

Continuous mercury measurement
in air and other gases



VM - 3000 Mercury Vapor Monitor



MERCURY INSTRUMENTS · ANALYTICAL TECHNOLOGIES

- Direct reading mercury vapor meter
- Portable, integrated battery for 6 hours operation
- Proven reliable detection method: UV absorption
- Easy operation
- Automatic zero adjustment
- Measuring ranges
0-100 / 0-1000 / 0-2000 $\mu\text{g}/\text{m}^3$
- High resolution 0.0001 mg/m^3
- Data logger integrated

Mercury
in air and gases



Mercury
stack monitors



Mercury
laboratory analyzers



Mercury
process analyzers



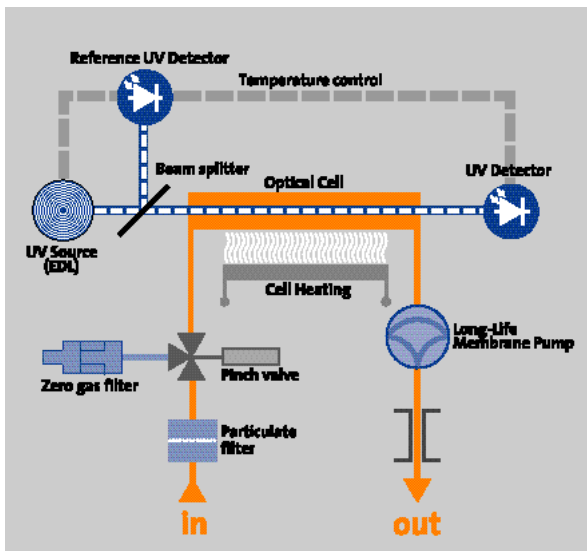
Fields of application

The VM-3000 Mercury Tracker serves for continuous measurement of the mercury concentration in air and other gases in laboratory as well as industry and mobile applications. It has a wide variety of applications:

- work place monitoring (threshold limit value)
- exhaust air monitoring in mercury recovery plants
- emission monitoring in the chemical industry
- ground air screening of contaminated soil
- quality control of hydrogen and natural gas
- detector for laboratory applications

Measuring principle

The mercury concentration is measured in an optical cell made of fused silica. A maintenance-free membrane pump continuously feeds the sample gas to the optical cell where light absorption measurement takes place at a wavelength of 253.7 nm. This so-called "cold vapor atomic absorption spectroscopy (CVAAS)" measuring method is extremely sensitive for mercury determination and has been used successfully for many years. In contrast to the occasionally propagated atomic fluorescence spectroscopy (AFS) method it is low in interference and requires neither an amalgamation step nor expensive noble gases as carriers.



VM-3000 flow chart

Analytical Performance

The VM-3000 uses a high-frequency driven electrodeless Hg low pressure (EDL) lamp as UV source. It generates emission lines of an extremely narrow bandwidth which are congruent with the absorption lines of the Hg atoms. Cross-sensitivities are thus minimized. The extremely high stability of the UV source in the VM 3000 is a result of the reference beam feedback control method. Total background noise is less than $0.1 \mu\text{g}/\text{m}^3$. To prevent temperature drift both the lamp unit and the detectors are temperature-stabilized. Because the optical cell is heated the VM-3000 is insensitive to water vapor.

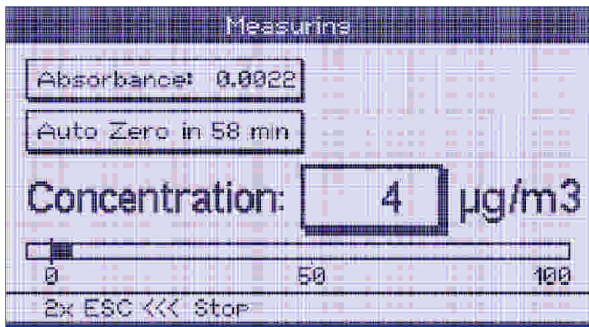
Special Features

- Metal housing with sturdy handle
- Option: Rack version with mounting brackets for 19" racks
- Membrane pump with long service life
- Input filter with teflon membrane
- Stable optical bench
- Factory-calibrated

Easy to operate

The user controls the VM-3000 by menu-guided inputs via a

waterproof membrane keypad. After switch-on the light source is stabilized (approx. 1 - 15 minutes). When the measurement mode is started, a zero adjustment is first carried out automatically. Then the analyzer switches to measurement and continuously indicates the measured mercury concentration of the gas as a numerical value and a graphic bar. The following settings are possible in the "parameters" menu: duration and repeat interval of the zero adjustment, selection of the concentration unit ($\mu\text{g}/\text{m}^3$ or ppb), measuring range ($0.1-100$, $0-1000$, $0-2000 \mu\text{g}/\text{m}^3$), input of three different alarm levels, calculation of a mean value over three freely selectable time intervals, printer activation, and, if required, a sample dilution factor.



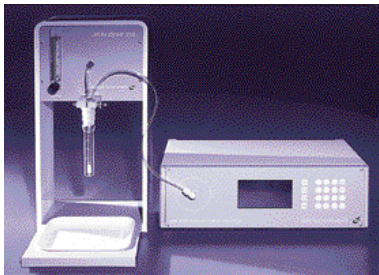
Graphical and numerical display of results in realtime

Display and Output of Measurements

The result of the measurement is displayed on an LCD in real time, both numerically and graphically and is output as an electrical signal of 4-20 mA. The device has outputs for alarm, status and measurement values for full integration in plant control systems. The device also has a serial interface (RS 232) for data collection on a PC.

Extensions

The VM-3000 Mercury Vapor Monitor is the basic model of our modular system for mercury analytics. An optional reaction unit and activation of the relevant software turn it into a laboratory unit for liquid samples.



Extension:
Laboratory analyzer
for mercury

A gold trap installed upstream allows measurements in the extreme trace range.

Multiplexer operation

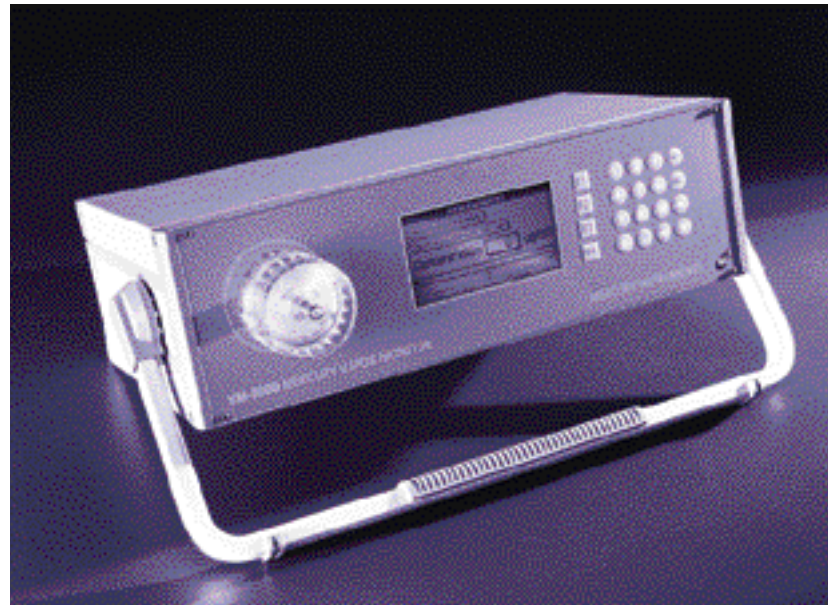
A multiplexer unit can be connected for automatic monitoring of several measurement points. See information in special brochure.

Self Diagnosis System

If an important component of the VM-3000 malfunctions the user is warned via the display (blinking messages: clean cell, lamp, low battery, alarm) and via output signals.

Battery Operation

For operation independent from mains power the VM-3000 is also available with a built-in rechargeable battery and a charger unit. This option allows mobile battery-powered applications of up to approx. 5 hours.



Precise and proven technique:
Mercury Vapor Monitor VM-3000

Data Logger Function

A data logger function can be integrated into the VM-3000 as an option. Up to 30000 readings can be stored in the data memory. The logging interval can be set from 1 - 16 seconds revealing a total recording capacity of 4-60 hours. The stored data can be read out with a PC using the serial interface of the VM-3000 according RS232 standard.

VM-3000 Mercury Vapor Monitor

Technical Specifications

Measuring principle:	UV-Absorption
Wavelength:	253,7 nm
UV source:	Electrodeless low-pressure mercury lamp
Stabilization:	reference beam and thermal
Optical cell:	fused silica (Suprasil),23 cm long
Optical cell heating:	approx. 70° C
Measuring range:	1...100µg/m ³ ; 1...1000µg/m ³ ; 1 - 2000µg/m ³
Sensitivity:	0.1 µg/m ³
Response time:	1 sec
Computation of mean value:	autom.via three freely selectable time intervals
Alarm:	when concentration is exceeded, 3 levels are programmable
Status alarms:	measuring cell soiled,battery state, UV source
Control pad:	waterproof membrane keypad
Measurement display:	Graphic display with background lighting
Signal outputs:	4...20 mA for recorder; RS 232 bidirectional for PC,data logger etc., parallel for printer
Pump:	membrane pump, approx. 2 L / min. optional Flow meter with alarm message
Filter:	PTFE,1 µ, 47-50 mm diameter
Power supply:	110 ... 240 V/(50/60 Hz)
Battery operation:	optional, 12 V batteries integrated,6 h capacity or external DC Source
Data logger-function:	Up to 30000 readings capacity
Power consumption:	40 W
Dimensions:	45 x 15 x 35 cm (W x H x D)
Weight:	approx. 7 kg

The Response to an Analytical Challenge: Mercury Instruments.

Quantitative trace analysis of mercury has been a challenging task for the analyst until now. We from MERCURY INSTRUMENTS have made it our job to develop instruments for mercury analysis of the highest technical level.The range of applications for our mercury analyzers is unique world-wide.



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