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GA-12
madur

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Electronic Measurement Labs, Inc.
"Best in Gas Detection"
800-452-6822
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24/7/365 Tech Support

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

GA-12 is madur's smallest gas analyser - hand-held, equipped with up to 3 EC cells.
Small dimensions and light weight makes it very convenient for technicians that use analyser on a daily basis.
Rich offer of equipment and add-ons makes it interesting for more demanding users.
Manufactured according to the principles of EN50379.

GA-12

- Equipped with 2 or 3 electrochemical cells (typical configuration: O_2, CO, NO/NO_x)
- Works with an external portable printer via wireless communication (IR LED)
- Up to 60 hours of work (version with replaceable alkaline batteries)
- Fixed probe of two different lengths with inline filter and condensate trap
- Differential pressure sensor - for measurements of chimney draft and flow velocity (with help of Pitot tube)
- Additional gas filter with condensate trap (installed in the lid)
- Differential pressure sensor - for measurements of chimney draft and flow velocity (with help of Pitot tube)
- Cooperation with digital RH and temperature sensors
- Measurements of gas and ambient temperatures
- Results presented on LCD display (128*64) with backlight
- Calculations of many additional parameters
- Firmware for gas calibration

- Two versions of power supply are possible:
  - version with four replaceable AA batteries (alkaline, Ni-Cd or Ni-MH)
  - version with built-in Li-ion rechargeable battery and aditional mains adapter for battery charging

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ANALYSER	VERSION A WITH REPLACEABLE AA BATTERIES	VERSION B WITH BUILT-IN Li-ION BATTERY
Dimensions (W * H * D)	245 mm * 116 mm * 47 mm	
Weight (without accessories & batteries)	470 g	510 g
Housing 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	4 * AA battery (alkaline or Ni-Cd or Ni-MH)	Built-in Li-ion battery (3,6 V, 1600 mAh)
Operating time	Up to 60 hours	Up to 16 hours
Number of gas sensors	2-3	
Memory for results	for 64 measurements reports	
Display	Graphical LCD 128 * 64, with variable contrast and LED backlighting	
Gas pump	Diaphragm, max 0,6 ÷ 0,9l/min	
Printer	External thermal IR printer MCP 8850 with charger	
Communication interface with PC computer	RS-232C	
Gas probe: length | hose length | temp. range	150mm | 2m | 300°C max	
Gas filtering	In-line filter included in the gas probe hose	

MEASUREMENTS

Variable	**Method**	**Range | Resolution**	**Accuracy**	**Time (T90)**
T_{gas} - gas temperature	K-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 & pressure sensor	1 ÷ 50 m/s | 0,1 m/s	0,3 m/s abs. or 5% rel.	10 sec
RH - relative humidity	SHT11 capacitive polymer sensor (special probe needed)	5 ÷ 95% | 1%	± 5% rel.	30 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

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Method	Range | Resolution	Accuracy	Time (T_{90})	Conformity
O_2 - OXYGEN				
O2 - A2 electrochemical sensor	20,95% | 0,01%	± 0,1% abs. or 5% rel.	45 sec	EN 50379; CTM-030
O2 - A2 electrochemical sensor	25,00% | 0,01%	± 0,1% abs. or 5% rel.	45 sec	EN 50379; CTM-030
CO - CARBON MONOXIDE				
CO - AF electrochemical sensor	2 000 ppm | 0,1 ppm	± 5 ppm abs. or 5% rel.	45 sec	EN 50379; CTM-030
CO - AF electrochemical sensor	4 000 ppm | 1 ppm	± 5 ppm abs. or 5% rel.	45 sec	EN 50379; CTM-030
CO - AF electrochemical sensor	20 000 ppm | 1 ppm	± 10 ppm abs. or 5% rel.	45 sec	EN 50379; CTM-030
CO - AE electrochemical sensor	10% |0,001%	± 0,005% abs. or 5% rel.	45 sec	EN 50379; CTM-030
CO - AX electrochemical sensor with low H_2 cross sensitivity	4 000 ppm | 1 ppm	± 5 ppm abs. or 5% rel.	45 sec	EN 50379; CTM-030
NO - NITRIC OXIDE				
NO - AE electrochemical sensor	2 000 ppm | 0,1 ppm	± 5 ppm abs. or 5% rel.	45 sec	EN 50379; CTM-030
NO_2 - NITROGEN DIOXIDE				
NO2 - AE electrochemical sensor	1 000 ppm | 0,1 ppm	± 5 ppm abs. or 5% rel.	45 sec	EN 50379; CTM-030
SO_2 - SULPHUR DIOXIDE				
SO2 - AE Electrochemical sensor	2 000 ppm | 0,1 ppm	± 5 ppm abs. or 5% rel.	45 sec	EN 50379
H_2S- HYDROGEN SULPHIDE				
H2S - AE electrochemical sensor	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 made of HDPE for analyser and accessories
- 4 * AA alkaline batteries OR built-in Li-ion battery + mains adapter
- 2,5m RS-232C communication cable with DB9 female connector
- Software CD with programmes and manuals

ADDITIONAL EQUIPMENT

NECESSARY FOR THE ANALYSER TO WORK

- Gas probe 150mm or 250mm

Complete gas probe (L=150mm or L=250mm, OD=8mm). Made of stainless steel, equipped with K-type thermocouple. Delivered with fastening cone, in-line filter and 2,0m gas-electric line with 4-pin male plug.

ordering codes:
gas probe L = 150mm - E-SON1200

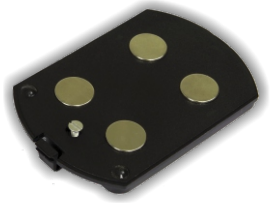
OPTIONAL EQUIPMENT & SPARE PARTS

- Portable printer and printer paper

Portable printer (battery operated), communicates with the analyser via wireless HP-IR interface. Allows to print measurements results instantly on the 58mm thermal paper. The printer is delivered together with 4 Ni-MH rechargeable batteries, mains adapter (for batteries charging) and single roll of paper.

ordering codes:
printer - M20-2DHP2
thermal paper roll - V-THP5701

- Magnetic holder



Modified battery cover with magnets installed in it. This magnetic holder allows to attach the analyser to the metal parts of the boiler, what makes the operation with the analyser even simpler. Replaces the standard battery cover. Delivered with fixing screw.

ordering code:
Z12-MAGN-HOLD

- Leatherette casing

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

ordering code:
M12-ETUI1

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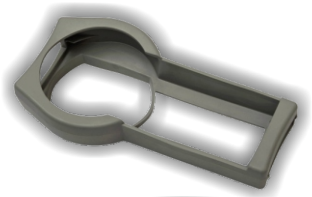
OPTIONAL EQUIPMENT & SPARE PARTS

- Rubber protector

  Special rubber protector for the analyser's casing. Protects the analyser against hits and blows.

  ordering code:
  Z12-RUBBER-001



- Ambient temperature sensor

  This ambient PT500 temperature sensor on a 3m cable is used for measurement of the boiler's inlet air.

  ordering code:
  Z12-SENS-TEMP

- 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

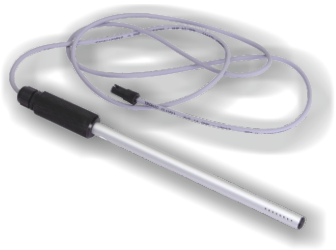
  This magnetic holder allows to safely hang the sensor on a metal surface.

  ordering code:
  Z14-MAGN-PT500

- 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



- Pitot tube

  Pitot tube is used for indirect measurement of gas flow velocity (measurement with the analayser's differential pressure sensor).
  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

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- AA alcaline batteries or Ni-MH AA rechargeable batteries

  Alcaline batteries, 1,5V, size AA/ Rechargeable batteries Ni-MH, 1,2V, size AA, 2000mAh (or better)
  Remember the rechargeable batteries need external charger (cannot be charged inside the analyser).

  ordering codes:
  alkaline batteries- 590E0150A.M
  rechargeable batteries - 590D1216A.M

- Li-ion rechargeable battery

  Rechargeable batteries Li-ion, 3,6V, 1600mAh (or better).
  Spare part for the B version analysers.

  ordering code:
  Z14-BAT-CHARGER_02

- Pressure test kit

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

  ordering code:
  Z12-LEAK-TEST-KIT

- In-line filter

  In-line filter for all the types of GA-12 probes.
  Spare part for gas probes.

  ordering code:
  Z14-FILTER-INLINE

- In-line filter insert 20µm

  In-line filter insert for all the types of GA-12 probes.

  ordering code:
  V-FELM252

- 4-pin male plug 719 series or equivalent

  4-pin plug for all the types of GA-12 probes.

  ordering code:
  513N7194C

- 4-pin male plug 719 to 7-pin female socket adapter

  4-pin plug to 7-pin female socket adapter. Enables use of all the types of GA-21^{plus} probes with GA-12 analyser.

  ordering code:
  Z12-PROBE-ADAPTER

- Mains adapter for Li-ion battery charging

  For use only with the B-version of GA-12 (with built-in Li-ion battery). The mains plug has to be ordered separately.

  ordering codes:
  adapter without mains plug - 196B2001A
  EU (European) plug - 196B2011A
  US plug - 196B2021A
  UK plug - 196B2031A
  AUS (Australian) plug - 196B2051A

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FRONT PANEL

128*64 MONOCHROMATIC DISPLAY WITH BACK-LIGHT

ON BUTTON / FUNCTION KEY

7 NAVIGATION AND FUNCTION KEYS

INSTANT PRINTOUT KEY

OFF BUTTON

GA-12 VS GA-12plus

SIZE COMPARISON

BOTTOM VIEW

GAS INLET

GAS OUTLET

EXTERNAL TEMPERATURE SENSOR / RH PROBE

THERMOCOUPLE / AMBIENT TEMPERATURE MEASUREMENT

DIFFERENTIAL PRESSURE MEASUREMENT INLETS

TOP VIEW

A VERSION WITH AA REPLACEABLE BATTERIES

RS232C

IR LED - COMMUNICATION WITH PORTABLE PRINTER

B VERSION WITH BUILT-IN FIXED LI-ION BATTERY

POWER SUPPLY / BATTERY CHARGING SOCKET

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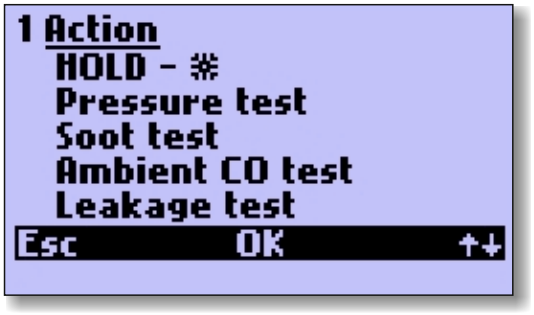
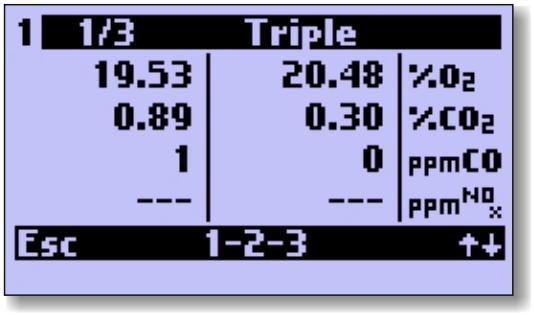
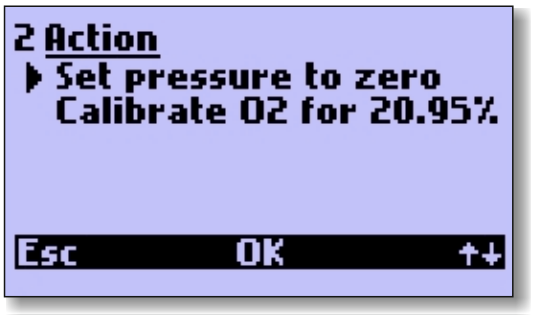
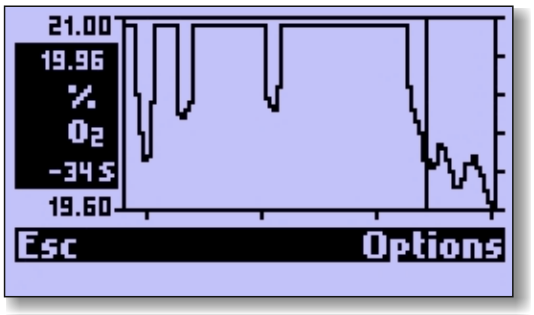
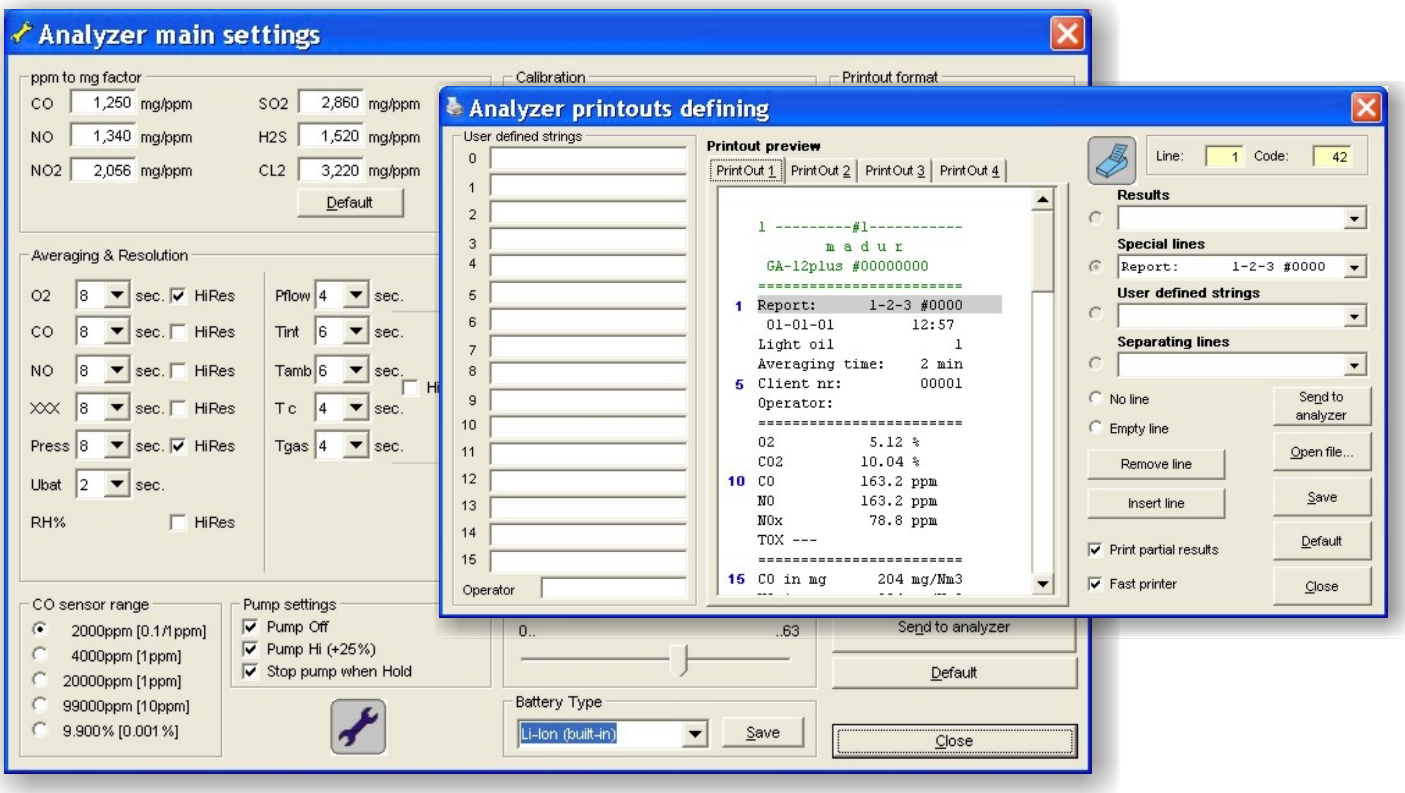
EXAMPLE PRINTSCREENS









EXAMPLE SCREENSHOTS FROM THE PROGRAMME