Guided Wave INCORPORATED

Process Analytical Systems

Simulplex SMART™ Photometer for Two Sample Points

Simulplex is a special configuration of our popular Optical Solutions' brand ChemView photometer. **Simulplex** means simultaneous multiplexing. **Simulplex** is designed to measure:

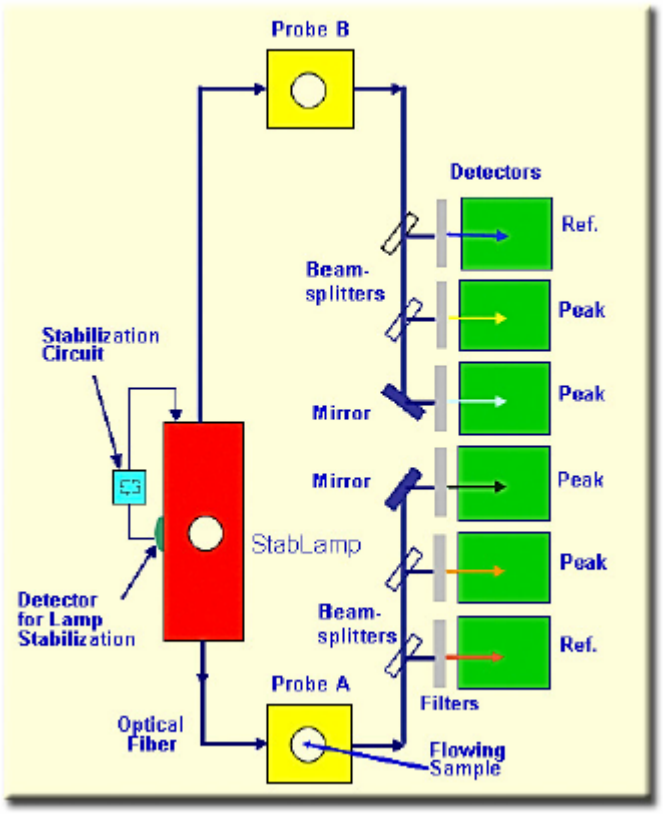
- 2 sample streams
- All wavelengths measured simultaneously
- All outputs transmitted simultaneously
- NO-MOVING-PARTS for low maintenance
- Same SMART PHOTOMETER technology as ChemView for rapid diagnostics

Probe 2

Probe 1

Notice in this picture that there are two additional optical fibers (in strain relief fittings) at the top of the NEMA 4X enclosure. These go to the second insertion probe or flow cell.

As shown in the schematic to the right, our patented design is a modification of our ChemView layout. We mirror image the lamp, having focusing optics on both sides of the lamp. Light is transmitted in two opposite directions, each to an independent fiber optic insertion probe of flow cell. The light returning from the sample streams enters the linear row of detectors inside ChemView on opposite sides. We divide the detectors into two groups, identified in software as "A" and "B". As in ChemView, the light within each group is divided up among a reference wavelength detector and several analyzing wavelength detectors. We then put a mirror at the position of the last detector for each group, bringing all remaining light into the last detector position for that group. Notice that there are no moving parts and all the wavelengths are being analyzed simultaneously. The signals are again converted into absorbance. Calibration coefficients are applied to the absorbances to determine chemical concentration. The chemical concentrations are scaled and transmitted via 4-20 mA analog outputs. There are a total of 6 analog outputs possible.



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How We Set Up Simulpex for Two Probes

There are a maximum of 6 detectors in Simulplex. Thus, we can divide groups "A" an "B" into the following number of filters/detectors:

- 2 + 2
- 3 + 3
- 4 + 2

For example in the last case, there would be 1 reference wavelength and 3 analyzing wavelengths for group "A", and 1 reference wavelength and 1 analyzing wavelength for group "B".

Let's say that your Simulplex is measuring ppm water at both probe locations at 1900 nm. The way Simulplex distinguishes the separate detector/filter modules for each probe is to give them a GROUP "A" or "B" designation, as shown in the following Simulplex screens. There is a GROUP A 1900 nm detector and a GROUP B 1900 nm detector. Once these are defined, then the first answer, H2O_A, will use the correct 1900 nm detector and apply the coefficients from the middle screen identifying WATER GROUP A, and similarly for GROUP B. We let you know which pins on the terminal strip represent the WATER_A or WATER_B ppm output for the 4-20 mA analog wiring.

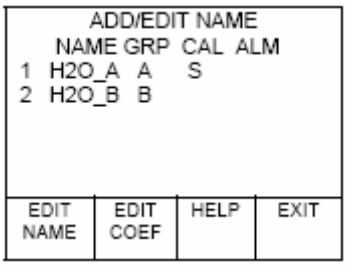
SMART PHOTOMETER Diagnostics

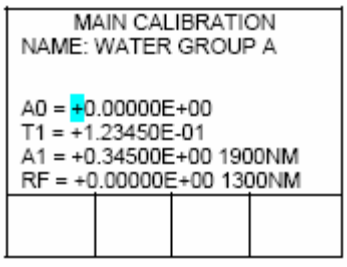
Simulplex's diagnostic features with fault alarms are extensive, helping the instrument specialist to determine:

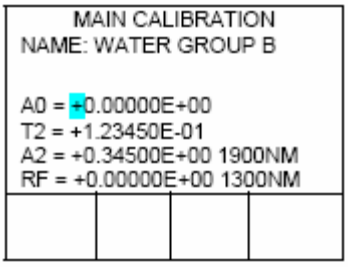
- lamp replacement
- window fouling
- fiber breakage
- sample cell failure
- intermittent cloudiness or turbidity

If there are no system faults, ChemView can further help in determining if the sample is an "outlier", that is, it does not "fit" within the calibration model. ChemView optionally has a patented chemical outlier detection (OutlierDetect) capability that can be trended or alarmed if the calibration uses 2 or more analytical wavelengths.

Lastly, ChemView can be provided with VirtualView, where an operator has access to nearly all menus, output scalings and calibration coefficients on a remote PC via local area network. This saves time in sending an instrument specialist to another building to check a specific reading on the LCD display or upgrading the prediction model with new coefficients.







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Specifications

Enclosures	• NEMA 4x 304SS • Class 1,Div. 1,2, Groups B-D (Z- or X-purge) 304SS • ATEX (non-purged) powder-coat Al
Dimensions	• NEMA 8x6x10" (wxdxh) (20x15x25cm) 14.5 lbs, 6.6 kg • C1D1/2 15x9x16" (wxdxh) (38x21x41cm) 40 lbs, 18.2 kg • ATEX 24x20x31.8cm (wxdxh) 18.2 kg
Certifications	• C1D1 NFPA 496, 1993, FM compliant • CE • ATEX II 2 EEx d IIC T6
Purge	Expo-Safety Systems, continuous flow sub-miniPurge (1ZCFSS1S). Intrinsically safe switch closure and pneumatic "winkie" fo purge loss. 1/2" NPTF purge fitting. Purge vent orifice is Size 1 (for 0.4 cfm; 10 L/min). Allow 6 min. purge cycle (min. 4 volumes) prior to power up
Purge Gas	110 p.s.i. clean, dry compressed air or inert gas
Fiber Connections	SMA 905 400 - 600 micron (core)
Detectors	Max. 2+2, 3+3, 4+2 for Group "A" + "B" • Si for 250-950 nm • InGaAs for 900-1650 nm • TE-Cooled extended InGaAs for 1000-2150nm
Filters	10 nm FWHM for UV/VIS, 15 nm for NIR typical. 4 OD out-ofband blocking
Light Source	• Optical Solutions brand StabLamp, optical feedback circuit, Tungsten-halogen bulb, precision mounting for easy replacement. Approx 8 months bulb life nominal • Pulsed Xe lamp for UV/VIS. Approx 2 year bulb life
Wavelength Drift	0.1 nm with Si detector 0.2 nm near 1450 nm with InGaAs detector
Photometric Drift	<2 mAU with ±5ºC variation (±2 to 3 mAU with Xe) 0.2 mAU/ºC at 0 AU typical <2 mAU over 2 weeks
Photometric Noise	<1 mAU (3 mAU with Xe source)
Outputs	4 4-20 mA isolated, self-powered. 2 4-20 mAU additionally optional for a total of 6
Environmental	10 - 40 ºC, 10-90% rel. humidity (non-condensing)
Power	110 - 240 V AC, 50-60 Hz, 70 VA (24 V DC, 2.1 A

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