

## Protein Analyzer

### Absorbance

### Introduction

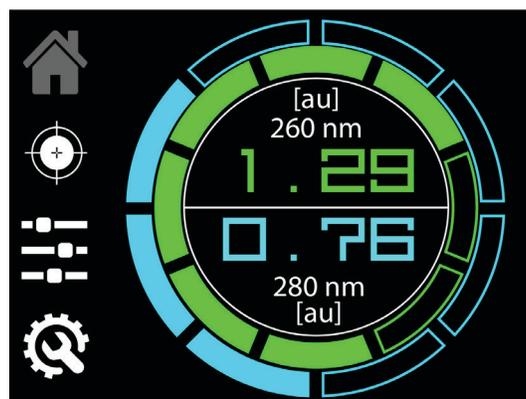
Quantifying or identifying the absence or presence of proteins by directly measuring UV absorbance provides for fast, convenient results which are critical for biopharmaceutical and bioprocess applications. This method is widely used for detection of proteins during their separation by chromatography. Proteins exhibit a distinct UV absorption maximum at 280 nm, however nucleic acids sometimes present in the sample also absorb at 280 nm. The measurement at only 280 nm can identify the absence or presence of a protein and is more suited for the comparison of solutions of the same protein and less for absolute measurement. To make a more accurate determination of concentration, proteins can be monitored at 260 nm and 280 nm and the concentration can be calculated. CST offers photometers that monitor proteins exclusively at 280 nm or a dual wavelength photometer capable of monitoring at 260 nm and 280 nm simultaneously. CST's Protein Absorbance Analyzers are designed for continuous, real-time monitoring of protein.

### Features

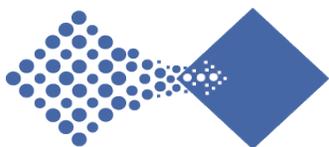
- ◇ Continuously and accurately measures protein concentration by monitoring UV absorbance.
- ◇ The all-inclusive Protein Absorbance Analyzer comes preassembled in a waterproof NEMA4X enclosure with a dedicated sample flow cell outside of the enclosure. The analyzer includes a PX2+ Photometer with two fiber optic cables and a flow cell with two optical interface couplers.
- ◇ UV light source is non-destructive to the sample.
- ◇ 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 or labeling required.



*CST's Dual Wavelength Protein Absorbance Analyzer includes a PX2+ with (2) fiber optic cables and a flow cell with (2) optical interface couplers*



*PX2+ Dual Wavelength Capacitive Touch LCD*



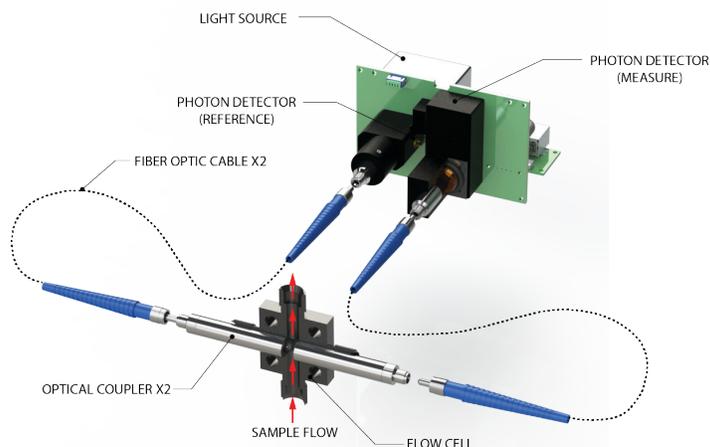
## Theory of Operation

CST's Protein Absorbance 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 an 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 an LED to provide specific measure wavelength ranges chosen to coincide with protein absorbance.

The Protein Absorbance Analyzer can be configured to measure at 280 nm exclusively or at 260 nm and 280 nm simultaneously. Light absorbed by the protein in the sample correlates to the concentration of protein present. The measurement at 280 nm is more suited for the comparison of solutions of the same protein and less for absolute measurement, while the dual wavelength measurement can be utilized to calculate a more accurate protein concentration estimate. Monitoring protein concentrations by measuring their absorbance is an excellent method because it is rapid, simple, and nondestructive to the sample.

## Technical Specifications

| General                  |  |
|--------------------------|--|
| Range / Path Length      | 0.04mg/ml Protein in Solution;<br>Pathlength = 50cm<br><br>2mg/ml Protein in Solution;<br>Pathlength = 1cm<br><br>200 mg/ml Protein in Solution;<br>Pathlength = 0.1mm |
| Repeatability            | ± 1% of Full Scale   |
| Measurement Principle    | UV Absorbance  |
| Light Source             | 280nm or 260/280nm Dual LED  |
| Detector                 | Silicon Photodiode   |
| Fiber Optic Cables       | (2) 2 meter, 600 micron core   |
| Sample Introduction      | 3/8" 316SS Cross Flow Cell   |
| Process Pressure         | 2000 psi 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),<br>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 Temperature   | -20°C to 50°C |

### Communications

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

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