

## Protein Analyzer

### Fluorescence

### Introduction

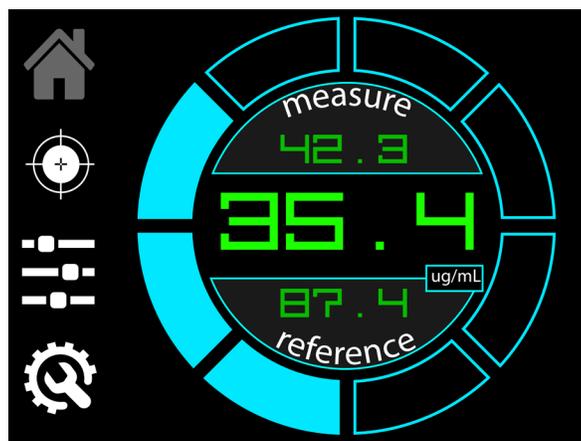
Quantifying proteins by monitoring UV fluorescence has become a crucial tool in biopharmaceutical and bioprocess applications due to its robustness, high sensitivity, and non-invasiveness. By utilizing the intrinsic fluorescence of proteins, a concentration measurement can be made using our PX2+ Photometer with our Front Surface Fluorescence Probe. Intrinsic fluorescence is also a strong indicator of protein structure and function and can give researchers and technicians an understanding of the protein's conformational states under various conditions like pH and temperature. CST's Protein Fluorescence Analyzer is designed for continuous, real-time monitoring of protein concentrations without the need for expensive dyes or labeling.

### Features

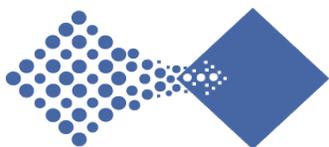
- ◇ Continuously and accurately measures protein concentration by monitoring UV fluorescence.
- ◇ The all-inclusive Protein Fluorescence Analyzer comes preassembled with a PX2+ Photometer attached to a Front Surface Fluorescence Probe via fiber optic cables.
- ◇ The fluorescence probe can easily be removed, cleaned, and re-installed if required.
- ◇ 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 10 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 Protein Fluorescence Analyzer includes a PX2+ with a Front Surface Fluorescence Probe*



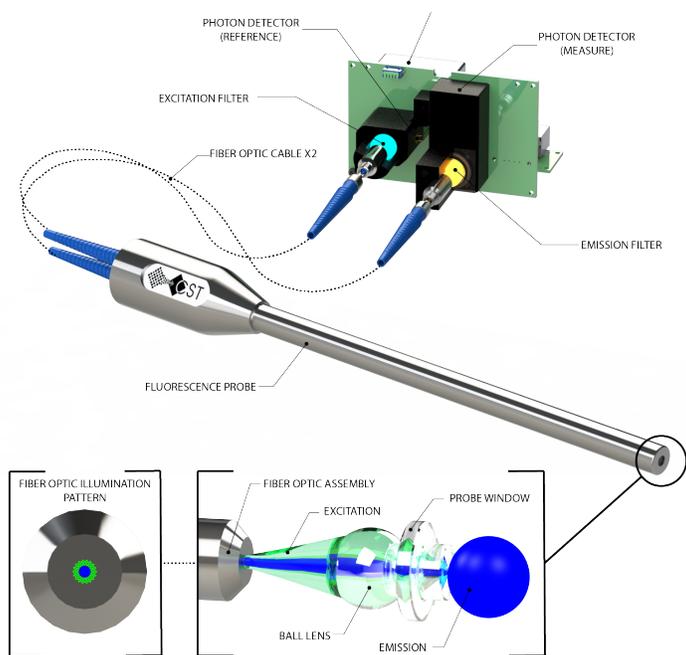
*PX2+ Capacitive Touch LCD*



### Theory of Operation

CST's Protein Fluorescence Analyzer contains a PX2+ UV Photometer that uses optical filters to provide specific excitation/emission wavelength ranges chosen to coincide with protein fluorescence. Fluorescence occurs when a molecule absorbs light energy at one wavelength and re-emits light at another, typically longer, wavelength. The wavelength where the maximum absorption occurs is called the excitation wavelength, and the wavelength where the maximum emission occurs is called the emission wavelength.

The Protein Fluorescence Analyzer monitors intrinsic protein fluorescence by exciting protein typically at 280 nm and measuring the emission at approximately 350 nm. Light emitted by the protein sample correlates to the concentration of protein present. Fluorescence measurements are highly sensitive and are more suitable for low protein concentrations as compared to absorbance measurements. Monitoring protein concentrations by measuring their intrinsic fluorescence is an excellent method because it is rapid, simple, and requires no expensive dyes or labeling.



Covered under US Patent # 7,382,458

### Technical Specifications

| General                  |   |
|--------------------------|---|
| Range                    | Application Dependent   |
| Accuracy                 | ± 1% of Full Scale  |
| Repeatability            | ± 0.5% of Full Scale  |
| Measurement Principle    | UV Fluorescence   |
| Light Source             | Xenon Flash Lamp  |
| Detector                 | PMT and Silicon Photodiode  |
| Fiber Optic Cables       | (2) 2 meter, 600 micron core  |
| Sample Introduction      | In-situ of Extractive   |
| 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), 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  |

| Front Surface Fluorescence Probe |   |
|----------------------------------|---|
| Wetted Materials                 | 316SS Body, Sapphire Window, and Viton Seal |
| Temperature Rating               | 0-400°F                                     |
| Pressure Rating                  | 2,000 psi                                   |
| Insertion Length                 | 8.66" / 220mm (custom available)            |

| 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), 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.