

Nucleic Acid Analyzer

DNA/RNA Purity

Introduction

Nucleic acids are the building blocks of life in all living things, from plants and animals to bacteria and viruses. In research, it's important to ascertain the purity of DNA and RNA samples prior to downstream processes like sequencing, PCR, and restriction enzyme digestions and ligations along with many other applications.

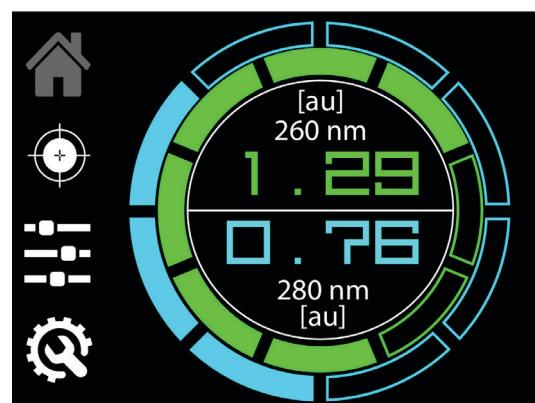
Proteins and other contaminants like phenol and salts may interfere with the sample and produce a lower absorbance ratio. This informs users that contaminants are present in the sample and allows a change to be made before the contaminated sample ends up in downstream processes. Fortunately, CST's Nucleic Acid Analyzer is designed for continuous, real-time monitoring of nucleic acid purity.

Features

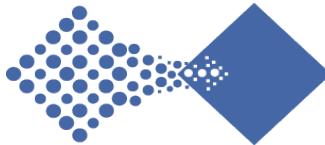
- ◊ Continuously and accurately measures nucleic acid purity by monitoring both DNA and RNA at 260nm and proteins at 280nm with UV spectroscopy.
- ◊ The all-inclusive Nucleic Acid Analyzer comes preassembled in a waterproof NEMA4X enclosure with a dedicated sample flow cell outside of the enclosure. The analyzer includes a PX2+ photometer with two fiber optic cables and a flow cell with two optical interface couplers.
- ◊ Easy to use software with a digital touch display allows users to view data and calibrate.
- ◊ High reliability with a typical light source lifetime of 5 years.
- ◊ Standard data outputs include MODBUS, 4-20mA, and USB to CST Software.
- ◊ Low cost of ownership with no routine maintenance or expensive dyes required.



CST's Nucleic Acid Analyzer includes a PX2+ with (2) fiber optic cables and a flow cell with (2) optical interface couplers



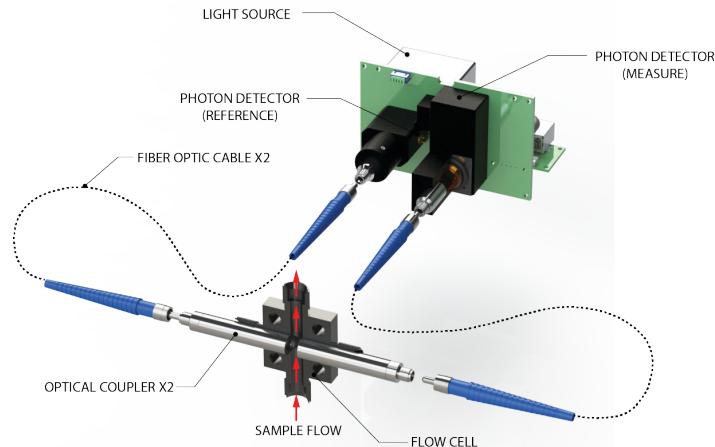
PX2+ Capacitive Touch LCD



Theory of Operation

The use of ultraviolet spectroscopy is certainly the best method of measurement for nucleic acid purity. CST's Nucleic Acid Analyzer contains a PX2+ 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 ultraviolet light from a dual LED within the instrument out to a flow cell and returns the signal to the instrument via optical interface couplers and fiber optic cables. The PX2+ uses a dual LED to provide specific measure wavelength ranges chosen to coincide with nucleic acid and protein absorbance.

The Nucleic Acid Analyzer is a dual wavelength analyzer and measures nucleic acid at 260nm and proteins at 280nm simultaneously. Light absorbed by the nucleic acid in the samples correlates to the concentration of nucleic acid present. Both DNA and RNA absorb light at 260nm, therefore this is a measurement of total nucleic acid. The PX2+ also takes a measurement at 280nm because this is the absorbance peak for proteins made up of aromatic amino acids. The ratio of the 260nm and 280nm measurements provides an estimation of the purity of the nucleic acid, with a ratio near two indicating a highly pure nucleic acid sample. Ultraviolet spectroscopy has long been the method of choice to measure nucleic acid purity because it is rapid, simple, and nondestructive to the sample.



Technical Specifications

General	
Range / Path Length	0-100 µg/ml Nucleic Acid in solution; 2mg/ml Protein in Solution; Pathlength = 1cm 0-10000 µg/ml Nucleic Acid in solution; 200 mg/ml Protein in Solution; Pathlength = 0.1mm
Repeatability	± 1% of Full Scale
Measurement Principle	UV Absorbance
Light Source	260nm and 280nm LED
Detector	Silicon Photodiode
Fiber Optic Cables	(2) 2 meter, 600 micron core
Sample Introduction	3/8" 316SS Cross Flow Cell
Process Pressure	2000psi max
Minimum Flow Rate	100 ml/min
Calibration	Analyzer is calibrated with customer sample; measurement normalized by zeroing every 1-2 months or as needed.
Response Time	1 second
Power Requirement	24VDC nominal (12-48VDC), 8.5 watts max
Dimensions of Photometer	2.8" H x 4.5" W x 9.5" L

PX2+ Operating Conditions	
Process Temperature	204°C
Operating Temperature	5°C to 50°C
Storage Temparture	-20°C to 50°C

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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