GA-12 plus

madur portable gas analyser

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CHARACTERISTIC | FEATURES | TECHNICAL DATA | SENSORS | EQUIPMENT | APPEARANCE

A further development from the tried and tested GA-12 hand-held analyser.
GA-12plus can be equipped with up to 4 electrochemical cells. By default fitted with Li-ion battery.
Suitable for a soot test using electronically controlled gas volume.
It holds big memory capable of storing 32 measurement reports.
Manufactured according to the principles of EN50379.
An attractive alternative to other, bigger analysers.

GA-12 *plus*

- Equipped with 3 or 4 electrochemical cells (typical configuration: O_2, CO, NO/NO_x, SO_2)
- Works with an external portable printer via wireless communication (IR LED)
- Built-in rechargeable Li-ion battery for up to 16 hours of operation
- Probe holder with a standard M30x1 fitting, fits all madur gas probes with the K-type or S-type thermocouples
- Availability of soot measurements (with proper probe holder)
- Built-in pressure sensor for chimney draft measurements and continuous pump flow control
- Optional differential pressure sensor - for measurements of chimney draft and flow velocity (with help of Pitot tube)

  NOTE that two versions of analyser are available:
  standard version with single pressure sensor
  version with additional differential pressure sensor (that allows to perform measurements of gas flow velocity)
- Cooperation with digital RH and temperature probe
- Measurements of gas and ambient temperatures
- Results presented on LCD display (128 * 64) with back-lighting
- Built-in large memory for results
- Firmware for gas calibrations
- Calculations of many additional parameters

GA-12 plus

GA-12plus GAS ANALYSER	VERSION A SINGLE PRESSURE SENSOR	VERSION B SECOND DIFFERENTIAL PRESSURE SENSOR
Dimensions (W * H * D)	243 mm * 130 mm * 60 mm	
Dimensions with gas connectors (W * H * D)	257 mm * 130 mm * 60 mm	271 mm * 130 mm * 60 mm
Weight (4-sensors) without accessories	615 g	635 g
Casing material	ABS case, rubber protective boot (optional)	
Operating conditions	T: 10°C ÷ 50°C RH: 5% ÷ 90% (non-condensing)	
Storing temperature	-20°C ÷ +55°C	
Power supply	Built-in Li-ion rechargeable battery (1600 mAh)	
Operating time (fully charged battery)	Up to 16h	
Number of gas sensors	3 or 4	
Data memory	64 measurement reports	
Display	Graphical LCD 128 * 64 with variable contrast and LED backlighting	
Printer	External thermal IR printer MCP 8850 with charger	
Gas pump	Diaphragm, max 0,6 ÷ 0,9 l/min	
Communication interface with PC computer	RS-232C	
Gas filtering	In-line filter included in the gas probe hose	

MEASUREMENTS

Variable	Method	Range | Resolution	Accuracy	Time (T_{90})
T_{gas} - gas temperature	K-type thermocouple	-10 ÷ 1000°C | 0,1°C	± 2°C	10 sec
T_{gas} - gas temperature	S-type thermocouple	-10 ÷ 1000°C | 0,1°C	± 2°C	10 sec
T_{amb} - boiler intake air temperature	PT500 resistive sensor	-10 ÷ 100°C | 0,1°C	± 2°C	10 sec
Differential pressure	Silicon piezoresistive pressure sensor	-25 hPa ÷ +25 hPa | 1 Pa (0,01hPa)	± 2Pa abs. or 5% rel.	10 sec
Gas flow velocity (optional)	Indirect, with Pitot tube & second pressure sensor	1 ÷ 50 m/s | 0,1 m/s	0,3 m/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	0 ÷ 100% | 0,1%	± 5% rel.	10 sec
Eta η - combustion efficiency	Calculated	0 ÷ 120% | 0,1%	± 5% rel.	10 sec
RH- relative humidity (special probe needed)	SHT11 capacitive polymer sensor	5 ÷ 95% | 1%	± 5% abs.	30 sec

GA-12 *plus*

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Method	Range | Resolution	Accuracy	Time (T_{90})	Conformity
O_2 - OXYGEN				
Electrochemical	20,95% | 0,01%	± 0,01% abs. or 5% rel.	45 sec	EN 50379; CTM-030
Electrochemical	25,00% | 0,01%	± 0,01% abs. or 5% rel.	45 sec	EN 50379; CTM-030
CO - CARBON MONOXIDE				
Electrochemical	2 000 ppm | 0,1 ppm	± 5 ppm abs. or 5% rel.	45 sec	EN 50379; CTM-030
Electrochemical	4 000 ppm | 1 ppm	± 5 ppm abs. or 5% rel.	45 sec	EN 50379; CTM-030
Electrochemical	20 000 ppm | 1 ppm	± 10 ppm abs. or 5% rel.	45 sec	EN 50379; CTM-030
Electrochemical	10% |0,001 %	± 0,005% abs. or 5% rel.	45 sec	EN 50379; CTM-030
Electrochem., with H2 compensation	4 000 ppm | 1 ppm	± 5 ppm abs.or 5% rel.	45 sec	EN 50379; CTM-030
NO - NITRIC OXIDE				
Electrochemical	2 000 ppm | 0,1 ppm	± 5 ppm abs. or 5% rel.	70 sec	EN 50379; CTM-030
NO_2 - NITROGEN DIOXIDE				
Electrochemical	1 000 ppm | 0,1 ppm	± 5 ppm abs. or 5% rel.	45 sec	EN 50379; CTM-030
SO_2 - SULPHUR DIOXIDE				
Electrochemical	2 000 ppm | 0,1 ppm	± 5 ppm abs. or 5% rel.	45 sec	EN 50379
H_2S- HYDROGEN SULPHIDE				
Electrochemical	2 000 ppm | 0,1 ppm	± 5 ppm abs. or 5% rel.	45 sec	

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STANDARD EQUIPMENT

SUPPLIED ALONG WITH THE DEVICE

- Carrying case for analyser and accessories
- Power supply (charger) for the built-in Li-ion battery with selected type of mains plug
- Comparison scale with paper filters for the soot test
- Software CD with program and manuals
- 2,5m RS-232C communication cable with DB9 female connector

ADDITIONAL EQUIPMENT

NECESSARY FOR THE ANALYSER TO WORK

- Probe holder

  Together with an exchangeable gas probe pipe the holder is a complete gas probe for extraction of gas samples. It has a single gas tube ended with quick coupler and electric cable ended with a 4-pin connector. Gas probe pipe is mounted with a M30x1 fastening.
  Probe holder is equipped with an in-line filter with a condensation trap (pore size of the filter inlet is 5µm). Probe holder is available in two versions:
  - heated (with a slit for a filter for soot measurement test),
  - unheated (without a possibility to perform soot test).

- Gas probe pipe

  Gas probe is immersed in the gas duct and is supposed to extract the gas sample and to measure its temperature.
  Exchangeable probes are easily connected to probe holders (with M30x1 fastening). They have thermocouple type K (in some configurations type S) for measurement of gas temperature and a threaded fixing cone. With the probe holder is a complete gas probe.
  There are many probe pipes available. They differ in length and working temperature.
  For work efficiency it is advised to own different probe pipes to be able to adjust to the measurement place.

OPTIONAL EQUIPMENT & SPARE PARTS

- Portable printer & printer paper

  Portable printer (battery operated), communicates with the analyser via wireless HP-IR interface. Allows to print measurement results instantly on the 58mm thermal paper.
  The printer is delivered together with 4 Ni-MH rechargeable batteries and a single roll of paper. The mains adapter for the charger can be ordered appropriately in the AU/EU/UK/US version.

  ordering codes:
  printer - M20-2DHP2
  battery charger with EU plug - M20-2DHP1
  battery charger with US plug - M20-2DHP3
  battery charger with UK plug - M20-2DHP4
  58mm thermal paper roll - V-THP5701

- RH and ambient temperature probe

  Probe for RH and ambient temperature measurements.
  Not-suitable for inside stack measurements (working temperature up to 120°C).

  ordering code:
  Z14-SON-HUM

- Ambient temperature sensor

  This ambient temperature sensor on a 3m cable is used for measurement of the boiler's inlet air.

  ordering code:
  Z12-SENS-TEMP

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- Anchor cone for PT-500 ambient temperature sensor

  This cone allows fitting the temperature sensor into holes with different diameter.

  ordering code:
  Z14-CONE-PT500

- Magnetic holder for PT500 sensor

  This magnetic holder allows to safely hang the sensor on a metal surface.

  ordering code:
  Z14-MAGN-PT500

- Pitot tube

  Pitot tube is an accessory that allows to perform measurement of the flow velocity of the gas stream. The measurement is performed indirectly – Pitot tube is connected to analyser's differential pressure sensor. Analyser recalculates the differential pressure on the Pitot tube's outlets to velocity.
  A few lengths of tubes are available. Pitot tube has 2m gas tubings to connect it with the analyser.

  ordering codes:
  pitot tube 800mm - Z00-PITOT-8002
  pitot tube 500mm - Z00-PITOT-5002

- RS232C to USB converter

  2.5m cable that allows to connect the analyser (its RS232C port) with USB port in PC computer (especially valuable when PC is not equipped with COM port).

  ordering code:
  Z12-USB-ADAP

- Bluetooth communication module

  Module connected to the analyser's RS232C port, allows to communicate with PC computer over Bluetooth protocol.

  ordering code:
  Z12-BLUE-TOOTH

- Leatherette casing

  Soft casing (for the analyser alone) made from leatherette, protects the analyser during transport.

  ordering code:
  Z14-ETUI1

- Rubber protector

  Special rubber protector for the analyser's casing. Protects the analyser against hits and blows. Shoulder strap eases carrying the analyser.

  ordering code:
  Z14-RUBBER-001

- Pressure kit

  Pressure kit allows to perform leakage test of the pneumatic / gas installations.
  Requires differential pressure sensor to operate.

  ordering code:
  Z02-LEAK-TEST-KIT

- Li-ion rechargeable battery

  Rechargeable Li-ion battery, 3,6V, 1600mAh (or better).

  ordering code:
  Z14-BAT-CHARGER_02

- In-line filter

  In-line filter for all the types of GA-12 probes and GA-12^{plus} probe holders.

  ordering code:
  Z14-FILTER-INLINE

- In-line filter insert 12mm/5µm and 12mm/20µm

  Filter insert for all the types of in-line filters.

  ordering codes:
  5µm insert - V-FELM082
  20µm insert -V-FELM252

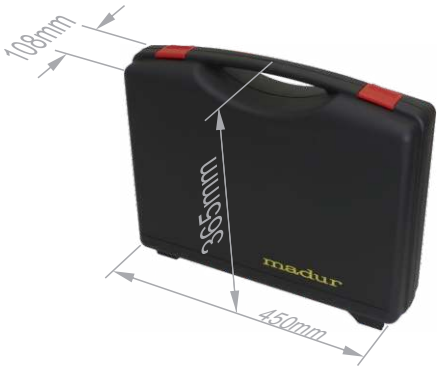
GA-12 plus

FRONT PANEL

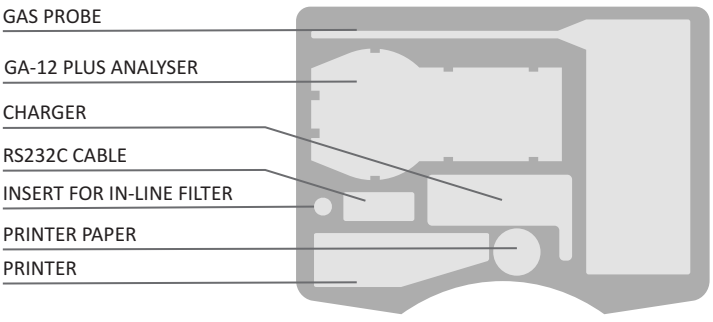
VERSION WITH A SINGLE PRESSURE SENSOR

VERSION WITH AN ADDITIONAL DIFFERENTIAL PRESSURE SENSOR

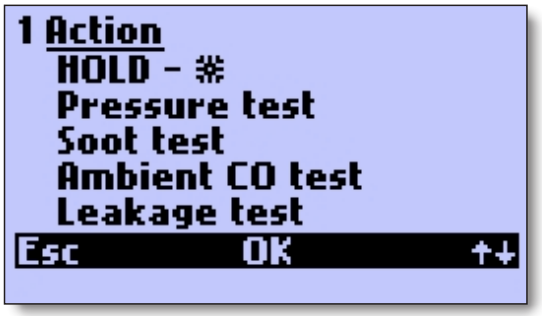
ANALYSER'S CARRYING CASE

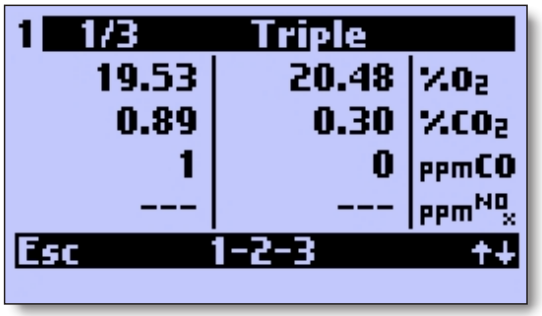


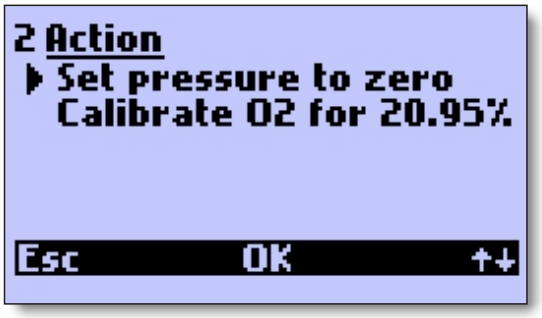
PU FOAM INSERT TO THE CASE

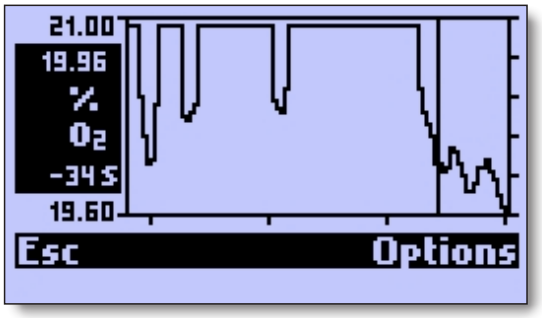
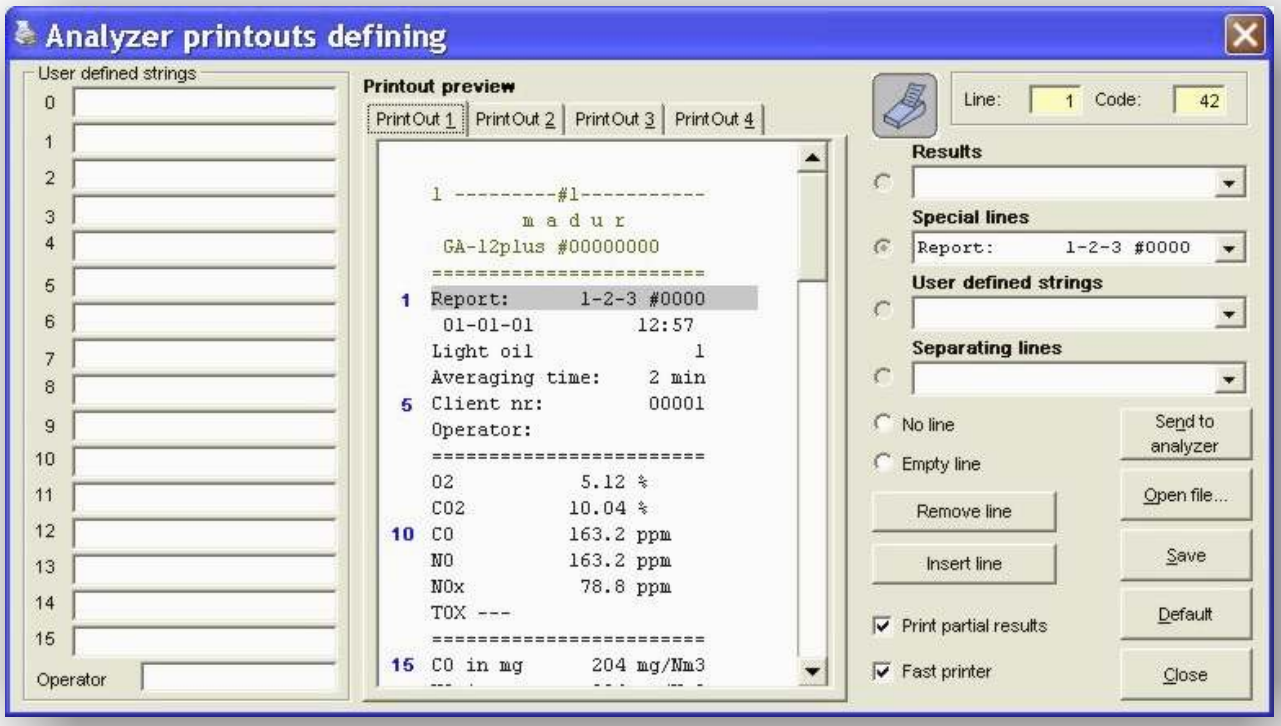


EXAMPLE PRINTSCREEN









EXAMPLE SCREENSHOT FROM THE PC PROGRAM