

## H<sub>2</sub>O<sub>2</sub> Vapor Monitor

**The Guided Wave H<sub>2</sub>O<sub>2</sub> Vapor Monitor is a turnkey solution for the measurement of hydrogen peroxide and water vapor concentrations. Because it operates in real time, this monitor takes the guesswork out of determining the hydrogen peroxide vapor level during cycle development and throughout the actual sterilization cycle. The process engineer now has continuous, accurate data for documentation of the cycle.**

### Proven Technology

Guided Wave has been measuring hydrogen peroxide vapor concentrations for several years using our near infrared (NIR), fiber optic scanning spectrophotometers. Once the specific wavelengths for H<sub>2</sub>O<sub>2</sub> and H<sub>2</sub>O were determined, a simpler, non-scanning analyzer could be developed for this application. This new design uses fixed wavelength technology but still incorporates dual beam design for stability and accuracy. Fiber optic cables take the light to the isolation chamber and back to the analyzer, the virtual equivalent of vapor sampling. This monitor measures to within 0.1 mg/l of H<sub>2</sub>O<sub>2</sub>.

### Easy Operation and Control

The monitor is controlled via the touch pad or through the RS232 communications port with simple to use operational commands. Password protection allows for two different levels of access: operator and administrator. All of the analytical calculations are encoded in the firmware -- there is no advanced or field programming required.

### Quick Installation and Start-up

The system is packaged with everything needed to start monitoring. Included are: the analyzer, the probe, a pair of fiber optic cables to connect the probe to the analyzer, a comprehensive operations manual, power cable and even a communications cable to connect to your PC. There are no extras to buy; you just unpack, plug it in, warm it up, install the probe, and start to monitor. There is virtually no start-up learning curve.



### Factory Calibrated

Normally, spectrophotometers are calibrated by comparing the spectral results against an accepted wet chemical method. This analyzer was calibrated by comparing concentration readings versus theoretical calculations and two wet chemical methods commonly used to measure H<sub>2</sub>O<sub>2</sub> vapor concentrations (Pharmaceutical Engineering, July/August 1998, Vol. 18 No. 4). Once the chemical and physical constants were determined and encoded into the firmware, the only way the analyzer could fall out of "calibration" is if the photometric properties of the instrument change.

### Failsafe Operation

Every time a reference is taken prior to the sterilization cycle, the monitor checks itself to ensure that these photometric properties have not varied from factory specifications. Each instrument contains a validation filter, made of a polymeric material chosen because of its insensitivity to moisture and temperature conditions. The filter also has unique spectral characteristics at the wavelengths used to measure hydrogen peroxide and water. The spectrum of H<sub>2</sub>O<sub>2</sub> and H<sub>2</sub>O do not change. Every time the monitor is instructed to take a reference, the validation filter is temporarily moved into the light path and the optical characteristics of the analyzer are checked. If the monitor fails any of the diagnostic checks, or does not meet factory specifications, it will give an error message and will not allow itself to continue. This same filter is available as a manual probe insert, testing the external (fibers and probe) components of the system, providing data via the RS232 port or touchscreen.

## Specifications

H <sub>2</sub> O <sub>2</sub> vapor measurement range	0.1 - 50.0 mg/l [71.2 – 35,600 ppm V/V]
H <sub>2</sub> O <sub>2</sub> measurement accuracy	± 0.1 mg/l
H <sub>2</sub> O vapor measurement range	1.0 mg/l – to condensation [>1345 ppm V/V]
H <sub>2</sub> O measurement accuracy*	± 0.2 mg/l
Wavelength accuracy	±1.0 nm
Bandwidth	6.0 ± 1.0 nm

## Operating Environment

Ambient temperature	10 – 35 °C
Optimal ambient temperature stability	< ±2 °C
Relative humidity	0 – 95% non-condensing

## Monitor Dimensions

- Height: 29.2 cm (11.5")
- Width: 50.8 cm (20.0")
- Depth: 33.5 cm (13.2")
- Weight: 12 kg (25 lb)

## Probe Specifications

- 32.0 cm length (12.6") x 4.7 cm diameter (1.85")
- 25.0 cm pathlength
- Temperature and pressure range: 0 °C to 90 °C and suitable for use in 10<sup>-3</sup> Torr
- Fabricated parts are electropolished 316SS

## Fiber Cable

- 6 m fiber length of Ultra Low -OH fiber with SS SMA connector on probe end and FC connector on monitor end
- PVC jacketed fiber cable

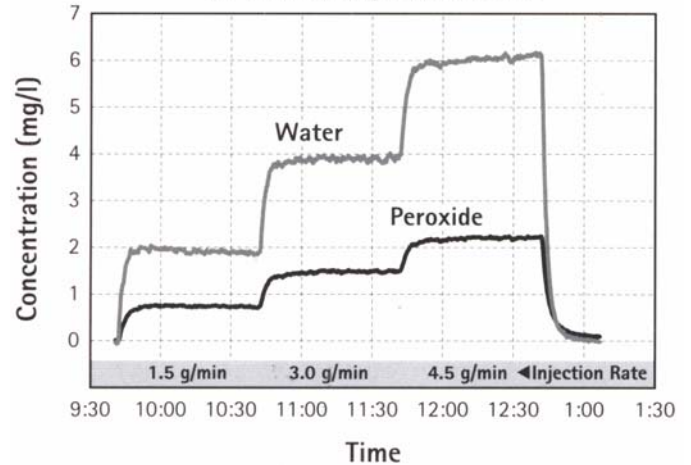
## Electrical and Communications Connections

- Analog outputs: (37 pin D type) separate 0-10 Vdc outputs for H<sub>2</sub>O<sub>2</sub> and H<sub>2</sub>O: paralleled with a corresponding 4-20 mA current signal
- Serial input/output: RS232, 9 pin male; transmitting H<sub>2</sub>O<sub>2</sub> and H<sub>2</sub>O concentrations, date, time, and serial number



\* relative to concentration at time of reference

Typical Water and H<sub>2</sub>O<sub>2</sub> Vapor Concentrations for Various Injection Rates



## Included as Standard

- Monitor
- Probe
- Terminated fiber cable pair, each 6 meters long
- Power cord
- Communications cable (9 pin female to 9 pin female)
- Extra tungsten halogen bulb - 6 watts
- Fuses and SMA wrench
- Complete operations manual
- Power Supply: universal switching, 50/60 Hz, 120 or 220 Vac

## Options

- Additional terminated fiber cable, 6 meters long
- Additional probes, custom probes
- External validation filter
- 50 cm single sided G-SST probe
- Custom length fiber cable (max 20 meter distance, probe to monitor)
- Annual factory calibration service

## User Programmable Features

- Password protection: 2 level, Operator and Administrator
- Sampling time: 10 - 30 seconds
- Reporting units: mg/l or ppm
- Control source: built in keypad or RS232 communications port
- Analog output scaling: 0 – 10 volts

Specifications are subject to change without notice.

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