Stationary Combustion Gas Analyzer

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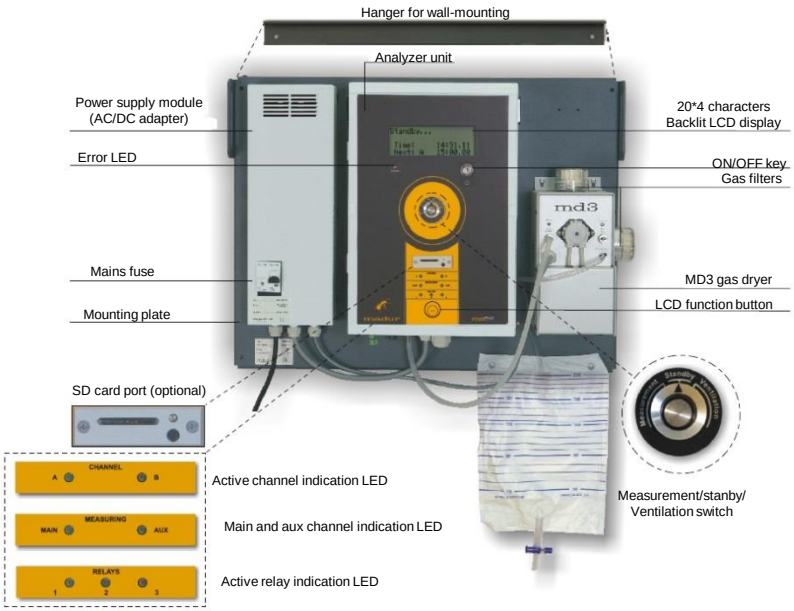
maMoS

Small in size, yet very skillful analyzer – it has the best capabilities/price ratio. maMoS is our alternative for large, intricate CEMS systems, as it does not fall behind them concerning functionality and abilities, and is far ahead in terms of expenses. It has modular construction, and many add-ons, that makes it easily adjustable to a very specific, individual application. Powerful PC software allows to adopt many aspects of the analyzer's work very individually (work schedule, analogue outputs' behavior, data presentations…).
Manufactured according to the principles of ISO10396.



Characteristics

- Standard configuration consists up to 4 sensors (NDIR and electrochemical)
- Up to 8 sensors in an extreme, unique configuration
- Large display with backlight, 4 lines * 20 characters
- Different types of gas dryers to fit the customers needs
- Compact, Split and Twin split configurations
- Data-logger with SD card for results collection
- Analogue outputs (both current and voltage) to control external devices
- Digital and analogue inputs to pass signals from external devices, to trigger maMoS actions
- Different work modes to select from
- Powerful PC program to adjust the analyzer's settings and to view the results
- Rich offer of add-ons and accessories
- Possibility to work with heated hoses : L = 3m, 5m, 8m for 115 and 230VAC



Technical specifications may change without previous warning

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Compact configuration (all mounted at measurement site)

With MD2 gas dryer





With MD3 gas dryer

Split configuration (each module has its own power supply)

Analyzer unit



Gas connection



Gas conditioning unit

Twin split configuration A

Analyzer unit with dryer



Gas conditioning unit



Second gas conditioning unit

Twin split configuration B

Analyzer unit







Second gas conditioning unit

Technical data

maMoS analyzer	
Dimensions (W * H * D)	240mm * 360mm * 160mm
Weight (depends on equipment)	4kg – 5kg
Casing material	ABS
Mounting plate : dimensions (H * W) / material /weight	596mm * 450mm / Aluminium / 1.9kg
Operating conditions	T : +10°C - +50°C, RH : 5% - 90% (non-condensing)
Storing temperature	0°C - +55°C
Power consumption (analyzer only)	30W max
Data-logger : type /size / number of results	SD flash card / max 4GB / practically unlimited
Display : type / maximum number of results per screen	20 characters * 4 rows / 4 measurement results
Gas pump : type / max gas flow /standard gas flow	Diaphragm / 2L/min / 1.5L/min (90L/h) with automatic flow control
Current analogue outputs	4 outputs 0-20mA or 4-20mA
Voltage analogue outputs	4 outputs 0-5V or 0-10V
Digital inputs	2 inputs, TTL levels, floating – high level
Digital outputs	1 open collector output + 2 SPDT relays (optional)
Communication interface with PC computer	B type USB
Power supply unit	
Dimensions (W * H * D)	360mm * 130mm * 56mm
Weight	1.4kg
Casing material	Aluminium
Mounting plate	Power supply is mounted on common plate with analyzer unit
Operating conditions	T : +10°C - +50°C, RH : 5% - 90% (non-condensing)
Storing temperature	-20°C - +55°C
Input voltage	100 – 240VAC 50/60Hz
Output voltage	24VDC / 6.2A / 150W
Output current	6.3A max
Mains fuse	6A
Cable pass	2 pcs PG-9

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MD2 Gas Dryer	
Dimensions (W * H * D)	211mm * 74mm * 82mm
Weight	450g
Drying method	Water condensation by rapid cooling down
Cooler type	Based on Peltier cooling element with fan (7VDC supply)
Cooling temperature	Down to +4°C electronically stabilized Dew point of outlet gas 8°C below the temperature of inlet gas
Ready to operate after	10 minutes
Operating conditions	T : 0°C - +35°C, RH : 5% - 90% (non-condensing)
Storing temperature	0°C - +55°C
Maximum gas flow for efficient drying (at inlet gas temp. 100°C and RH 100%)	40L/h
Gas filter	Integrated, with condensate reservoir and replaceable insert
Filter insert : length / ID / OD / material / pore size	32mm / 15mm / 20mm / PE / 5µm
Condensate removal	With peristaltic pump installed in the analyzer's body
Peristaltic pump capacity	38mL/min
Power supply	Via maMoS (through 15-pin D-SUB connector)
Power consumption	9W



MD3 Gas Dryer	
Dimensions (W * H * D)	Without filters : 110mm * 205mm * 160mm With filters : 145mm * 240mm * 160mm
Weight	1790g (single filter version)
Drying method	Water condensation by rapid cooling down
Cooler type	Bad on Peltier cooling element with fan (12VDC supply)
Cooling temperature	Constant, about +1°C, output gas dew point about +4°C
Ready to operate after	5 minutes
Operating conditions	T : 0°C - +50°C, RH : 5% - 90% (non-condensing)
Storing temperature	0°C - +55°C
Maximum gas flow for efficient drying (at inlet gas temp. 100°C and RH 100%)	100L/h
Gas filters : quantity / material	1 (optionally 2) / PA-body, PC-cover, Viton-sealing
Filter insert : length / ID /OD / material / pore size	42mm / 26mm / 32mm / glass fiber / 2µm
Condensate removal	With built-in peristaltic pump
Peristaltic pump	38mL/min
Power consumption	9W

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Measurements				
Variable	Method	Range | resolution	Accuracy	Time (T_{90})
Gas temperature (T_{gas})	K-type thermocouple	-10°C - +1000°C | 0.1°C	± 2°C	10 sec
Gas temperature (T_{gas})	S-type thermocouple	-10°C - +1500°C | 0.1°C	± 2°C	10 sec
Boiler intake air temperature (T_{amb})	PT500 resistive sensor	-10°C - +100°C | 0.1°C	± 2°C	10 sec
Differential pressure	Silicon piezoresistive pressure sensor	-25hPa - +25hPa | 1Pa (0.01hPa)	± 2Pa abs. Or 5% rel.	10 sec
Gas flow velocity	Indirect, with Pilot tube & pressure sensor	1 – 50m/s | 0.1m/s	0.3m/s abs. Or 5% rel.	10 sec
Lambda λ – excess air number	Calculated	1 – 10 | 0.01	± 5% rel.	10 sec
qA – stack loss	Calculated	1% - 100% | 0.1%	± 5% rel.	10 sec
Eta η – combustion efficiency	Calculated	1% - 120% | 0.1%	± 5% rel.	10 sec
Gas analysis				
Method	Range | Resolution	Accuracy	Time (T_{90})	Conformity
Oxygen – O_2				
Electrochemical, partial pressure	20.95% | 0.01%	± 0.1% abs. or 5% rel.	45 sec	ISO 12039 ; CTM-030
Electrochemical, partial pressure	25.00% | 0.01%	± 0.1% abs. or 5% rel.	45 sec	ISO 12039 ; CTM-030
Electrochemical, partial pressure	100.00% | 0.1%	± 0.1% abs. or 5% rel.	45 sec	ISO 12039 ; CTM-030
Carbon Monoxide – CO				
Electrochemical sensor	20000ppm | 1ppm	± 5ppm abs. or 5% rel.	45 sec	ISO 12039 ; CTM-030
Electrochemical with hydrogen compensation	4000ppm | 1ppm	± 5ppm abs. or 5% rel.	45 sec	ISO 12039 ; CTM-030
Electrochemical sensor	10% | 10ppm	± 50ppm abs. or 5% rel.	45 sec	ISO 12039 ; CTM-030
NDIR	10% | 0.01%	± 0.05% abs. or 5% rel.	45 sec	EN 15058 ; METHODE 10
NDIR	50% | 0.01%	± 0.05% abs. or 5% rel.	45 sec	EN 15058 ; METHODE 10
NDIR	100% | 0.1%	± 0.5% abs. or 5% rel.	45 sec	EN 15058 ; METHODE 10
Carbon Dioxide – CO_2				
NDIR	25% | 0.01%	± 0.05% abs. or 5% rel.	45 sec	ISO 12039 ; OTM-13
NDIR	50% | 0.01%	± 0.05% abs. or 5% rel.	45 sec	ISO 12039 ; OTM-13
NDIR	100% | 0.1%	± 0.5% abs. or 5% rel.	45 sec	ISO 12039 ; OTM-13
Total Hydrocarbons – C_xH_y				
NDIR	5% | 0.01%	± 0.05% abs. or 5% rel.	45 sec	
NDIR	25% | 0.01%	± 0.05% abs. or 5% rel.	45 sec	
NDIR	100% | 0.1%	± 0.5% abs. or 5% rel.	45 sec	

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Nitric Oxide – NO				
Electrochemical sensor	5000ppm | 1ppm	± 5ppm abs. or 5% rel.	45 sec	CTM-022
Nitrogen Dioxide – NO_2				
Electrochemical sensor	1000ppm | 1ppm	± 5ppm abs. or 5% rel.	45 sec	CTM-022
Sulphur Dioxide – SO_2				
Electrochemical sensor	5000ppm | 1ppm	± 5ppm abs. or 5% rel.	45 sec	
Hydrogen Sulphide – H_2S				
Electrochemical sensor	1000ppm | 1ppm	± 5ppm abs. or 5% rel.	45 sec	
Hydrogen – H_2				
Electrochemical sensor	20000ppm | 1ppm	± 10ppm abs. or 5% rel.	45 sec	
Thermal Conductivity Detector	10% | 0.1%	± 0.5ppm abs. or 5% rel.	45 sec	
Thermal Conductivity Detector	25% | 0.1%	± 0.5ppm abs. or 5% rel.	45 sec	
Thermal Conductivity Detector	50% | 0.1%	± 0.5ppm abs. or 5% rel.	45 sec	
Thermal Conductivity Detector	100% | 0.1%	± 0.5ppm abs. or 5% rel.	45 sec	
Nitrous Oxide – N_2O				
NDIR	2000ppm | 1ppm	± 10ppm abs. or 5% rel.	45 sec	ISO 21258
Chlorine – Cl_2				
Electrochemical sensor	250ppm | 1ppm	± 5ppm abs. or 5% rel.	45 sec	
Volatile Organic Compounds – VOC				
PID – Photoionization Detector	100ppm | 1ppm	± 5ppm abs. or 5% rel.	120 sec	METHOD 21
PID – Photoionization Detector	1000ppm | 1ppm	± 5ppm abs. or 5% rel.	120 sec	METHOD 21
PID – Photoionization Detector	5% | 1ppm	± 5ppm abs. or 5% rel.	120 sec	METHOD 21
PID – Photoionization Detector	10% | 1ppm	± 5ppm abs. or 5% rel.	120 sec	METHOD 21
Fluoroform (refrigerant R23) – CHF_3				
NDIR	2.5% | 0.01%	± 0.5% abs. or 5% rel.	45 sec	
Hydrogen Chloride - HCl				
Electrochemical sensor	100ppm | 1ppm	± 5ppm abs. or 5% rel.	120 sec	

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Standard equipment (supplied along with the device)

- maMoS gas analyzer on a mounting plate
- Power supply unit that converts mains supply 115VAC or 230VAC to 24VDC for maMoS
- USB communication cable
- 8 analogue outputs (4 currents, 4 voltage)
- 2 digital inputs for triggering maMoS behavior
- 7-pin connector for Tgas probe (thermocouple connection)
- Software CD with programs and manuals
- 4 wall plugs to attach mounting plate

Additional equipment (necessary for the analyzer to work)



- MD2 gas dryer

MD2 gas dryer – economy class Peltier cooler unit – basic equipment of the maMoS monitor



- MD3 gas dryer

High efficiency gas dryer based on the Peltier cooling element. Equipped with 1 or 2 microfibre filters. Replaces the basic MD2 dryer.



- MD3 gas dryer with power supply unit

MD3 gas dryer with its own power supply module. Can work as a part of maMoS analyzer (in split or twin-split configuration), or as a standalone device.

Optional equipment



- Pilot tube

Pilot tube is used for indirect measurement of gas flow velocity (measurement with the analyzer's differential pressure sensor). A few lengths of tubes are available. Pilot tube has 2m gas tube to connect it with the analyzer. It may be provided with a suitable holder for stationary purposes.



- Heated filter

Heated filter is installed right after the gas probe. It is best when it is paired with heated hose to prevent vapor from condensing.



- Stationary gas probe

Gas probe designed specially for stationary purposes. Probe is available in different lengths and is equipped with suitable holder (different types are available). Optionally it may also be equipped with :

- Thermocouple for measurements of gas temperature
- Sintered stainless-steel filter (cleanable) – especially recommended when dealing high concentration of dust and soot



- Ethernet/WiFi communication interfaces

Optional interface allows to communicate with maMoS analyzer within LAN network either via cable or wirelessly with help of special WiFi adapter.

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