Although in-situ installations in tanks and open channels is recommended, bypass sampling flow cells may be used when in-situ mounting is not possible.

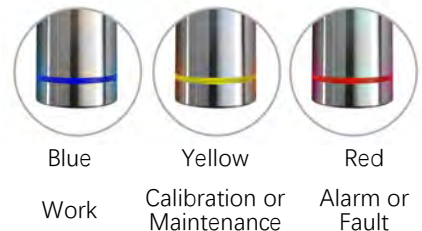
The SA9L sensors seamlessly connect to Delta-Phase's family of General Display & Controllers (GDC) by RS485/Modbus communication. The GDCs offer flexible calibration and configuration to the sensor. Setup is simple and quick. The GDCs have analog outputs, full function of control and data logging, multiple digital interfaces including Modbus & Bluetooth.

As the protocol is open, the SA9L can work with other terminals from third parties and may be interfaced to a PC. Connection to a PC is facilitated with Delta-Phase View™ software. The Delta-Phase View™ features powerful configuration/calibration function of the sensor and more extensive data logging than the GDC alone.

FOUR OPTICAL PATHS



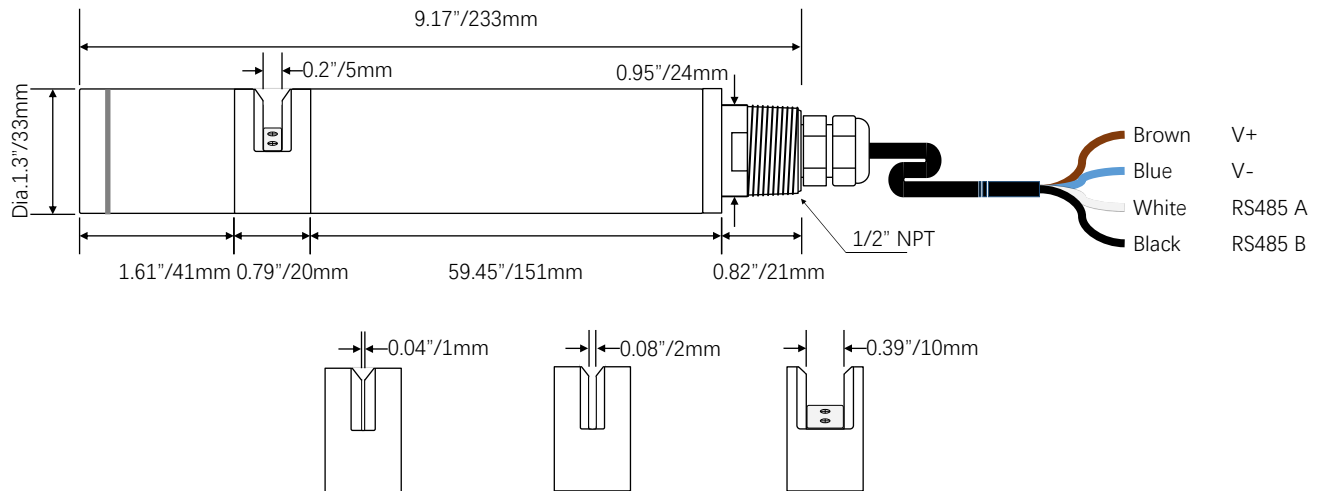
LED STATUS RING



THE TYPICAL OPTICAL PATH & RANGE OF TYPICAL APPLICATIONS

Applications	Industrial Wastewater	Influent of WWTP			Effluent of WWTP	Reclaimed / Surface Water
Optical Path	1 mm	2 mm	5 mm	5 mm	10 mm	
COD/BOD mg/l	10 to 2400	5 to 1000	2 to 500	2 to 500	1 to 200	
TOC mg/l					1 to 200	
Nitrate mg/l					0 to 100	
Color Pt-Co					0 to 50	
SS mg/l	30 to 6000	15 to 3000	5 to 1000	5 to 1000	2 to 500	
Turbidity NTU/FNU				2 to 500	1 to 200	

DIMENSION



Different optical paths for various measurement ranges

SPECIFICATIONS

Measuring Principle	Beer-Lambert law based on Dual wavelength Absorption Detection
Light source	LED light sources, two wavelengths, selectable based on specific parameters
Parameter	SA9L: COD, BOD, TOC, TSS/Turbidity SA9LN: Nitrate & Turbidity/TSS (<200NTU/500mg/l) SA9LC: Color & Turbidity (for Clean water, Color Range 0 to 50 Pt-Co, Turbidity < 20NTU)
Optical Path	1/2/5/10 mm, consult factory for special request.
Resolution	±1% F.S.
Accuracy	±5%
Measurement Interval	Min. 10s, 9999s Adjustable
Operating Temp.	14 to 122 °F (-10 to 50 °C)
Storage Temp.	14 to 140 °F (-10 to 60 °C)
Operating Pressure	< 5 bar
Material	Housing: 316L Stainless steel, optional Titanium Optical Window: Sapphire
Protection type	>IP68 immersible
Auto cleaning	Built-in wiper Optional air or water purging uses either compressed air of 3 to 5 Bar or pressurized water.
Interface	RS-485 Modbus RTU
Power	24VDC (12 to 30 VDC), Consumption normally 5W.
Dimension & Weight	1.3" O.D., 9.17" length (Diameter 33 x L233 mm) & 4.41 lbs. (2 kg) for SS housing probe

ORDER CODE

SA9L	Dual Wavelength Carbon Detecting Sensor		
SA9LN	Dual Wavelength Nitrate Detecting Sensor		
SA9LC	Dual Wavelength Color Detecting Sensor		
Housing Material			
- Standard Stainless Steel 316L			
- <i>T</i> Titanium			
Optical Path			
-001 1mm (For SA9L only)			
-002 2mm (For SA9L only)			
-005 5mm (For SA9L only)			
-010 10mm			
Cable Length			
-C20 20'			
-C30 30'			
-C50 50'			
More Length Please Contact Factory			
SA9L	-	005	-C30



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