

# OiW-100 Oil in Water Analyzer

Applied Analytics DS-006A — Revised 07 July 2017



## Continuous analysis of total petroleum concentration in water.

As global oil production grows each year, so does the amount of water being released into the environment from refining and other processes. Continuously monitoring dynamic oil concentrations in effluent water, the OiW-100 is a painless and economical option for complying with increasingly stringent wastewater regulations. Measuring aromatics' absorbance from 250 to 320 nm, the OiW-100 accurately correlates total oil concentrations from trace levels to high contamination.

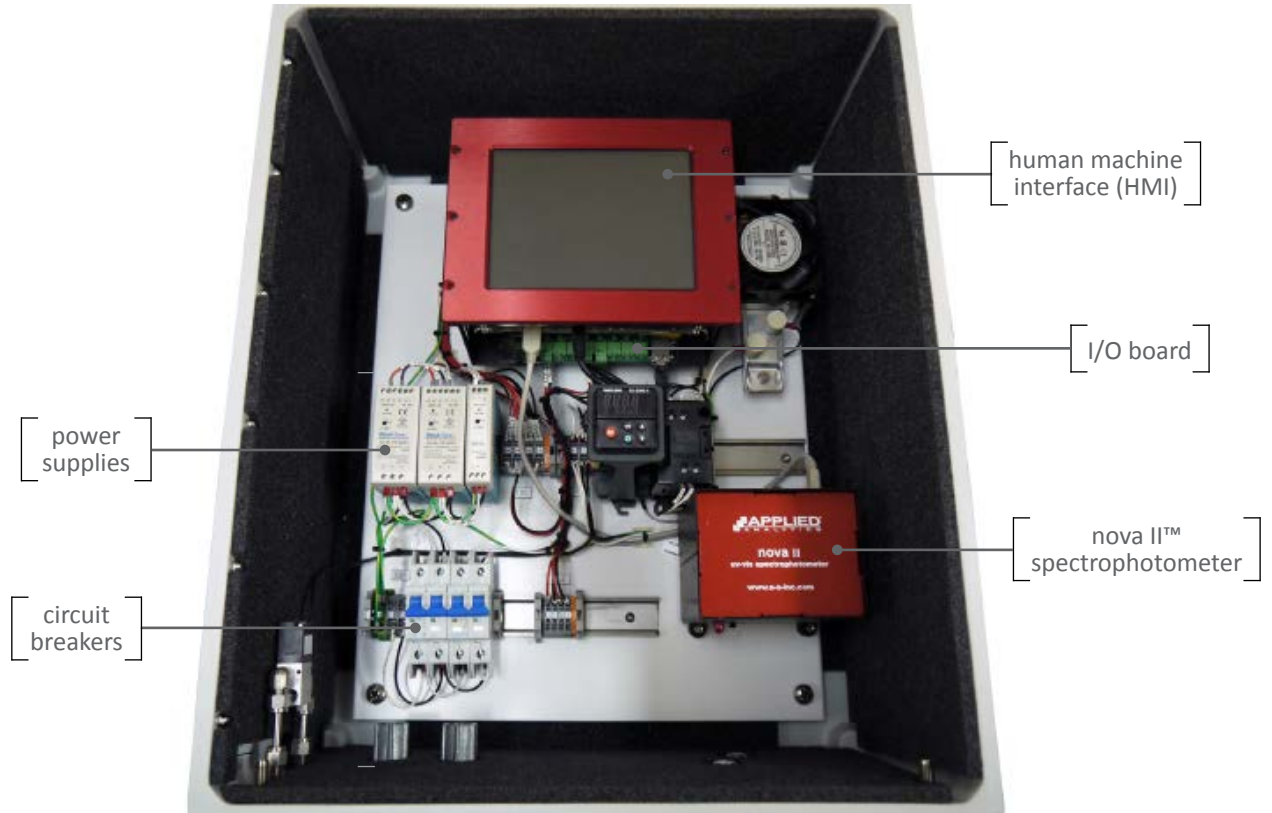
### Features

- » Continuously measures total petroleum concentration in a homogenous water stream sample
- » Totally solid state build with no moving parts — modern design for low maintenance
- » Correlates aromatic hydrocarbons' absorbance to total oil using customer sample for precise calibration
- » Long-lifespan xenon light source (avg. 5 years)

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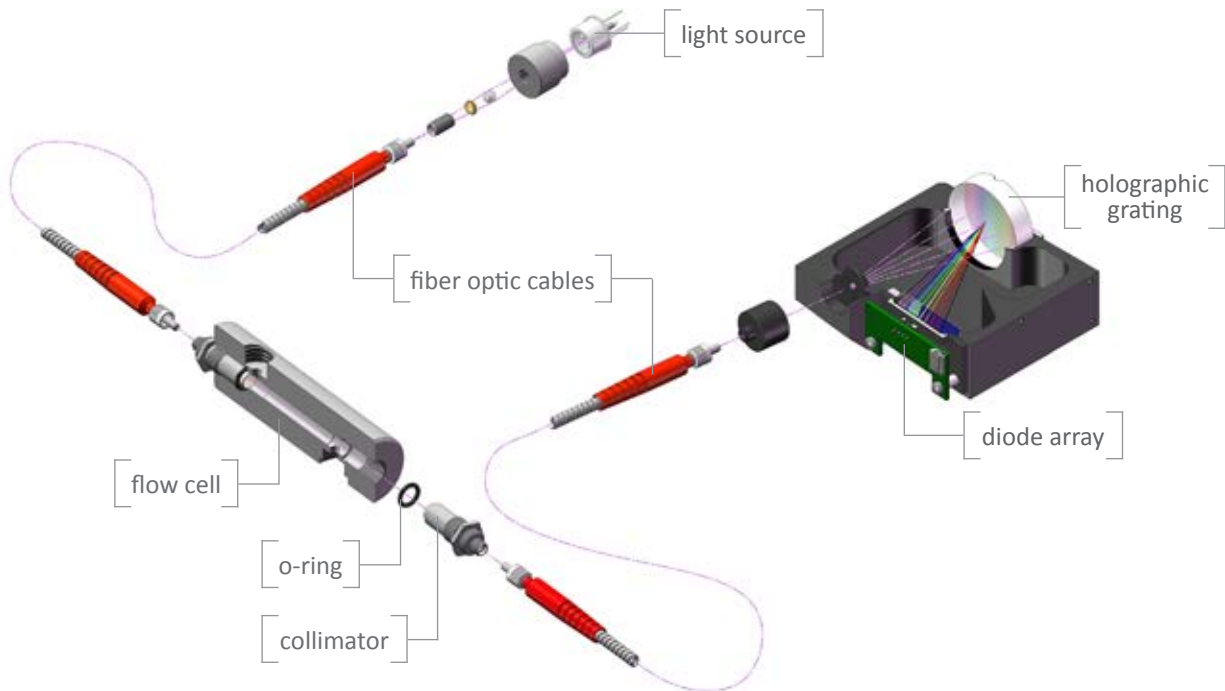
## OiW-100 Internal Components



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## Optical Assembly & Principle of Operation



The OiW-100 measurement cycle is instantaneous, but it can be helpful to visualize it in stages:

- (1) The white light signal originates in the pulsed Xe lamp that functions as the light source.
- (2) The signal travels via fiber optic cable to the flow cell. A collimator narrows the light beam.
- (3) The signal travels directly across the flow cell, interacting with the continuously drawn process sample.
- (4) The signal exits the flow cell through a collimator, now containing the distinct absorbance imprint of the current chemical composition of the sample.
- (5) The signal travels via fiber optic cable to the nova II.
- (6) The signal is dispersed by the holographic grating. Each differentiated wavelength is focused onto a designated photodiode within the diode array. The nova II provides this rich data to the HMI for real-time visualization of the absorbance spectrum.

## The Oil Measurement

In various industries, complying with environmental regulations often boils down to verifying specified limits for oil content in effluent water. In order to validate their investments in wastewater processing, refineries and plants require highly accurate online monitoring of dissolved and un-dissolved hydrocarbon concentrations in runoff water. High oil content in effluent water also presents a maintenance concern, as it often indicates equipment failure (e.g. leaky heat exchangers) and that the wastewater is unfit for reuse in the facility.

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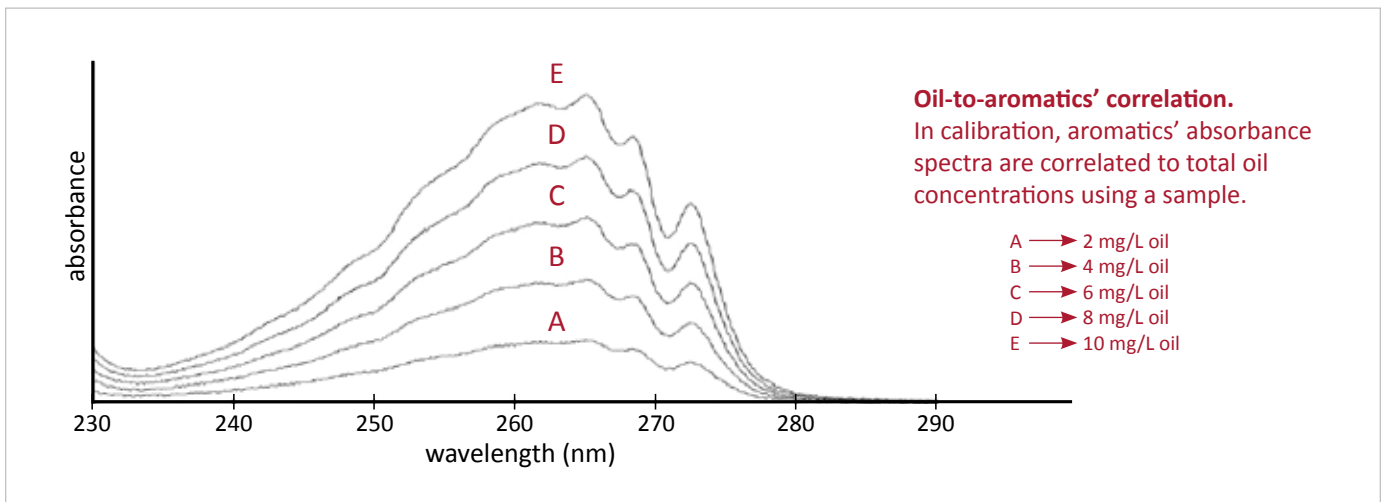
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By nature, petroleum is a mixture of many compounds; this complex constitution (including hundreds of unique organic compounds) makes it impossible to directly measure the concentration of oil in solution. How can we verify that this vague mixture is below limits in our wastewater?

The answer lies in aromatic hydrocarbons, which, on average, comprise 15% (by weight) of crude oil. These molecules have strong absorbance features in the 250-320nm wavelength range and can thus be easily detected through UV-VIS (ultraviolet-visible) spectrophotometry.

The OiW-100 continuously monitors the total aromatics' concentration in wastewater streams. While conventional photometric analyzers will only measure absorbance at the 254nm benzene peak--a single value susceptible to cross-interference and lacking any internal reference for validation--the OiW-100 uses diode array technology to measure the absorbance spectrum across the full 250-320nm aromatic absorbance range.

The system correlates aromatics' concentration to total oil in the water. To perfect the correlation, the instrument is calibrated for the typical composition of oil in the customer's wastewater (using a process sample).

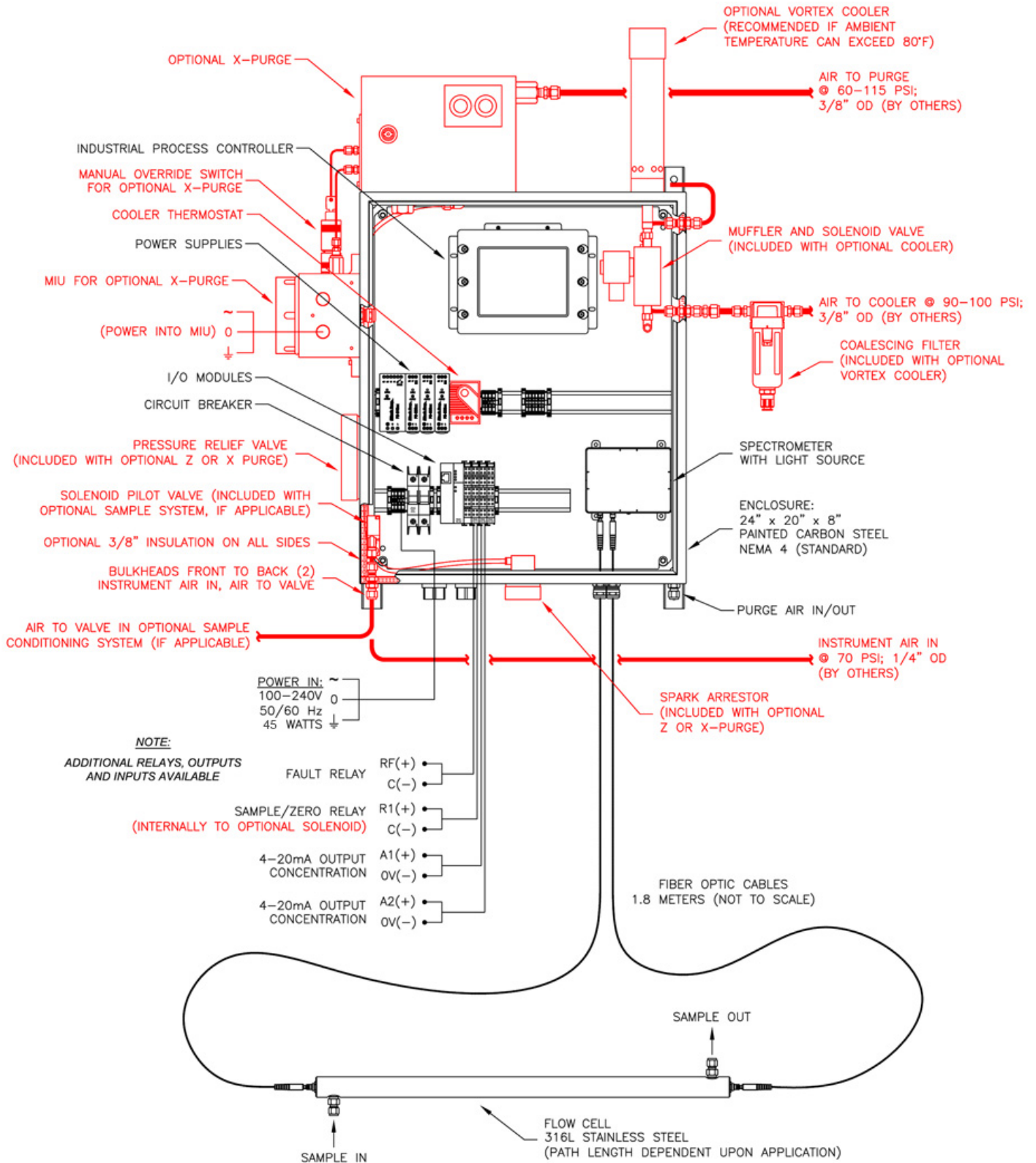


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## OiW-100 Technical Drawing

COMMON OPTIONS SHOWN IN RED



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All performance specifications are subject to the assumption that the sample conditioning system and unit installation are approved by Applied Analytics. For any other arrangement, please inquire directly with Sales.

Subject to modifications. Specified product characteristics and technical data do not serve as guarantee declarations.

Technical Data	
<b>General</b>	
Measurement Principle	Dispersive UV-Vis absorbance spectrophotometry
Detector	nova II™ Spectrophotometer Data sheet: <a href="http://aai.solutions/documents/AA_DS201A_novall.pdf">http://aai.solutions/documents/AA_DS201A_novall.pdf</a>
Spectral Range	200-800 nm
Light Source	Standard: pulsed xenon lamp with average 5 year lifespan
Fiber Optic Cables	Standard: 600 µm core 1.8 meter fiber optic cables (qty = 2) Data sheet: <a href="http://aai.solutions/documents/AA_DS206A_FiberOptics.pdf">http://aai.solutions/documents/AA_DS206A_FiberOptics.pdf</a>
Sample Medium	Homogenous phase liquid
Sample Introduction	Standard: stainless steel 316L flow cell with application-dependent path length Options in data sheet: <a href="http://aai.solutions/documents/AA_DS207X_FlowCell_All.pdf">http://aai.solutions/documents/AA_DS207X_FlowCell_All.pdf</a>
Sample Conditioning	Custom design if necessary
Analyzer Calibration	If possible, analyzer is calibrated with customer sample; no re-calibration required after initial calibration; measurement normalized by Auto Zero.
Reading Verification	Simple verification with samples and self-check diagnostic
Human Machine Interface	Applied Analytics standard HMI: industrial controller with touch-screen LCD display Data sheet: <a href="http://aai.solutions/documents/AA_DS202A_HMI.pdf">http://aai.solutions/documents/AA_DS202A_HMI.pdf</a>
User Interface	ECLIPSE™ Runtime Software Data sheet: <a href="http://aai.solutions/documents/AA_DS203A_Eclipse.pdf">http://aai.solutions/documents/AA_DS203A_Eclipse.pdf</a>
Data Storage	Solid State Drive Data sheet: <a href="http://aai.solutions/documents/AA_DS204A_SSD.pdf">http://aai.solutions/documents/AA_DS204A_SSD.pdf</a>
Enclosure	Standard: wall-mounted, carbon steel NEMA 4 enclosure Options in data sheet: <a href="http://aai.solutions/documents/AA_DS401X_Enclosures.pdf">http://aai.solutions/documents/AA_DS401X_Enclosures.pdf</a>
Available Certifications	Standard: General Purpose Available Options: ATEX, IECEx, EAC <i>Please inquire with your sales representative for additional certifications (CSA, FM etc.).</i>
<b>Measuring Parameters</b>	
Accuracy	@ range 0-20 mg/L: ±2% full scale
Response Time	Analyzer response time is 1 to 5 seconds
Zero Drift	±0.1% after 1hr warm-up (measured over 24hrs at constant ambient temp.)
Sensitivity	±0.1% full scale
Noise	0.004 AU at 220 nm
<b>Sample Conditions</b>	
Sample Temperature	Using flow cell: -20 to 150 °C (-4 to 302 °F)
Sample Pressure (max)	Using flow cell: 206 bar (3000 psi)
<b>Ambient Conditions</b>	
Analyzer Environment	Indoor/Outdoor (no shelter required)
Ambient Temperature	Standard: 0 to 35 °C (32 to 95 °F) With optional temperature control: -20 to 55 °C (-4 to 131 °F) <i>To avoid radiational heating, use of a sunshade is recommended for systems installed in direct sunlight.</i>

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Physical Specifications	
Dimensions	Analyzer: 24" H x 20" W x 8" D (610mm H x 508mm W x 203mm D) SCS (if included): custom size
Weight	Analyzer: 32 lbs. (15 kg) SCS (if included): variable depending on custom build
Wetted Materials	Standard: K7 glass, Viton, stainless steel 316L <i>Various custom materials available — please inquire.</i>
Utility Requirements	
Electrical Requirements	85 to 264 VAC 47 to 63 Hz
Power Consumption	45 watts
Outputs/Communication	
Outputs	1x galvanically isolated 4-20mA analog output per measured analyte 2x digital outputs for fault and SCS control Optional: Modbus TCP/IP; RS-232; RS-485; Fieldbus; Profibus; HART; more
I/O Electronics	Voltage/Current Interface Module (i.e. I/O Board) Data sheet: <a href="http://aai.solutions/documents/AA_DS205A_VCIM.pdf">http://aai.solutions/documents/AA_DS205A_VCIM.pdf</a>



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