



# TRACE MOISTURE ANALYZERS



# Trace-Moisture-Analyzer ppm/v

- Moisture in corrosive and combustible gases (Exi) !
- Extreme short response time
- High sensitivity
- Multifunctional LC-display
- Fully microprocessor-controlled
- Zero-/ Span- Calibration
- Auto-ranging, Remote-control
- Serial port RS 232
- 2 alarm contacts
- Automatic self-check
- fulfils **NAMUR**



## The Analyzer

The new trace moisture-analyzer **TMA** is fully microprocessor-controlled and is designed to operate in rough field service. The amplifier is a high technology, solid state unit which is available as a desk-, as a portable version and as a 19"-rack.

2 alarm-levels can be set, 5 potentialfree contacts for range identification, one analog output and one serial port RS 232 are integrated.

For remote control there are 5 isolated

input contacts to switch the ranges externally.

The system can be set in 4 modes: manual, RS 232, external, auto-range.

The high quality LC-display shows the measuring result in ppm/v, the alarm-levels which are set and also the mode (for example: auto ranging).

The cable-clamps of the sensor are of special high quality water proof connectors.

After switching on the unit, the instrument automatically does a self-check (zero-/span-control)

To measure in explosive hazardous areas the unit will be fitted with safety barriers (intrinsically-safe, zone 1).

A portable unit with rechargeable battery and built in charger is also available.

## Principle of Operation

The  $P_2O_5$ -sensor uses the principle of dissociation of water to hydrogen and oxygen. The sensor element itself consists of a round glass body on which two electrodes are wound at constant distance. Depending on the sensor type these electrodes are either made out of platinum- or rhodium wire. Between these electrodes a thin film of phosphoric acid ( $H_3PO_4$ ) is applied. The sensor-current causes the water contained in the acid to dissociate to hydrogen and oxygen.

The result of this process is  $P_2O_5$  (diphosphorous pentoxyde).  $P_2O_5$  is a highly hygroscopic substance which absorbs the water from the sample gas. Through continuous dissociation of the water a balance between the water content of the sample gas and the water which is being dissociated builds up. The electrolysis current is proportional to the water content in the sample gas. It is displayed on the instrument readout after it is processed by the instruments signal amplifier. This principle of measurement can be used on all gases ( $Cl_2, HCl, H_2S, H_2SO_4, HBr, SO_2, SF_6, CO_2, PH_3$ , all inert gases and hydrocarbons) except those which chemically react with phosphoric acid or polymerise.





The P<sub>2</sub>O<sub>5</sub>-sensor TMS-X is suitable for measurement of inert gases, hydrocarbons, or depending of the chosen material of the sensor, in corrosive gases like HCl, Cl<sub>2</sub>.

The materials in contact with the sample are glass, platinum or rhodium, and the chosen material of the sensor.

The special transfer of the sample-gas through the sensor, combined with a high quality surface provides fast response and minimizes the tailing effect.

This benefit is especially important when monitoring low ppm-concentration. The **gasflow** through the sensor is **20 sl/h** (optional 100 sl/h).

The electric-connection to the amplifier is a watertight straight plug. The regeneration of sensor (cleaning) could be done by the user within 5 min easily.

The sensor can be mounted with three M 4 screws with the optional mounting-assembly.

Complete **sampling-systems** with filter, pressure-reducer, flowmeter, heating, etc. on request.

## Configuration

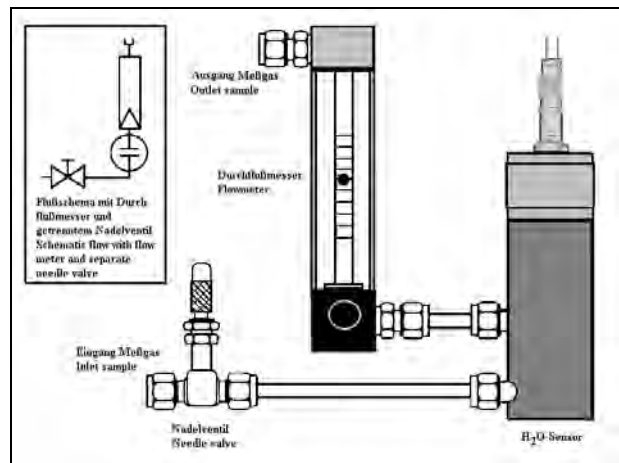
### Sensor-rod

glass and  
electrodes made in  
platinum **or** optional  
rhodium

### Sensor-body

optional  
Modell TMS-SS  
**Stainless steel 316 SS**  
Test-pressure: 10 barg  
Modell TMS-M  
**Monel 400**  
Test-pressure: 10 barg  
Modell TMS-H  
**Hastelloy**  
Test-pressure: 10 barg  
Modell TMS-G  
**Glass**  
Test-pressure: 0,5 barg

Sealings: Viton (or FEP-jacket optional)



Flow-schematic for H<sub>2</sub>O-Sensor TMS-X

## **cmc Instruments GmbH**

Meß-, Regel- und Analysetechnik  
Hauptstraße 388  
D-65760 Eschborn, Germany  
fon: + 49 6173 / 32 00 78  
fax: + 49 6173 / 6 50 50  
e-mail: [cmcingmbh@aol.com](mailto:cmcingmbh@aol.com)  
[www.cmc-instruments.de](http://www.cmc-instruments.de)

# Technical data TMA / TMS

## Analyzer

Ranging:  
manual, RS 232, extern, auto-ranging

### Digital output:

-2 potentialfree relais for alarm  
(max. 230 V / 1 A)  
-5 potentialfree relais for  
range identification

**Analog outputs** 0 –20 mA (< 500 Ω)  
**with** 4 - 20 mA (< 500 Ω)  
**range identification:** 0 -10 Vdc (> 100 kΩ)

**Ranges** : 10 ppm/v  
100 ppm/v  
1.000 ppm/v  
2.500 ppm/v  
**service** 5.000 ppm/v

**Display:** LC-multifunctional

**Serial port** RS-232 Modem

**Input:** 5 contacts  
(for ext. range switching)

**Sensitivity:** +/- 0,1 % fs

**Voltage** : 230 V / 50 Hz (110 V)

**Power consumption:** 8 W

**Operating Temper. :** -10°C to +50°C

**Dimensions:** L = 257 mm  
H = 160 mm (3 U)  
D = 316 mm

**Weight:** 6 kg

**For further information please contact:**



cmc reserve the right to change product specification without prior notice

## Sensor

Gasflow: 20 sl/h optional 100 sl/h

Recommended  
Gas-pressure: 0,1 – 1,5 barg

Gas temperature: +5°C to +150°C

Response time: < 1 sec.

T<sub>50</sub>: < 8 sec.

Accuracy : +/-1% fs

Reproducibility: 0,1 % fs

Ambient temperature: +5°C .... +65°C

Sensor-cable: 2 mtr.  
(max. 300 m/on request)

Dimensions: 120 mm high  
40 mm diameter

Gas connections: 6 mm Swagelok®  
Optional: ¼" pipe-fitting Swagelok®

Glas-housings: 6 mm- tube-connection

### Service-Kit:

To regenerate the sensor:  
electrolyte, acetone, safety gloves,  
DE-water, safety glass and tools with suitcase  
(Order code **TMW-SET**).

### Flowmeter with needle-valve 20 sl/h or 100sl/h

Calibrated for: H<sub>2</sub>, He, N<sub>2</sub>, Ar

### Software for RS 232: TMA-202/SW

## **cmc Instruments GmbH**

Meß-, Regel- und Analysetechnik

Hauptstraße 388

D-65760 Eschborn, Germany

fon: + 49 6173 / 32 00 78

fax: + 49 6173 / 6 50 50

e-mail: [cmcingmbh@aol.com](mailto:cmcingmbh@aol.com)

[www.cmc-instruments.de](http://www.cmc-instruments.de)

# Order Information

| Analyzer       | Configuration                          | Application   |
|----------------|--|---|
| <b>TMA-202</b> | calibrated for sensors <b>20 sl/h</b>  | standard-applications,<br>continuous control of H <sub>2</sub> O- level,<br>advantage: low gas consumption                    |
| <b>TMA-204</b> | calibrated for sensors <b>20 sl/h</b>  | fast response-time,<br>especially suitable for dry and<br>particle-free gas analysis,<br>recommended for portable application |
| <b>TMA-210</b> | calibrated for sensors <b>100 sl/h</b> | standard-applications,<br>recommended for by-pass installation,<br>fast response-time   |

## Portable design

TMA-204-P

Exi-intrinsically-safe (Zone 1)  
**with built-in safety-barriers**  
**(CENELEC EEx ia IIC/IIB)**

TMA-202-ZB

TMA-204-ZB

TMA-204-P-ZB (portable design)

TMA-210-ZB

**19“- racks, 3 U** are also available------(enclosures with protection-class IP 54/64 on request)

## Examples:

|                   |                     |               |
|-------------------|---------------------|---------------|
| Analyzer: TMA 202 | Sensor, 316 SS:     | TMS-SS/P/20   |
|                   | Sensor, monell 400: | TMS-M/P/20    |
|                   | Sensor, Hastelloy   | TMS-H/P/20    |
|                   | Sensor, Glas        | TMS-G/P/20    |
| Analyzer: TMA 204 | Sensor, 316 SS:     | TMS-SS/P/20-F |
|                   | Sensor, monell 400: | TMS-M/P/20-F  |
|                   | Sensor, Hastelloy   | TMS-H/P/20-F  |
|                   | Sensor, Glas        | TMS-G/P/20-F  |
| Analyzer: TMA 210 | Sensor, 316 SS:     | TMS-SS/P/100  |
|                   | Sensor, monell 400: | TMS-M/P/100   |
|                   | Sensor, Hastelloy   | TMS-H/P/100   |
|                   | Sensor, Glas        | TMS-G/P/100   |

all models: sensor-cables are included

**For further information please contact:**



cmc reserve the right to change product spec. without prior notice

## cmc Instruments GmbH

Meß-, Regel- und Analysetechnik

Hauptstraße 388

D-65760 Eschborn, Germany

fon: + 49 6173 / 32 00 78

fax: + 49 6173 / 6 50 50

e-mail: [cmcingmbh@aol.com](mailto:cmcingmbh@aol.com)

[www.cmc-instruments.de](http://www.cmc-instruments.de)