MRU – Competence in gas analysis. Since 1984.

Hydrogen measurement

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

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

The MRU H_2-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 H_2 analyzers are a unique, industrial solution for

- pyrolysis plants
- gas power plants
- oil rigs
- electrolysis plants
- fuel cells or hydrogen powered burners (H_2 slip)

OPTIMA 04

- Flexible handheld unit for control measurements up to 2.000 ppm H_2
- Measurement of H_2, pressure, flow velocity and temperature

SWG 100 SYNGAS-Ex 05

- Continuous Syngas applications in Ex-zone 2
- also for H2 measurements up to 100 %

MGAprime 06

- H_2-analysis up to 2.000 ppm, alternatively up to 20.000 ppm
- in addition with highly accurate NDIR-technique for NO, NO_2, SO_2, CO_2, CO, N_2O, CH_4 and C_3H_8

Unit and gas washer

VARIOluxx Syngas 08

- Portable processgas-analysis of H_2 up to 100 %
- further measuring components CH_4/CO/CO_2
- designed for rough industrial applications

Gas Detector 400GD 10

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

Gas Detector 500GD 11

- Detector with suction feature
- for faster measuring results

OPTIMA

Flexible handheld unit for control measurements

H_2 up to 2.000 ppm

The new OPTIMA is equipped with an electrochemical H_2-sensor, 0 ... 1.000/2.000 ppm and thus allows a fast and highly precise H_2-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: CH_4, CO_2, O_2, H_2S, H_2
- Exhaust gas measurement: O_2, CO_2, CO, NO, NO_2
- Ambient measurement: CH_4 (LEL), H_2S
- 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 (H_2)	electrochemical	0 ... 1.000/2.000 ppm	1 ppm	± 5 ppm or 5 % (0 ... 500 ppm), 10 % (> 500 ppm) reading
Methane (CH_4)	Infrared	0 ... 100 %	0,1 %	± 0,3 % or 3 % reading*
Carbon dioxid (CO_2)	Infrared	0 ... 100 %	0,01 %	± 0,3 % or 3 % reading*
Hydrogen sulfide (H_2S)	electrochemical	0 ... 2.000/5.000 ppm	1 ppm	± 5 ppm or 5 % (0 ... 500 ppm), 10 % (> 500 ppm) reading
Oxygen (O_2)	electrochemical	0 ... 25 %	0,01 %	± 0,2 % absolute
Nitrogen (N_2)	calculated	0 ... 100 %	0,1 %	
Calorific value (Hu)	calculated	0 ... 36 MJ/m³	0,01 MJ/m³	

* the higher value applies

SWG 100 SYNGAS-Ex

The stationary system for continuous Syngas applications in Ex-zone 2, also for H_2 measurements up to 100 %

The MRU analyzer, SWG 100 Syngas-Ex has been developed for use in Ex zone 2, as well as for save areas, e.g. laboratories.

The analyzer can be installed in outdoor or indoor locations, itcan sample dry or wet syngas, pressurized or low pressurized or low pressure gas and can be used from 6 sampling points.

We offer you these special advantages

- Completely stainless steel piping
- Process gas recirculation
- IP 65 stainless steel housing
- High-precision infrared measurement technology for CO, CO_2, CH_4
- Thermal conductivity technology for H_2
- Paramagnetic O_2 measurement
- Gas sampling in the pressure range from –100 mbar up to +200 mbar
- Integrated gas cooler with maintenance-free condensate drainage
- Measurement of up to 6 gas sampling points

Applications

- Biomass and waste gasification
- Coal gasification, coal liquefaction, synthetic fuel
- Pyrolysis applications and steam reforming
- Syngas analysis in laboratories and research

Measured components	Method	Range	Resolution	Accuracy
Carbon monoxide CO	NDIR	0 ... 100 %	0,01 Vol.-%	0,2 Vol-% or 2 % of reading** or 0,1 % of reading after calibration**
Carbon dioxide CO_2	NDIR	0 ... 100 %	0,01 Vol.-%	0,2 Vol-% or 1 % of reading** or 0,1 % of reading after calibration**
Methane CH_4	NDIR	0 ... 100 %	0,01 Vol.-%	0,2 Vol-% or 1 % of reading** or 0,1 % of reading after calibration**
Oxygen O_2	paramagnetic	0 ... 25 %	0,01 Vol.-%	0,1 % abs.
Sulfur dioxide H_2S	EC, discontinuously	0 ... 2.000 /5.000 ppm*	1 ppm	± 10 ppm / 5 % (0...500 ppm) 10 % (>500 ppm)
Hydrogen H_2	TCD	0 ... 1,00 / 100,00 %	0,1 % Vol.-%	0,5 % or 2 % of reading**

* overload measuring range | ** the higher value applies

MGAprime

Highly precise NDIR measuring technique

H_2 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_2O)	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_3H_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/Nm³, O_2-reference		

* overload measuring range | ** the higher value applies

VARIOluxx Syngas

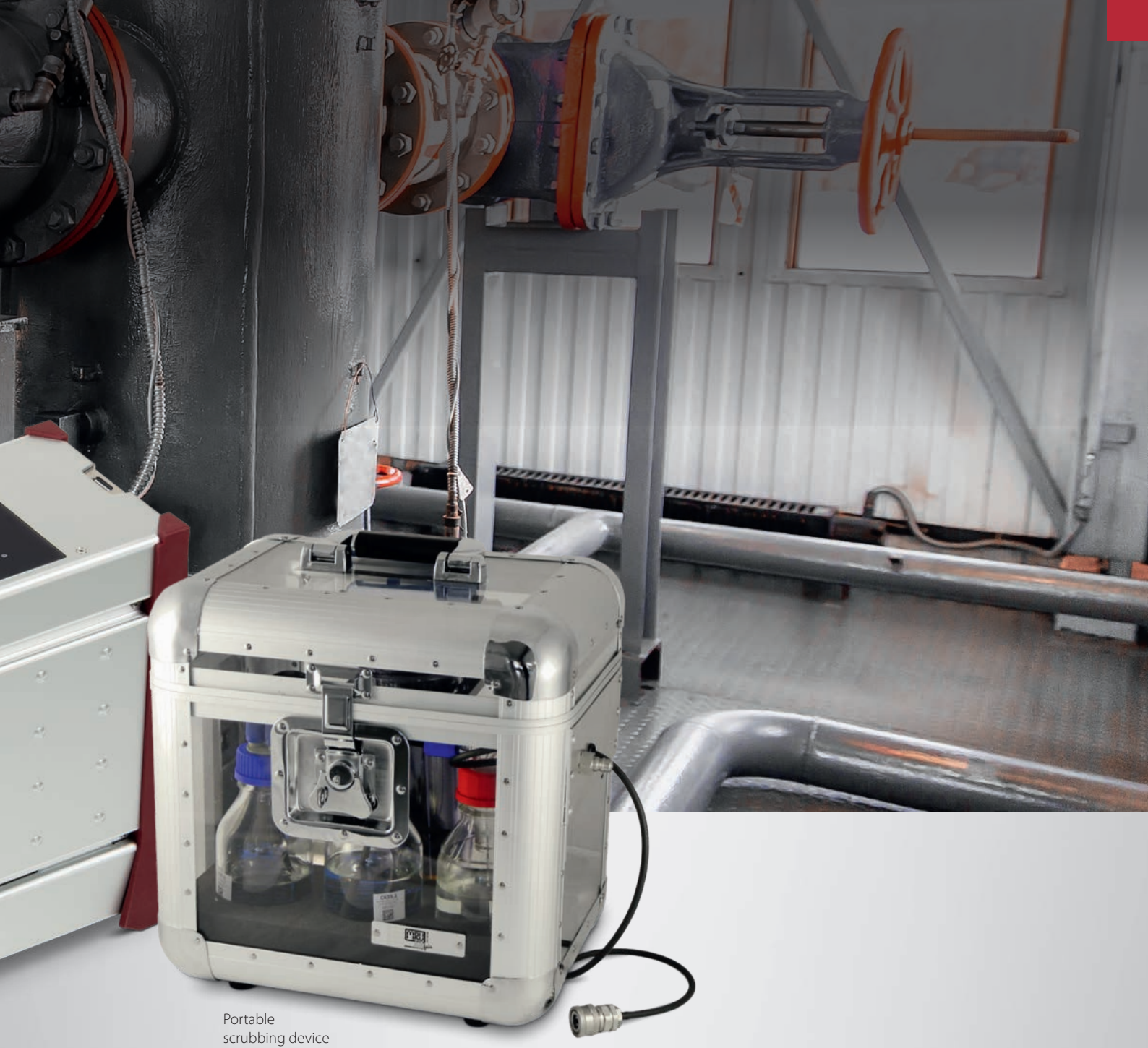
First choice for smart gas analysis

Selective and precise H_2-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 O_2, NDIR for $CO/CO_2/CH_4$ and TCD for H_2 measurement
- Linux OS and large backlit 800 x 480 px clour display, with touch and swipe technique
- Lithium-Ion battery operation, including gas cooler and measurement technology

H_2 up to 100%



Portable
scrubbing device

Gas measurement	Method	Measuring range min./max.*	Resolution	Accuracy**
H_2 – hydrogen	TCD	0 ... 1,0/100,00 %	0,1 %	± 0,5 % or 2 % reading.
O_2 – oxygen (Long-life)	ECS	0 ... 25,00 %	0,01 %	0,2 %
O_2 – 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
CO_2 – carbon dioxide	NDIR	0 ... 10,00 % / 100,00 %	0,01 %	± 0,3 % or 2 % reading
CH_4 – methane	NDIR	0 ... 10,00 % / 100,00 %	0,01 %	± 0,2 % or 2 % reading
H_2S – 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	
N_2 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/Nm³, 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 H_2-concentrations up to 20.000 ppm
- Further exchangeable detectors available (combustible gases, refridgerants, temperature, humidity, dew point, flue gas spillage, CO and CO_2 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_3H_8, H_2
Measuring range CH_4	0 ... 22.000 ppm
Measuring range C_3H_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 H_2-concentrations up to 20.000 ppm
- Further exchangeable detectors available (combustible gases, refridgerants, temperature, humidity, dew point, flue gas spillage, CO and CO_2 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_3H_8, H_2
Measuring range CH_4	0 ... 22.000 ppm
Measuring range C_3H_8	0 ... 8.500 ppm
Measuring range H_2	0 ... 20.000 ppm
Resolution	1 ppm
Response time	≤ 2s

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MRU – Competence in gas analysis. Since 1984.

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