

GA-12

madur



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.

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- Equipped with 2 or 3 electrochemical cells (typical configuration: O₂, 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
- 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 additional mains adapter for battery charging

SUPPLY / CHARGER
(DELIVERED ONLY WITH B VERSION
- WITH LI-ION BATTERY)

RH PROBE

IN- LINE FILTER

GAS PROBE L=150MM
OR L=250MM

SOFTWARE
& DOCUMENTS CD

RS232C CABLE

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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 30 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 or 250mm 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

GA-12



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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% (100 000 ppm) 10 ppm		± 50 ppm 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 ₂ S- 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					
<ul style="list-style-type: none">• 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					
<ul style="list-style-type: none">• Gas probe 150mm or 250mm <p>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.</p> <p>ordering codes: gas probe L = 150mm - E-SON1200 gas probe L = 250mm - E-SON1201</p>					
<ul style="list-style-type: none">• Gas probe 150mm or 250mm with double pipe & double gas hose (for draft measurements) <p>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.</p> <p>ordering codes: gas probe L = 150mm - E-SON1300 gas probe L = 250mm - E-SON1301</p>					
OPTIONAL EQUIPMENT & SPARE PARTS					
<ul style="list-style-type: none">• Portable printer and printer paper <p>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.</p> <p>ordering codes: printer - M20-2DHP2 thermal paper roll - V-THP5701</p>					
<ul style="list-style-type: none">• Magnetic holder <p>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.</p> <p>ordering code: Z12-MAGN-HOLD</p>					
<ul style="list-style-type: none">• Leatherette casing <p>Soft casing (just for the analyser) made from leatherette, protects the analyser during transport.</p> <p>ordering code: M12-ETUI1</p>					

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OPTIONAL EQUIPMENT & SPARE PARTS					
<ul style="list-style-type: none">• Rubber protector Special rubber protector for the analyser’s casing. Protects the analyser against hits and blows.			ordering code: Z12-RUBBER-001		
<ul style="list-style-type: none">• 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		
<ul style="list-style-type: none">• 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		
<ul style="list-style-type: none">• Magnetic holder for PT500 sensor This magnetic holder allows to safely hang the sensor on a metal surface.			ordering code: Z14-MAGN-PT500		
<ul style="list-style-type: none">• 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		
<ul style="list-style-type: none">• Pitot tube Pitot tube is used for indirect measurement of gas flow velocity (measurement with the analyser’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		
<ul style="list-style-type: none">• 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		
<ul style="list-style-type: none">• 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 alkaline batteries or Ni-MH AA rechargeable batteries

Alkaline 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



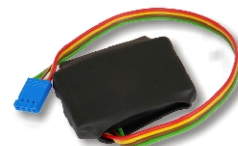
- Li-ion rechargeable battery

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

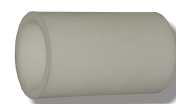


- In-line filter insert 20µm

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

GA-12 VS GA-12plus SIZE COMPARISON



128*64 MONOCHROMATIC DISPLAY
WITH BACK-LIGHT

ON BUTTON / FUNCTION KEY

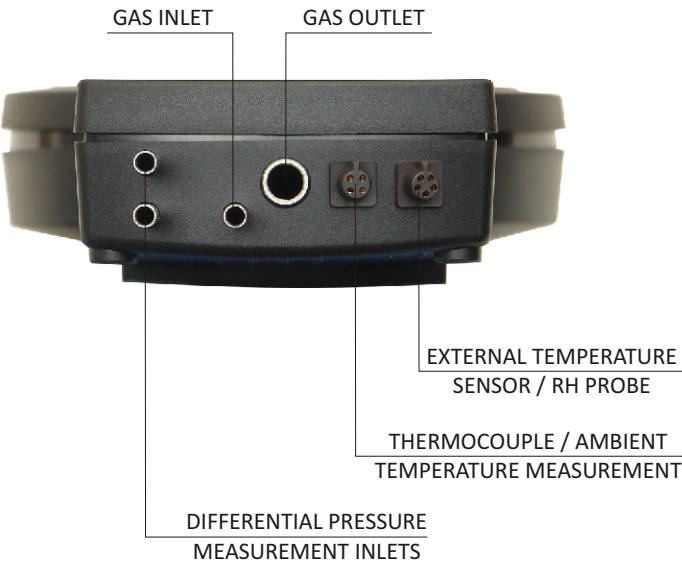
7 NAVIGATION AND
FUNCTION KEYS

INSTANT
PRINTOUT KEY

OFF BUTTON

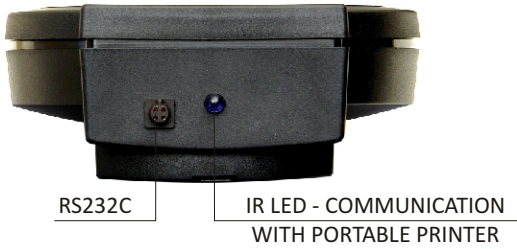


BOTTOM VIEW



TOP VIEW

A VERSION WITH AA REPLACEABLE BATTERIES

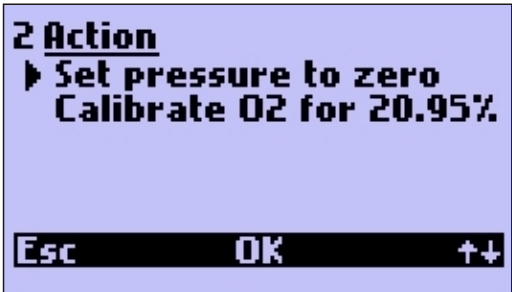
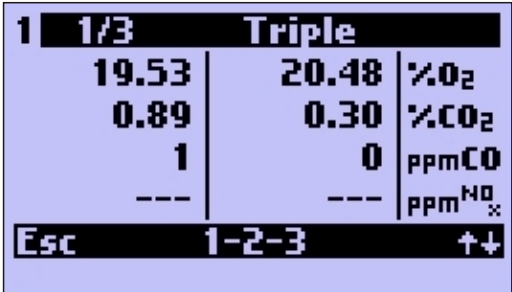
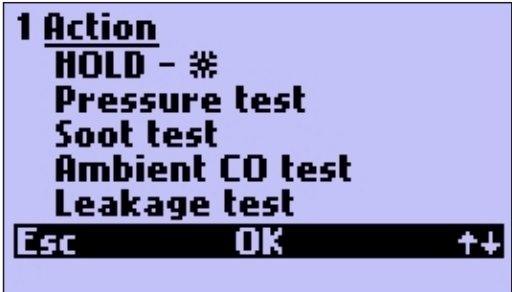


B VERSION WITH BUILT-IN FIXED LI-ION BATTERY



GA-12

EXAMPLE PRINTSCREENS



EXAMPLE SCREENSHOTS FROM THE PROGRAMME

