

AL4021

FORMALDEHYDE IN AIR AND WATER MONITOR



Features of the instrument:

- Provides absolute concentrations for Formaldehyde in gas-phase and liquid-phase.
- Fully automated operation using micro controller.
- Automated calibration using internal HCHO permeation source or liquid HCHO standards.
- Ranges liquid phase measurement:
(free programmable)
 - 0 to 30.0 mg/l
 - 0 to 300 mg/l.
 - 0 to 1,5 mg/l
- Ranges gas phase measurement:
(free programmable)
 - 0 to 20.0 ppbV
 - 0 to 200 ppbV
 - 0 to 2.0 ppmV
- HCHO gas-phase detection limit of < 50 ppt.
- HCHO liquid-phase detection limit of < 100 ng/l
- Rugged and simple to use. RS232 interface and analog output.

AERO-LASER GmbH
Gesellschaft für
Gasanalytik

Unterfeldstraße 12
82467 Garmisch-Partenkirchen
GERMANY

Telephone (49) 8821- 94386-0
or: (49) 8821- 94386-20
Fax: (49) 8821-94386-18
e-mail: dieter.haaks@aero-laser.de
www.aero-laser.de

• Principle of Technique

The detection of formaldehyde is based on the so called "Hantzsch"-reaction. The technique is sensitive to formaldehyde in aqueous solutions. Therefore, for the measurement of gaseous formaldehyde, these have to be trapped in aqueous solution first. This is achieved in a **stripping coil** by pumping air and a **stripping solution** (pH-buffered water free of HCHO) continuously at known flow rates. The air and liquid streams are afterwards separated in a glass separator and the solution is then analyzed for formaldehyde.

In the instrument **AL4021**, capable for measuring HCHO in air and water samples, the HCHO mixing ratio in air is then calculated from the concentration in solution and the ratio of air and stripping solution flow rates.

Formaldehydes in water solutions can be measured directly. In this mode, stripping is not necessary and, consequently, either zero air has to be applied to the **samples inlet** or the internal zero trap has to be switched on.

• Instrument Specifications

The instrument AL4021 operates with individual measuring ranges. The liquid calibration for AL4021 can be defined by user within the ranges given as examples below.

- Measuring range 1: 0 to 30.0 µg/l
or 1 10⁻⁶ molar
- Measuring range 2: 0 to 300.0 µg/l
or 1 10⁻⁵ molar
- Measuring range 3: 0 to 1.50 mg/l
or 5 10⁻⁵ molar

b) gas phase measurements (provides calibration by **liquid formaldehyde standard** if no **gas phase standard** is available):

- Measuring range 1: 0 to 20.0 ppbV*
- Measuring range 2: 0 to 200.0 ppbV*
- Measuring range 3: 0 to 2.00 ppmV*

c) gas phase measurements (provides calibration by gas standard. gas standard permeation rate can be determined by using liquid standard)

- Measuring range 1: 0 to 20.0 ppbV
- Measuring range 2: 0 to 100.0 ppbV

This mode allows also to measure in **liquid phase** from 0 to 30 µg/l and 0 to 150 µg/l!

*** These ranges do depend on the flow rate of stripping solution and air flow which have to be determined by user from time to time or after replacement of pump tubings and replacement of flow controller. Settings are performed in supervisor mode!**

Detection Limit: < 50 ppt gasphase**
< 100 ng/l
equivalent to: 2 * 10⁻⁹ M (liquid phase)

Noise: < 2% at Full Scale

Time constant: 90 sec (10-90%),
delay time 300 sec

Interferences from:

Benzaldehyde	< 1 :	20.000
Acetaldehyde	< 1 :	10.000
Acrolein	< 1 :	10.000
Propanal	< 1 :	20.000
Glyoxal	1 :	123
Methanol	< 1 :	50.000
H ₂ O ₂	< 1 :	100
O ₃	< 1 :	3000

No detectable Interference from:

SO₂, NO, NO₂, Isobutane, Acetone,

Zeroing: internal zero trap

Calibration: internal permeation device using **KIN-TEKO** permeation tubes or liquid standards of HCHO.

Physical Dimensions: Length 49,6 cm
Width 48,8 cm
Height 13,0 cm
Weight 20 Kg

Power Requirem.: 120/220 VAC
80 Watt

Signal output:

Analog: 0-5 Volt FS. calibration sets automatically output to 4.0 Volt of maximum value of chosen range of HCHO.

Digital: via **RS 232** interface

Cosumables: Distilled Water, Acetylacetone, Acetic Acid, Ammonium Acetat, H₂SO₄ and Zero-Trap- material.

* liquid calibration only,

** Range 1 only