Water in Ethanol Analyzer

Introduction

Ethanol is a popular biofuel that is reguarly used as an effective alternative to fossil fuels such as gasoline or diesel. A growing interests in biofuels like ethanol has been stimulated by the limited quantity of available oil, ever-increasing petroleum costs, pollution concerns, and political pressure to decrease reliance on foreign fuels. To reduce the consumption of petroleum, ethanol with at most 1% water can be added to gasoline. However, for ethanol to be used as fuel, water must first be removed through distillation. This requirement creates the need for an efficient analyzer that can continously monitor the quality of the produced ethanol. Fortunately, CST's Water in Ethanol Analyzer is the perfect solution for continuous, real-time monitoring.

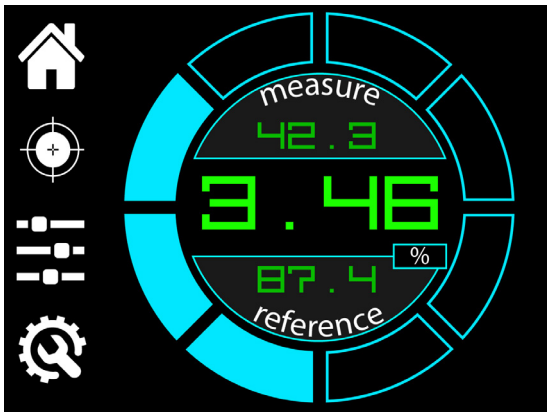
Features

- ◊ Continuously and accurately measures the presence of water in ethanol using NIR spectroscopy.
- ◊ The all-inclusive Water in Ethanol Analyzer comes preassembled in a waterproof NEMA4X enclosure with a dedicated sample flow cell outside of the enclosure. The analyzer includes a PX2+ NIR photometer with two fiber optic cables and a cross flow cell with two optical interface couplers.
- ◊ More efficient and less expensive than Karl Fischer titration. No reagents required and results are produced in real-time.
- ◊ Easy to use software with a digital touch display allows users to view data and calibrate.
- ◊ Standard data outputs include MODBUS, 4-20mA, and USB to CST Software.
- ◊ Low cost of ownership with no routine maintenance.

Applications

- ◊ Ethanol production
- ◊ Water in alcohol monitoring

CST's Water in Ethanol Analyzer includes a PX2+ with (2) fiber optic cables and a cross flow cell with (2) optical interface couplers.



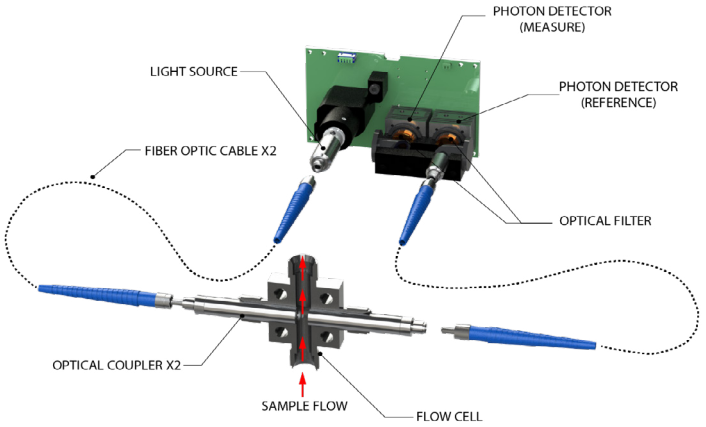
PX2+ Capacitive Touch LCD

Custom Sensors & Technology
531 Axminister Dr.
Fenton, MO 63026

Phone: (636) 305-0666
Sales@customsensors.com
www.customsensors.com

Theory of Operation

CST's Water in Ethanol Analyzer contains a PX2+ NIR photometer that utilizes Beer's Law, the attenuation of light as it passes through a substance, to monitor changes in properties of an analyte in process. It sends optical radiation from a tungsten halogen lamp within the instrument out to a cross flow cell and returns the signal to the instrument via optical interface couplers and fiber optic cables. The PX2+ uses optical filters to provide specific measure/reference wavelength ranges chosen to coincide with water absorbance. This method of analysis for water in ethanol is much faster and less expensive than Karl Fischer titration.



Technical Specifications

General	
Measurement Principle	NIR Absorbance
Light Source	Tungsten Halogen Lamp
Detector	Two Stage TE-cooled InGaAs Photodiode
Fiber Optic Cables	(2) 1 meter, 600 micron core
Sample Introduction	3/8" 316 Stainless Steel Cross Flow Cell
Calibration	Analyzer is calibrated with customer sample; measurement normalized by zeroing every 1-2 months.
Range / Repeatability / Path Length	Water in Ethanol 0-1% = ± 0.01% / 10.64mm 0-10% = ± 0.1% / 2mm
Response Time	1 second
Power Requirement	24VDC nominal (12-48VDC), 8.5 watts max
Dimensions of Photometer	5" H x 5.8" W x 2.8" D
Weight of Photometer	3.5 lbs. (1.6 kg)
Enclosure	NEMA4X anodized aluminum

Operating Conditions	
Process Temperature	204°C max
Operating Temperature	-20°C to 32°C
Storage Temparture	-20°C to 50°C
Process Pressure	2000psi max
Minimum Flow Rate	100 ml/min

Communications	
Outputs	4-20mA, RS-485 (MODBUS), or USB
Alarms	Contact closure (60VDC, 0.75 A max)
Display	3.2" capacitive touch LCD

*All information provided in this datasheet is subject to further application engineering based on customer sample.

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