



MRU – Competence in gas analysis. Since 1984.

Hydrogen measurement

$H_{2\text{low}}$ up to 20.000 ppm

$H_{2\text{high}}$ up to 100 %





The MRU H₂-Analyzers

A suitable device for every application.

Whether for hydrogen production (e.g. pyrolysis) or for hydrogen slip analysis after combustion – MRU's ready-to-measure H₂ analyzers are a unique, industrial solution for

- pyrolysis plants
- gas power plants
- oil rigs
- electrolysis plants
- fuel cells or hydrogen powered burners (H₂ slip)



OPTIMA

04

- Flexible handheld unit for control measurements up to 2.000 ppm H₂
- Measurement of H₂, pressure, flow velocity and temperature



MGAprime

06

- H₂-analysis up to 2.000 ppm, alternatively up to 20.000 ppm
- in addition with highly accurate NDIR-technique for NO, NO₂, SO₂, CO₂, CO, N₂O, CH₄ and C₃H₈



Unit and gas washer

VARIOluxx Syngas

08

- Portable processgas-analysis of H₂ up to 100%
- further measuring components CH₄/CO/CO₂
- designed for rough industrial applications



Gas Detector 400GD

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- Multifunctional Detector for combustible gases
- 3-fold alarm at overload conditions



Gas Detector 500GD

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- Detector with suction feature
- for faster measuring results

OPTIMA

Flexible handheld unit for
control measurements



The new OPTIMA is equipped with an electrochemical H₂-sensor, 0 ... 1.000/2.000 ppm and thus allows a fast and highly precise H₂-measurement.

With OPTIMA, we also offer you the option of measuring biogas pressure, flow velocity and temperature.

With the appropriate sensor combination, OPTIMA can also measure engine exhaust gases from CHP units.

We offer you these special advantages:

- Biogas measurement: CH₄, CO₂, O₂, H₂S, H₂
- Exhaust gas measurement: O₂, CO₂, CO, NO, NO₂
- Ambient measurement: CH₄ (LEL), H₂S
- Different measuring units can be set by the user
- Intuitive menu navigation with function keys
- Glass-fibre reinforced housing with holding magnets
- Large data memory with interface to app and PC software
- Powerful lithium-ion battery for min. 16 h continuous operation



	Method	Range min./max.	Resolution	Repeatability
Hydrogen (H₂)	electrochemical	0 ... 1.000/2.000 ppm	1 ppm	± 5 ppm or 5 % (0 ... 500 ppm), 10 % (> 500 ppm) reading
Methane (CH₄)	Infrared	0 ... 100 %	0,1 %	± 0,3 % or 3 % reading*
Carbon dioxide (CO₂)	Infrared	0 ... 100 %	0,01 %	± 0,3 % or 3 % reading*
Hydrogen sulfide (H₂S)	electrochemical	0 ... 2.000/5.000 ppm	1 ppm	± 5 ppm or 5 % (0 ... 500 ppm), 10 % (> 500 ppm) reading
Oxygen (O₂)	electrochemical	0 ... 25 %	0,01 %	± 0,2 % absolute
Nitrogen (N₂)	calculated	0 ... 100 %	0,1 %	
Calorific value (Hu)	calculated	0 ... 36 MJ/m ³	0,01 MJ/m ³	

* the higher value applies

MGAprime

Highly precise NDIR measuring technique



H₂ up to
20.000 ppm

If highly precise NDIR analysis is required for industrial applications, MGAprime fulfills exactly these requirements.

With MGAprime, simultaneous analysis of up to 8 NDIR gas components is possible:

We offer you these special advantages:

- Duration of measurement, interval and averaging can be set by the user, measured value display also possible as a curve chart
- Automatic zero point calibration for long-term measurements
- Lithium-ion battery operation, including gas cooler and measurement, but without heating hose
- Data transmission LAN, WiFi, USB, RS 485, analog as well 400 MB internal data storage



Gas measurement (EC/PM)	Method	Measuring range	Resolution	Accuracy
Oxygen (O ₂) (long life)	EC	0 ... 25 %	0,01 %	0,20% absolute
Oxygen (O ₂)	PM	0 ... 25/100%	0,01 %	0,1 %
Hydrogen (H ₂)	EC	0 ... 1.000/2.000 ppm	1 ppm	± 5 ppm or 5 % (0 ... 500 ppm), 10 % (> 500 ppm) reading
		0 ... 10.000/20.000 ppm	10 ppm	± 200 ppm or 5 % (0 ... 10.000 ppm), 10 % (> 10.000 ppm) reading

	Measuring range	Resolution	Repeatability**	8h-Drift**	Linearity
Nitric monoxide (NO)	0 ... 200/4.000* ppm	0,1 ppm	2 ppm or 1 % reading	2 ppm or 1 % reading	1 % m. r.
Nitric dioxide (NO ₂)	0 ... 300/1.000* ppm	0,1 ppm	5 ppm or 1 % reading	2 ppm or 1 % reading	1 % m. r.
Sulphur dioxide (SO ₂)	0 ... 300/4.000* ppm	0,1 ppm	5 ppm or 1 % reading	2 ppm or 1 % reading	1 % m. r.
Carbon dioxide (CO ₂)	0 ... 40 %	0,01 Vol%	0,2 % or 1 % reading	0,2 % or 1 % reading	1 % m. r.
Carbon monoxide (CO)	0 ... 175/10.000* ppm	0,1 ppm	2 ppm or 1 % reading	2 ppm or 1 % reading	1 % m. r.
Nitrous oxide (N ₂ O)	0 ... 100/500* ppm	0,1 ppm	2 ppm or 1 % reading	2 ppm or 1 % reading	1 % m. r.
Methane (CH ₄)	0 ... 500/10.000* ppm	0,1 ppm	10 ppm or 1 % reading	2 ppm or 1 % reading	1 % m. r.
Propane (C ₃ H ₈)	0 ... 200/5.000* ppm	0,1 ppm	2 ppm or 1 % reading	2 ppm or 1 % reading	1 % m. r.

Other measurements	Method	Measuring range	Resolution	Accuracy*
Stack gas temperature (T _{gas})	NiCrNi	0 ... 1,100 °C	1 °C	± 2 °C or 1 % reading
Combustion air temperature (T _{air})	NiCrNi	0 ... 100 °C	1 °C	± 1 °C or 1 % reading
Differential pressure (P-Druck)	Piezoresistive	-120 ... +120 hPa	1 Pa	± 2 Pa or 1 % reading
Flow velocity measurement (v)	Pitot	3 ... 100 m/s	0,1 m/s	± 1 m/s or 1 % reading
Standardized ext. signal (AUX connection)	software	for K-type thermoelement, 0 ... 10 Vdc, 4 ... 20 mA, RS 485		
Combustion calculations (fuel type depend.)	software	losses, excess air, lambda, dew point, CO ₂		
Emission calculations	software	mg/Nm ³ , O ₂ -reference		

* overload measuring range | ** the higher value applies

VARIOluxx Syngas

First choice for smart gas analysis



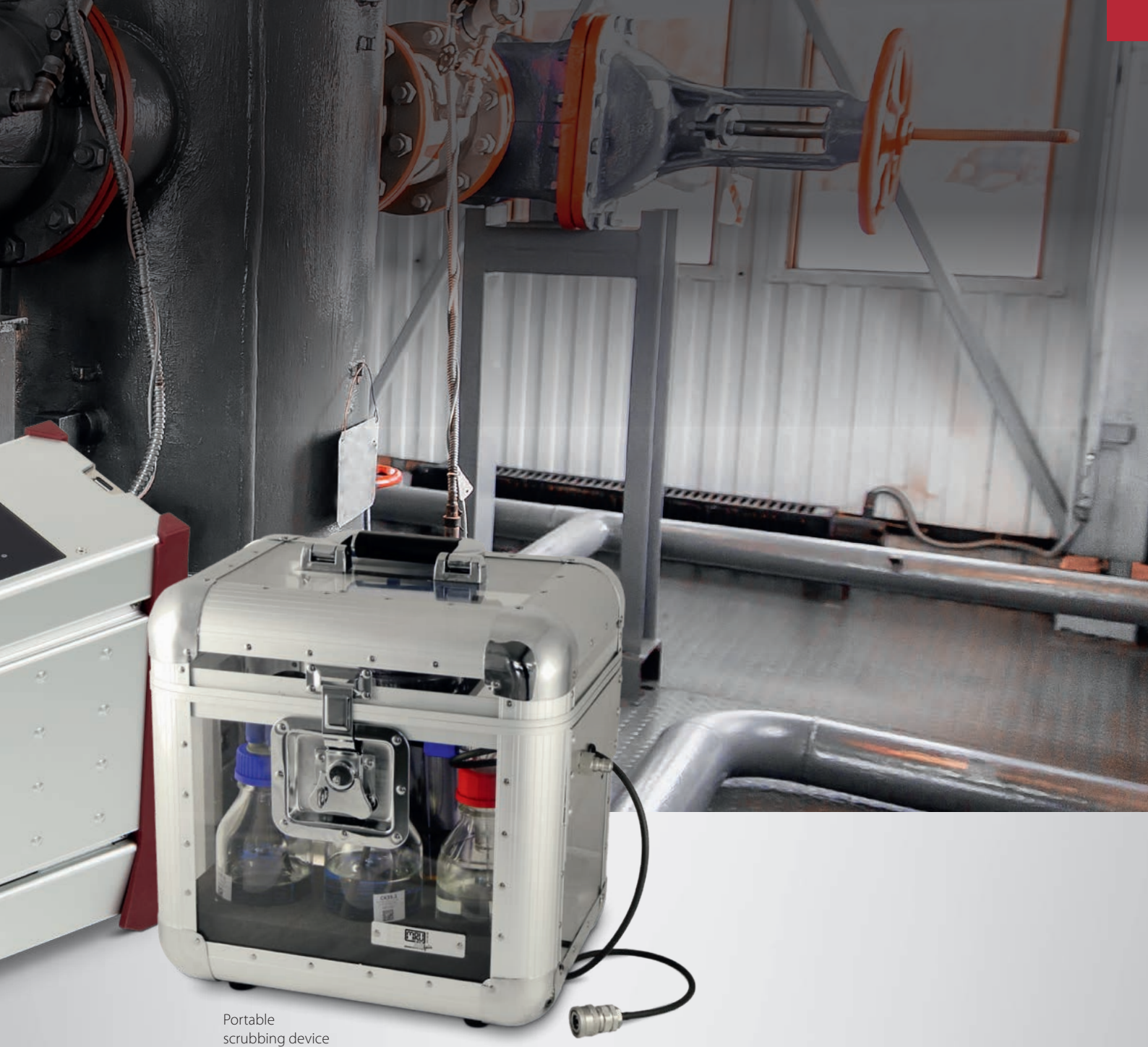
Selective and precise H₂-analysis by means of thermal conductivity detector (TCD).

We offer you these special advantages:

- Integrated electrical gas cooler (Peltier) and automatic condensate draining pump
- Strong sample gas pump
- Automatic zeroing by means of 3-way solenoid valve, user programmable
- Internal sample flow monitoring with display and alarm
- Use of long-life EC cell for O₂, NDIR for CO/CO₂/CH₄ and TCD for H₂ measurement
- Linux OS and large backlit 800 x 480 px color display, with touch and swipe technique
- Lithium-Ion battery operation, including gas cooler and measurement technology

H₂
up to 100%

MAU
AIR fair
EMISION MONITORING SYSTEMS
since 1984



Portable scrubbing device

Gas measurement	Method	Measuring range min./max.*	Resolution	Accuracy**
H₂ – hydrogen	TCD	0 ... 1,0/100,00%	0,1%	± 0,5 % or 2% reading.
O₂ – oxygen (Long-life)	ECS	0 ... 25,00%	0,01 %	0,2%
O₂ – oxygen	PM	0 ... 25,00%	0,01 %	0,1%
CO – carbon monoxide	NDIR	0 ... 10,00% / 100,00%	0,01 %	± 0,1 % or 2% reading
CO₂ – carbon dioxide	NDIR	0 ... 10,00% / 100,00%	0,01 %	± 0,3 % or 2% reading
CH₄ – methane	NDIR	0 ... 10,00% / 100,00%	0,01 %	± 0,2 % or 2% reading
H₂S – hydrogen sulphide	ECS	0 ... 50/250* ppm 0 ... 2.000/5.000* ppm	1 ppm 1 ppm	± 2 ppm/5% (0 ... 50 ppm) 10% (≥ 50 ppm) ± 5 ppm/10% to 500 ppm or 15% > 500 ppm

Calculated components

N₂ Balance difference to 100%

Other measurements	Method	Measuring range	Resolution	Accuracy**
Stack gas temperature (T_{gas})	NiCrNi	0 ... 1.100 °C	1 °C	± 2 °C or 1% reading
Ambient air temperature (T_{amb})	NiCrNi	0 ... 100 °C	1 °C	± 1 °C or 2% reading
Differential pressure (Diff.press.)	Piezoresistive	-120 ... +120 hPa	1 Pa	± 2 Pa or 1% reading
Flow velocity measurement (v)	Diff.press.	3 ... 100 m/s	1 m/s	± 1 m/s or 1% reading
Standardized ext. signal (AUX connection)	software	for K-type thermoelement, 0 ... 10 Vdc, 4 ... 20 mA, RS 485		
Emission calculations	software	mg/Nm ³ , reference to O ₂ , g/s, kg/h		

* overload measuring range | ** the higher value applies

400GD

Small, handy, easy to handle

Multifunction detector and measuring device

- Detector with gas leakage sensor HC402 for H₂-concentrations up to 20.000 ppm
- Further exchangeable detectors available (combustible gases, refrigerants, temperature, humidity, dew point, flue gas spillage, CO and CO₂ in ambient air)
- Plug & play sensors with automatic device recognition
- Optical alarm at the sensor and on the display of the device (only leak detection)
- Acoustic and vibration alarm by the device (only leak detection)
- Adjustable alarm thresholds (only leak detection)
- Indication of gas concentration in ppm, % and %LEL (HC-sensor)
- Strong Lithium-Ion battery, chargeable via Mini-USB socket
- QR-codes for measurement results, with forwarding via email



400GD basic unit

Rel. humidity during operation, non-condensing	95 %
Display	45 mm (1.8") TFT
Interface (Charging/firmware updates)	Mini-USB
Built-in battery, operating time (depending on sensor)	Li-Ionen, typ. 20 h
Operating conditions	+5 ... +50 °C
Storage conditions	-20 ... +60 °C
Power supply/consumption	100 ... 240 V, 5 V DC, 500 mA
Protection class	IP30
Dimensions (W x H x D)	50 x 135 x 35 mm
Weight	appr. 230 g

Plug & Play Sensor

Leak detection gas	HC402
Calibration gases	CH ₄ , C ₃ H ₈ , H ₂
Measuring range CH ₄	0 ... 22.000 ppm
Measuring range C ₃ H ₈	0 ... 8.500 ppm
Measuring range H ₂	0 ... 20.000 ppm
Resolution	1 ppm
Response time	≤ 5s

500GD

Fast, selective and powerful



Multifunction detector and measuring device

- Detector with gas leakage sensor HC402 for H₂-concentrations up to 20.000 ppm
- Further exchangeable detectors available (combustible gases, refigriderants, temperature, humidity, dew point, flue gas spillage, CO and CO₂ in ambient air)
- Fast measurement results due to integrated suction feature (≤ 2 seconds)
- Search mode for quick leak detection
- Reliable zeroing, even with contaminated ambient air
- Display in ppm for precise location of gas leaks and determination of the gas concentration
- Sensor change during operation possible, automatic recognition by the device
- Adjustable alarm thresholds (only leak detection)
- Optical alarm on the display of the device (only leak detection)
- Acoustic and vibration alarm by the device (only leak detection)
- Clear graphic display (TFT)
- Strong Lithium-Ion battery, chargeable via Mini-USB socket
- Display of measurement results also as QR code (forwarding measuring results via e-mail)



500GD basic unit

Rel. humidity during operation, non-condensing	95 %
Display	45 mm (1.8") TFT
Interface (Charging/firmware updates)	Mini-USB
Built-in battery, operating time (depending on sensor)	Li-Ionen, typ. 20 h
Operating conditions	+5 ... +50 °C
Storage conditions	-20 ... +60 °C
Power supply/consumption	100 ... 240 V, 5 V DC, 500 mA
Protection class	IP30
Dimensions (W x H x D)	50 x 163 x 25 mm
Weight	appr. 220 g

Plug & Play Sensor

Leak detection gas	HC402
Calibration gases	CH ₄ , C ₃ H ₈ , H ₂
Measuring range CH ₄	0 ... 22.000 ppm
Measuring range C ₃ H ₈	0 ... 8.500 ppm
Measuring range H ₂	0 ... 20.000 ppm
Resolution	1 ppm
Response time	≤ 2s

MRU – Competence in gas analysis. Since 1984.



**MRU · Messgeraete fuer Rauchgase
und Umweltschutz GmbH**

Fuchshalde 4 +8 +12
74172 Neckarsulm-Obereisesheim
Phone +49 7132 99620 · Fax +49 7132 996220
info@mru.de · www.mru.eu

MRU representative: