



ABE_1000 FIXED ANALYZER FOR BIOGAS

Operating instructions



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Biogas analyser ABE-1000

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Kind costumer,

Before to use analyser, we maintain you to attentively read this manual!
It contains warnings and important data, that, if you will observe, you will assure the instruments availability and some savings on costs. In this way, the use of this instrument will be easier and more durable.



Note

We advise you to contact our factory after to use the instrument for new application, for example in research and development.

1.1 General warnings

The device descripts in this manual, has left the factory in a good and secures condition. It must be use in the way descript by producer. Then, the secure working of this product, presuppose that it has an appropriate transport, that the store and the install have made whit accuracy.

This manual contains information for a conformable use to employment estimated. It applies qualified staffs, which has received specific training.

If you wish others information, or if you have particular problems, that there isn't in this manual, you'll have to ask necessary explanations to our factory.

1.2 Instructions to use this manual

In this manual there is the description how of put in service, use and make preservation of this instrument.

We recommend to observe with particular attention the **warnings and notes**.

1.3 Warnings

Warnings pertinent to security help to avoid risks for user's life and health or to avoid materials damages. In this manual this warnings are distinguished by signal's conception uninterruptedly definite. Then, they are marked by warnings symbols in the point that they are.

Danger



It mean that will verify death, heavy wounds to people and/or considerable damages to things, if don't take the right precaution.

Warning



It mean that can verify death, heavy wounds to people and/or considerable damages to things, if don't take the right precaution.

Attention



With triangular advise, it means that can happen light wounds if don't take the right precaution.

Attention

Without triangular advice. It means that can happen materials damages if don't take the right precaution.

Advise

It means that can happen unexpected problems if you don't observe correspondent advise.

1.4 Conformable utilization to estimated engagement

Product describe in this manual it was made, tested and documented whit observance to security laws now in use. If you'll respect manipulation rules, security, installation and preservation warnings, you won't have any problems. This instrument is made in way to guarantee secure isolation between primary and secondary electrical circuit.

Secure workings, without errors, ask accurate transport and professional store, and also accurate preservation.

Advise

This instrument is electric. Before open case, some parts of this instrument are accessible, but that are parts in electrical voltage. So, only qualified staff can make some interventions on this instrument.

1.5 Qualified staff

Can verify in case of interventions not qualified on analyser or not observance of the warnings of this manual, heavy wounds to people and/or considerable damages to things. So, only qualified staff is authorized to make interventions on this instrument.

For qualified staff, in sense of security we intend:

- People that have familiarity with security concept in the automation's technique.
- People that were trained to use device of automation's technique and that know the contents of this manual.
- People who have a formation for repair this type of device.

1.6 Guarantee' s note

The content of this manual don't establish part of an agreement, promise or a juridical relation. All obligations by A.B. Energy S.r.l. resulted by buying and selling contract, witch contains also complete guarantee's discipline. These contractual arrangements for guarantee are not extended or limited by exposition of this manual.

1.7 Note

The respective dotation is report, conformed to valid buying and selling contract, on shipment documents enclosed to supply.

During the packing opening, we ask to observe the pertinent learning and warning reported on packing. Please, verify the integrity of supply.

Conserve packing for possible re-shipping.

1.8 Laws and arrangements

Where possible, for specification and production of this instrument, it was based on European laws.

In case of use of this product outside application sphere of this laws and arrangements, it must observe laws and arrangements of customer's Country.

1.9 Conformity declaration

Biogas analyser ABE 1000 is conforming to following CE arrangements.

Biogas analyser ABE 1000 is conforming to request of CE 89/336/CEE direction "electro-magnetic compatibility".

Biogas analyser ABE 1000 is conforming to request of CE 89/336/CEE direction "low voltage".

According to the above-cited CE direction, the CE conformity declaration is conserved for competent authority in:

AB ENERGY S.R.L.
VIA AMENDOLA N.340
13836 COSSATO (BI)
ITALY

2.1 Security warnings



Warning

Some this instrument's parts are down dangerous voltage. After instrument's insertion the case must be closed and connected to the ground.



Warning

The product mustn't work in a place with risk of explosion. Mixture of explosive gas mustn't be collected.

If the sample gas inside the instrument contains inflammable components above their explosion limit, it must be take security measures with expert person.



Warning

During collecting of poisonous or aggressive gas, can happen that, for a defect of gas conducts, quantity of sample gas amass in the instrument. To anticipate an explosion or poisonous warning, the instrument must be wash with inactive gas.

2.2 Assembling instructions

- On must be choose a place for assembling exempt from vibrations. During working it must be observe the admissible field of temperature.
- The radiator in the posterior parts must be free for air circulation.

2.3 Gas connections to internal flux scheme

As gas connection is present Rislan tube of 6/4 mm.

For flexes or external rigid tubes, must be choose right material for the sample gas.

3.1 Principal characteristics

- **ABE 1000** analyser for methane (CH₄) Carbon oxide (CO₂) Carbon monoxide (CO) and oxygen in biogas.
Measure camps 0-70% in volume for CH₄ 0-70% in volume for CO₂, 0-20000 ppm for CO, 0-25% in volume for O₂.

3.2 Oxygen sensory

Utilized sensory (max 250) of electrochemical type; utilize an alkaline material insensible to carbon anhydride (gas who poison traditional electrochemical sensory, reducing theirs during). Operative life of sensory change favourably of percentage of oxygen measured (whit air to 20,93% of oxygen, standard during of sensory is of 2 years), whit percentage of oxygen less of 5%, it augments until 4/5 years (in case of clean and not damp gas).

3.3 Methane Sensory, Carbon Anhydride, Carbon Monoxide

The sensory utilize a source of impulsive emission of infrared to low temperature. Methane, Carbon Anhydride and Carbon Monoxide, presents an high coefficient of absorbtion of infrared light, the sensory read this attenuation when inside of measures room, are the gas in question and it's possible draw the concentration of respective gas.

3.4 Options

Code	Describing
ABE_1000	Analyser for oxygen, methane, carbon anhydride, carbon monoxide
ABE_550	Thermo capacity measurer 0-1000 sscm
ABE_551	Radio transmitter with capacity until 600m
ABE_552	Stabilization system of device's temperature
ABE_553	Software for configuration and dates reading on PC
ABE_554	Sensory for reading of absolute press ion
ABE_555	Sensory for reading of differential pressure
ABE_556	Condense presence sensory on analyse line
ABE_557	Aspiration pump for biogas managing directly by analyser
ABE_558	Analyse scanner on more lines (maximum 8).
ABE_559	Frigo Peltier for gas cooling
ABE_560	Calibration analyser automatic system

- **ABE 550** Thermic sensory of capacity, it permits the visualization of biogas flux value. Possibility to impost, threshold values and unchain alarm in case of insufficient flux for the analysis.

- **ABE 551** Pair of radio transmitters, they permit to transfer dates between PC and controller as far as 600 meters distance.

- **ABE 552** Temperature sensory, it is utilised for gas temperature stabilization. For augment the precision of analyse reading and avoid the formation of condense inside circuits.
-
- **ABE 553** Software for Microsoft Windows 2000, XP for controller configuration and transfer dates compatibles Microsoft Excel or database Microsoft Access.
-
- **ABE 554** Pressure sensory, it permits pressure visualisation in a measure room. It is utilize for measure compensation acting as pressure.
-
- **ABE 556** Sensory for presence of condense in circuit, it unchains alarm for defender the sensory.
-
- **ABE 557** Aspiration pump for biogas directly managing by controller.
-
- **ABE 558** Scanning of more lines test (Max 8), made by electro valves.
-
- **ABE 559** Static refrigerator (peltier) for gas cooling to remove aqueous vapour in the gas.
-
- **ABE 560** Option for automatic tare of controller. Each tare time layer during the configuration (it has need of sample gas cylinders).
-

3.5 Thermic capacity sensory (ABE 550)

Thermic capacity sensory measure the capacity of gas flux in analyse in cm³/minute. The value read is memorized and visualized on trend.

Sensory has a scale from 0 to 200 cm³/minute.

Minimum flux value (laying in configuration), cause alarm of flux want. Follow the alarm, system stopped analyse and it ask again the staff interview, is necessary an immediately interview to verify the cause of problem (ex. tubes obstruction, pump broken, etc.).

3.6 Radio transmitters (ABE 551)

By option ABE 551 the connection between analyser and pc can be also wireless until a 600 metres distance. Each unit can function also like signal repeater, augmenting transmission distance. One receiver can read until 32 analysers scattered on all surface of analyse place.

3.7 Temperature sensory (ABE 552)

Electronic temperature sensory with function camp from 0° C to 100° C. Signal is utilized for pilot by PID control a power exit witch stabilise container's temperature. PID parameters are modifiable in configuration like also temperature referent. Factory configuration is fixed to 25°C. Constant temperatures permit a best precision of measure. Option advised in case of external installation of instrument, to avoid that low temperatures make some condense problem or ice inside pipelines.

3.8 Supervision software (ABE 553)

Possibility of direct connector between analyser and PC for configuration, transfer or memorized data. The software is realized for Windows 2000 or XP, with ".net" technology. For more information of pack, make referred to software manual.

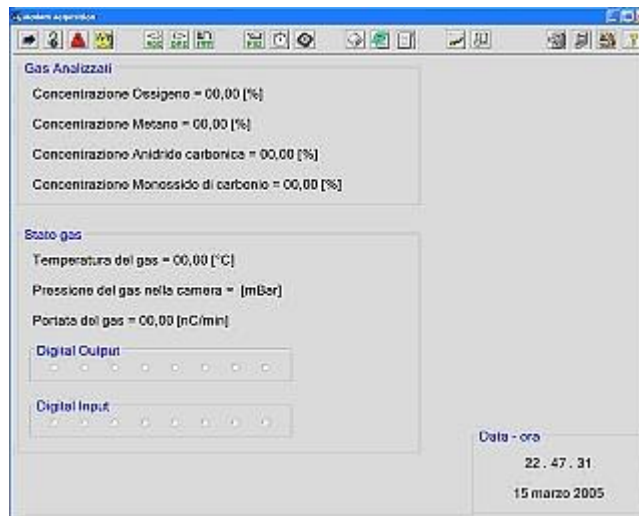


Fig.1 configuration software

The software permits reading and configuration of function parameters of instrument and the visualization of reading in a numeric and in a graphic trend form.

Analyser has 2 serial com 232 standard, first (main com) is galvanic insulated. The isolation permits the connection with external instruments that can be in a different potential. On this com is connected supervision system, installable on a personal computer (ABE 553).

3.9 Absolute pressure sensory (ABE 554)

Electric sensory for measure of atmospheric pressure has reading from 750 to 1050 mBar and precision of 0,5 mBar.

Presence of this sensory, permit to memorize the pressure value and its comparison with another greatness to verify the relations between pressure and oxygen concentration.

3.10 Condense sensory (ABE 556)

The condense sensory permit to verify the presence of condense inside the analyser's pipelines, this cause an alarm signal, if analyser has option ABE 557 the pump came off, if has the option ABE 558 the electro valves come closed. This option permit to protect the sensory that is damage by water.

3.11 Pump of biogas suction (ABE 557)

The option manages the command of a membrane pump pilot directly by taste on keyboard. The pump permits to take away the gas from depression collectors until 200 mBar. Working pump time is memorized in a not volatile memory, each 5000 working hours is utilized an alarm that ask the preservation of pump.

3.12 Scanner of analyse on more lines (ABE 558)

System permits the pilotage of maximum 8 electro valves. The open sequence active the exhaust electro valve that send the gas from first line directly to exhaust line for the wash time laid in configuration; this operation permit to remove the condense in the filter and to faster the phase of filling of analyser with new line gas.

In the end of wash phase, start the phase of analyse, the electro valve close itself, the gas across the analyser that look the reading values. Then, the reading values at the moment come memorized in the log variable and cycle start back.

3.13 Static refrigerator for gas cooling (ABE 559)

The refrigerator is realized by 3 cells "peltier" that permit to reduce the gas temperature until 2° C, this operation permits the remover of main gas condense.

If it's utilized with option ABE 552 that stabilise container temperature to 25° C, are removed the possibility that inside the sensory is formed some condense.

The refrigerator has a double exchanger, the gas are cooling by exit gas that in this phase warm itself; that permit to reduce the electric consumption and obtain an exit gas not damp but in a temperature superior of 2° C.

3.14 Automatic calibration (ABE 560)

This option permit the automatic calibration of analyser in a regular break for obtain stabilise measures.

In configuration it impost the time of automatic calibration, after this time the valve of zero gas open itself, after washing time is made the zero procedure, then it open the valve that send span gas to analyser, after washing time come asked span routine that receive a new value.

In the end of span phase, start back normal working of analyser.

3.15 Structure and characteristic



Fig.2 First screening

- **SCREEN**

LCD display has big dimension ¼ VGA (320*240 pixel) with inverse visual (lighter written), of blue colour. Best luminosity level. Possibility to change contrast. It permits to see at the same time all measures made by analyser in numerical or graphic form (trend).

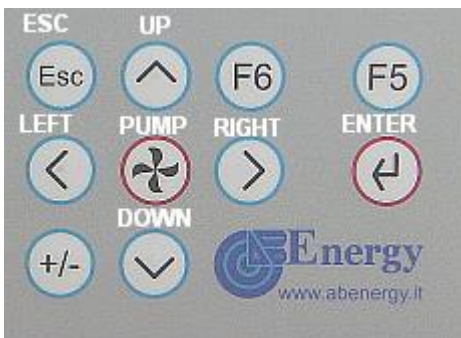


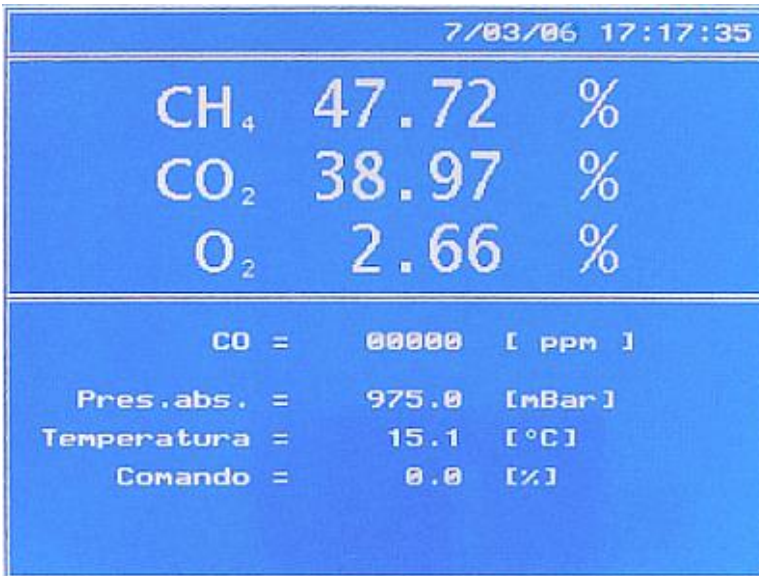
Fig.3 Keyboard (particular)

- **KEYBOARD**

Web keyboard, numerical, with more special functions (taste in relief, pressure squash a “boll” of steel, witch produce taste sensation). By that it’s possible local direction of all functionalities of instrument.

High protection grade that permit the use of analyser outside and presence of water.

3.16 Numeric visualization



It's the main window on which you can look in a numeric form, all variables reading by system. More important values (Oxygen, Carbon Anhydride, and Methane) are showed with big characters for easy reading from long distance. Favourably configuration choice, not all the following variables will be present.

Fig.4 Numeric window

- (1) On first line on the left it appear the write that show the line to which belong the values visualized, the pressure of taste 1 show the last valid dates for first line, the pressure of taste 2 show the last valid dates for second line and so away. The pressure of taste 0 shows the dates reading at the moment.
- (2) On first line on the right are showed date and time, the internal watch work also when the analyser is off.
- (3) The percentage value of oxygen concentration reading by analyser.
- (4) In a case of more input lines, it represent the percentage value of oxygen concentration reading on line N. by tastes from 1 to 8 it's possible change the line showed.
- (5) Atmospheric pressure.
- (6) Analyser temperature.
- (7) Command (in percentage 0-100%) sends to power exit for stabilization of temperature.
- (8) Instant capacity of gas fluxes that across the analyser.
- (9) Condense percentage.
- (10) On last line it appear the write that show the number of analyse line at the moment. It also shows if you are in washing line phase. The number in continual decrease on the right shows the second for the end of the phase.

3.17 Trend visualization

All variables managed by analyser are saved in an internal memory not volatile that manages until 7800 samples. The number of samples memorized depends of variables present favourably of options. Each sample has date, time, errors and analogic greatness. Exist (favourably of version) two modes to memorize, to time and to transition.

In case of analyse on only one line are utilized the acquisition to time.

To transition: utilized in a case of more lines analyse, in this second modality the dates are saved in memory. All dates saved can be visualized in trend form how show in figure 5.

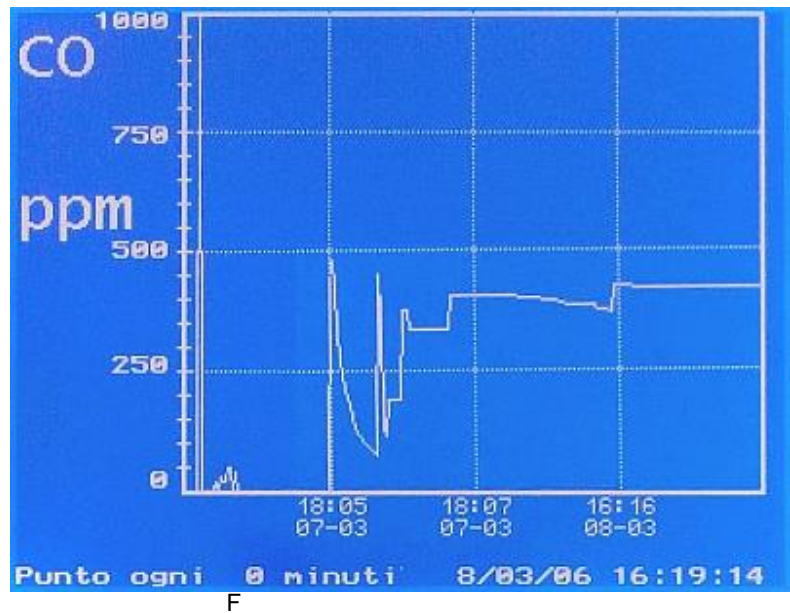


Fig.5 trend window

To accede to trend window push taste F2.

By arrows "UP" and "DOWN" it's possible change the variable on trend window between those avails favourably of models and options chooses. Every screen shows one variable.

Every point visualized represent a memorized sample, by arrows "LEFT" and "RIGHT" its possible move in time, to every press of taste "LEFT" are show dates of previous screen.

In case of more lines analyse, it's possible pass from trend of a line to trend of another line by pressure of taste with correspondent line number.

3.18 Alarm window



Fig.6 error window

If analyser point out an alarm, it show immediately the alarm window (fig.6) with the list of all actives alarm at the moment. Alarm window can be visualized also by pushing of F4 taste from main screen.

Pushing the taste "DEL" you disable momentary the visualization of this page and return to the main screen.

If the error doesn't come solve within 2 minutes, the system propose again this page.

Some errors (critical) block analyse system.

Here the list of possible errors:

Sensory O₂

Signalling "Sensory O₂"

The voltage measure of O₂ sensory is diminished for the aging, but it is again in the admissible camp. It mean that is not necessary intervene immediatly, but the O₂ sensory will be out in a short time. Possibly order a new sensory for O₂.

Oxygen alarm
Line N

The oxygen percentage has surpassed the maximum level permitted.

Maximum oxygen value is configured in the alarm configuration page. The alarm permits the digital output that opens error contact in the analyser exit.

LDC temperature
Out tolerance

Signalling "LCD temperature out tolerance"

If the LCD temperature is out of tolerance camp admissible, it isn't guaranteed the contrast regulation. In this case it's possible have a scarce reading of display.

The temperature is too high. Provide to sufficient ventilation or acclimatization. If anomaly continues, please inform our factory.

4.1 Window password

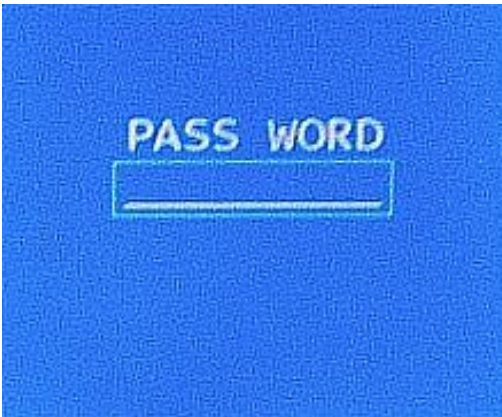


Fig.7 password insertion

The taste F3, move the visualization on password window.

Pushing the right code, pass directly in the first configuration window. Are present more or less configuration pages favourably of versions.

When you are inside of configuration, you can move form one page to another page by tastes F1, F2, F3, F4.

For exit of configuration and come back on visualization pages, you must push taste ESC.

4.2 Data salvage

Inside configuration pages, all modification is saved only in the temporary memory that is loose with the extinguishment.

To make permanent salvage of new values, push taste PUMP (fig.8), in this way, all modifications are registered



Fig.8

4.3 Insertion and modify date and time

Date: sow date and time laid; selecting the voice "DATA" it's possible impost the date and the time correct writing the new data in the formed (ddMMyyhhmmss). Then press "ENTER".

One advice to use the configuration program (ABE 553) which permit to make all these functions in an easy and immediately way.

4.4 CPU data configuration

Ingressi analogici			
Ossigeno 00589648	Valore 5.86	Zero Span	5.000 10.000
Temperatura 04838746	Valore 118.78	Zero Span	0.000 100.000
Metano 49.16	Valore 41.47	Zero Span	0.000 55.000
Anidride 40.06	Valore 33.79	Zero Span	0.000 44.000
Monossido -0000790	Valore 0.00	Zero Span	0.000 0.550

Fig.9 PLC data

- CPU start time: show (in minutes) for how time the CPU rest active without that is made any operation, in the end the analyser turn out itself automatically (0 for disability function). Function valid only for portable analyser.
- Display start time: show (in minutes) for how time the display rest lighted up without that come made any operation (0 for disability function), the light turn out itself automatically when one press any taste.
- Data memory time: show (in seconds) every how time is memorized the new data (only in a case of analyse on single line).
- Line washing time: show (in seconds) for how time is made the line washing. Present only in a case of analyse on more lines.
- Analyse line time: show (in seconds) for how time the line come analysed. Present only in a case of analyse on more lines.
- Contrast value: show the value of video contrast (value between 0% and 100%).
- Sound: show if the “bip” generated by pressure of tastes is active or not, for modify this parameter select the voice “key sound” and insert 1(ON) for active the “bip” or 0(OFF) to inactive it.
- Log data cancelling: permit the cancelling of all log data memorized. Selecting the parameter “LOG DATA CANCELLING” and inserting the value 1(ON), one permits the cancelling of data present in memory. When this operation is complete, the value returns automatically to 0(OFF).
- Factory parameters lying: permit the renewal of all factory analyser parameters that if not saved, will be maintained until analyser off.
- Pump working hours cancelling: show if cancel the value of pump working hours. Inserting the value 1(ON), it go on with data cancelling, when this operation is complete, the parameter value came back automatically to 0(OFF).

4.5 Analogic input

Card has 8 Ana logic input managing by a high resolution converted (24Bit) and a programmer gain between 1 and 64. Firsts 2 canals have input buffer realized with an amplifier with a high isolation and gain, six next canals have simple input buffer with negative input link to mass.

4.6 Ana logic input calibration

Calibration of oxygen sensory must be repeat each 60 days for guarantee declared precision.

Instrumentation necessary for analogic input calibration:

1. Voltage generator stabilized from 0 to 5 volt.(2)
2. Cylinder with zero sample gas (Nitrogen).(3)
3. Cylinder with span gas (5% oxygen rest nitrogen).(3)
4. cylinder with span gas (44% carbon anhydride, 1% carbon monoxide, 55% methane).(4)

(2) Voltage generator is necessary only for calibration of some signal that mustn't be generated directly with sensory.

(3) Necessary for calibration of oxygen sensory.

(4) Necessary for calibration of infrared sensory.



By first screen, on push F3 and entry in the password page. Insert password and push again F2, appear the screen of Fig.10:

Fig.10 Analogic input

By arrows "UP" "DOWN", to place on value that on want modified, number disappear and it is changed by some dashes. Now, on write a new value and push "Enter", new value is confirmed.

The meaning of camps is the following:

- Low value: show zero value (in engineering terms) of desiderate measure camp for channel (oxygen value)
- High value: show span value (in engineering terms) of desiderate measure camp for channel (oxygen value)
- Reading value: show value reading at moment (variable only in reading)

4.7 Calibration pass Analogic input

For calibration of each channel:

1. Connect zero signals on entry of analogic input, go on channel zero value and write zero value.
2. Press left arrow to take and associate value reading by converter with introducing value.
3. Connect span signal on entry of analogic input, go on channel span value and write span value.
4. Press left arrow to take and associate value reading by converter with introducing span value.
5. Press fan arrow for memorizes changes in the not volatile memory.

4.8 Calibration analogic input example

Oxygen from 0% to 5% For example for calibration of oxygen sensory:

1. Write: Channel 1 low value = 0
2. Connect nitrogen cylinder to instrument whit a flux of 5 litres, then wait at least 5 minutes for sensory stabilization.
3. Press left arrow taste, so the analyser read converter value and connect 0% to oxygen value.
4. Write Channel 1 high value = 5
5. Connect cylinder whit 5% of oxygen and rest of nitrogen to instrument whit a flux of 5 litres. Then wait at least 5 minutes for sensory stabilization.
6. Press left arrow taste and analyser read converter value and connects to 5% oxygen value.
7. Press fan arrow for memorise changes in memory.

Infrared sensory calibration For example for calibration of infrared sensory:

1. Write: Zero Value CH₄ = 0
2. Write: Zero Value CO₂ = 0
3. Write: Zero Value CO = 0
4. Connect nitrogen cylinder to instrument whit a flux of 5 litres, then wait at least 2 minutes for sensory stabilization.
5. Press left arrow taste, so the analyser read converter value and connect 0% to methane value.
6. Press left arrow taste, so the analyser read converter value and connect 0% to carbon anhydride value.
7. Press left arrow taste, so the analyser read converter value and connect 0% to carbon monoxide value.
8. Connect cylinder whit 55% of methane, 44% of carbon anhydride and 1% of carbon monoxide, to instrument whit a flux of 5 litres. Then wait at least 2 minutes for sensory stabilization.

9. Write: Zero Value CH₄ = 55
10. Write: Zero Value CO₂ = 44
11. Write: Zero Value CO = 10000
12. Press left arrow taste and analyser read converter value and connects it at value of 55% of methane.
13. Press left arrow taste and analyser read converter value and connects it at value of 44% of carbon anhydride.
14. Press left arrow taste and analyser read converter value and connects it at value of 10000 of carbon monoxide.
15. Press fan arrow for memorise changes in memory.

Factory calibration

This calibration at low sensory value must be made with annual maturity directly by factory staff.

4.9 Second serial com

On second serial com is connected an infrared sensory that read methane, carbon anhydride, carbon monoxide values. On recommend to make sensory tare each 60 days.

Necessary instrumentation for sensory tare:

1. Cylinder whit samples zero gas (nitrogen).
2. Cylinder whit span gas (55% methane, 44% carbon anhydride, 1% monoxide carbon).

4.10 Analogic output

The card has 4 analogic outputs that are guided by a converter (DAC) with high resolution (16Bit). All canals are isolate to cancel any problems in case of connecting in other plants. Standard configuration foresees the following connecting:

1. Oxygen signals 4-20mA 0-25% configurable
 2. Methane signal 4-20mA 0-100% configurable
 3. Carbon oxide signal 4-20mA 0-100% configurable
 4. Carbon monoxide signal 4-20mA 0-10000 ppm configurable.
-

Each output canal is protected against polarity inversion. It is passive, so it has need to continued alimantation between 15 and 30 Volt DC. The load must present a voltage lower 300 Ohm.

On positives small vice, must send positive voltage (generally the positive of 24Volt DC), on negatives small vices, will flow the voltage towards the load.

Element	ABE
Output	4 points
Current	4...20 mA
Load voltage max for esc in current	350 Ω
Resolution	1/2 ¹⁶ – passive opt isolate on single canal
Total precision	Current: +/- 0,5%
Connections	Small vice
External alimantation	From 19 to 30 Volt DC

4.11 Analogic output calibration

Instrumentation necessary for Ana logic output calibration:

1. Precision mA with scale from 0 to 20 mA.

If isn't necessary the calibration of output conversion, but only scale chance, the mA isn't necessary.

4.12 Calibration pass analogic output



By first screen, press F3 to entry in a password page. Insert password and push again F3, appear Fig.11.

Fig.11 Configuration Ana logic output

For each exit channel after written that determine the greatness associate at the channel (oxygen for example) is visualized the channel state that can be:

1. Forced low channel
2. Forced high channel
3. Channel with fixed exit
4. Normal working

Values that can be modified are:

1. Zero value
2. Span value
3. Fix value

By arrows "UP" and "DOWN", go on value that you want modified, the number present disappear and it is replaced with some dashes. Write new value and push "Enter", new value is confirmed.

For "zero" calibration go on "zero value", push left arrow to force exit at low value, the write of channel state change from "normal working" to "low force exit", the pressure of arrow taste towards high, raise exit value, the pressure of arrow taste towards low, diminish exit value. Read with the mA, exit value and with arrow tastes towards high and towards low, proceed until obtain right value of 4mA.

At the end, push arrow taste to right for disability low forced, the write of channel state change from "forced low exit" to "normal working".

For span calibration go on "span value", push left arrow to force the high value exit, the written of channel state change from "normal working" to "high force exit", the pressure of arrow taste toward high, raise exit value, the pressure of arrow taste towards low, diminish exit value. Read with the mA, exit value and with arrow tastes towards high and towards low, proceed until obtain right value of 20mA.

At the end, push arrow taste to right for disability low forced, the write of channel state change from "forced low exit" to "normal working".

For maintain channel exit to fix value, go on "fix value", push left arrow to force exit fix value, the written of channel state change from "normal working" to "fix exit", the exit value will maintain fix value equal to the value in "fix exit".

This value will be maintained until the pressure of right arrow taste, channel state change from "fix exit" to "normal working", or at analyser off.

4.13 Calibration analogic output example

Oxygen from 0% to 25% with 0% = 4mA and 25% = 20mA

Methane from 20% to 80% with 20% = 4mA and 80% = 20mA

Write:

- Zero oxygen value = 0
- Zero methane value = 20

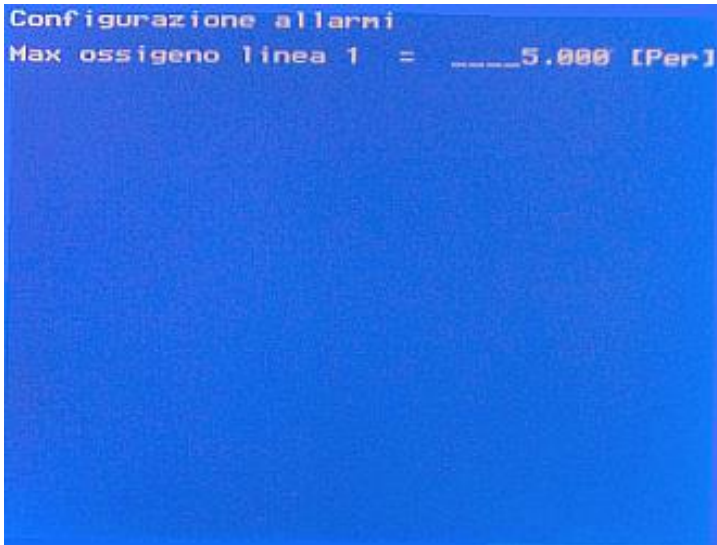
- Push left arrow to force low value exit, the written of state channel change from “normal working” to “low forced exit”, the pressure of arrow taste towards high raise exit value, the pressure of arrow taste towards low diminish exit value. Read with the mA, exit value and with arrow tastes towards high and towards low, proceed until obtain right value of 4mA.
At the end, push arrow taste to right for disability low forced, the write of channel state change from “forced low exit” to “normal working”.

- Span oxygen value = 25
- Span methane value = 80

- Push left arrow to force the high value exit, the written of channel state change from “normal working” to “high force exit”, the pressure of arrow taste toward high, raise exit value, and the pressure of arrow taste towards low, diminish exit value. Read with the mA, exit value and with arrow tastes towards high and towards low, proceed until obtain right value of 20mA.
At the end, push arrow taste to right for disability low forced, the write of channel state change from “forced low exit” to “normal working”.

- Memorize the found values with “fan” taste.

4.14 Alarm configuration



From main screen, pushing F3 taste, on entry in password page, insert password and push again F4, appear Fig.12.

Fig.12 Analyser configuration

By arrows "UP" and "DOWN", on place on value that you want modified, the number present disappear and it is replaced with some dashes. Write new value and push "Enter", new values are confirmed.

The meaning of various camps is the following:

- Oxygen alarm line n: show the maximum percentage value of oxygen that can be accepted on line after give an alarm
- Condense alarm: show the maximum percentage values of condense beyond whom gives the alarm.

4.15 Temperature control

After insert password it accedes at this page by pressure of F5 state.

```

Controllo temperatura
RIFERIMENTO           : ___30.000 [C]
GUADAGNO PROPORZIONALE : 0.400
GUADAGNO INTEGRATIVO  : 0.040
GUADAGNO DERIVATIVO   : 0.000
TEMPO CAMPIONAMENTO   : 00020 [ds.]
MINIMO COMANDO        : 0.000 [Per]
MASSIMO COMANDO       : 100.000 [Per]
RAMPA SALITA          : 0.500 [C/s]
RAMPA DISCESA        : 0.500 [C/s]
CONTROLLO MANUALE     : Off
VALORE COMANDO MANUALE : 0.000 [Per]
PID INVERSO           : Off
  
```

Fig.13 Torch data

- Reference: show temperature value that it was having inside analyser.
- P: show proportional value of PID control filter
- I: show integrative gain value of PID control filter
- D: show derivative gain value of PID control filter
- Control time: show (in second tenth) how each time must be made control cycle (sample time)
- Command minimum value: show the command minimum percentage for power exit (from 0% to 100%)
- Command maximum value: show the command maximum percentage for power exit (from 0% to 100%)
- Ascent flight: show how many grade each second must augment temperature reference of analyser until have laid temperature.
- Descent flight: show how many grades each second must diminish temperature reference of analyser until have laid temperature.
- Manual control: show if analyser temperature is controlled manually (ON) or automatically (OFF).
For modify the value from ON to OFF and vice versa, go on manual control parameter and push taste 0 and "enter" (OFF) to obtain that is automatic push 1 and "enter" (ON).
- Manual value: this value is ability only when manual control is laid on ON.
The coefficient laid command values for power exit that is maintained fix at this value.

4.16 Hardware

The card is realized in superficial assembling (SDM) and it uses a last generation microprocessor.

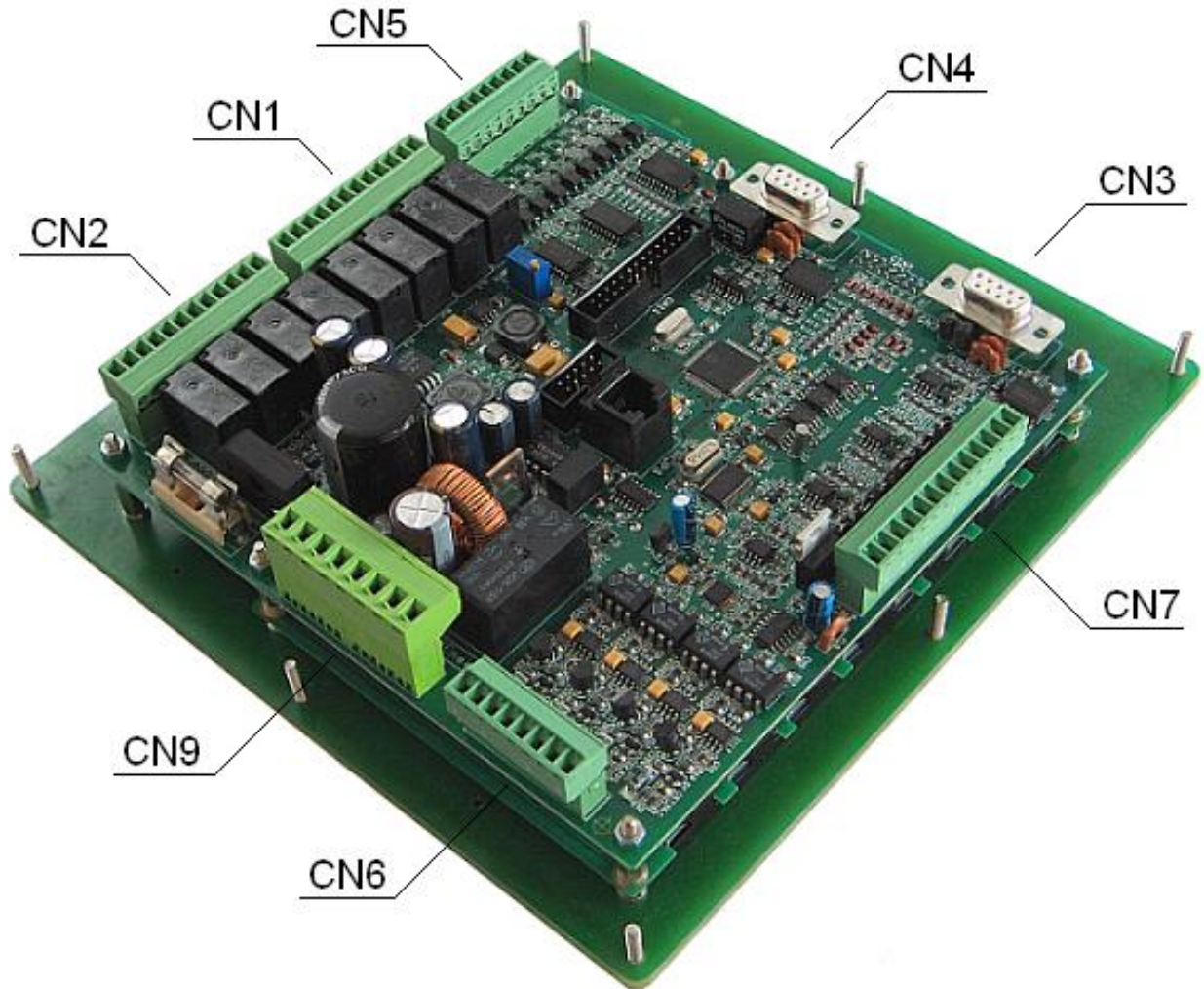


Fig.14 Card

4.17 Technical note

Operative temperature	-5°C / 50°C
Weight	2 Kg
Dimension	206*197*70 mm

4.18 Measures camps

Model	Operative	Resolution
Oxygen (O ²)	0 — 25% Volume	+/- 1%
Methane (CH ₄)	0 — 70% Volume	+/- 1,5%
Carbon Anhydride	0 — 70% Volume	+/- 1,5%
Carbon Monoxide	0 — 20000 ppm	+/- 1.5%
Absolute pressure	100 — 1200 mBar	+/- 2%
Temperature sensory	-10 — 100°C	0,5 °C
Sensory capacity	0 — 1000 cm ³ /min	20 cm ³ /min
Transmitter	600 linear metres	
Thermo controller		1°C Max
Aspiration pump	0 – 2000 cm ³ /min	

5.1 Preservation works



Warning

Working with poison gas must be assured that in the working place cannot be concentration hurtful for health. In case of not appropriate gas lacing can be verify warning of accident due to poison gas, fuels or explosives.



Attention

Components and electrical modules inside this instrument must be protected against electric discharges. For this one must take many protective measures anywhere they were made, tested, shipped and installed.



Warning

After open the instrument separate all electric feeding poles.

5.2 O₂ sensory replacement

- Unscrew the small vices (small vice 1 and 2 of CN7) using a screwdriver, draw out the two sensor's wires.
- Unscrew sensory by its seat, and clean the sensor's case.
- Open the packing with new sensory, remove the protective tongue, and screw new sensory.
- Tighten the sensory by hand, without instruments.
- Insert the red wire sensory in the small vice 1 of CN7 and black wire in the small vice 2 of CN7, tighten the small vices with a screw-driver.
- Go on to sensory calibration.

5.3 Preservation of gas pipeline.

Depending by gas corrosive, one must control the state of gas pipeline.

If necessary, replace flex tubes.

6.1 Re-shipping

Biogas analyser must be ship in the original packing. If you don't have the original packing, the instrument must be wrapping up in a plastic film and then packing in a case dressed with anti-collision material.

In case of maritime transport, the instrument must be warp up in a polystyrene film 0,02mm thick. For this shipping mode, the case must be dressed with tarpaper.

In case of shipping in guarantee, please enclose the guarantee certified.

6.2 Address for re-shipping

Technical assistance

for technical assistance:

Tel: +39 015 9842253
Fax: +39 015 9842253
info@abenergy.it

Repairs

For a rapid cancel of damage causes please send the instrument to the following address:

AB ENERGY S.R.L.
VIA AMENDOLA N.340
13836 COSSATO (BI)
ITALY
Tel.: +39 015 9842253
Fax: +39 015 9842253

KEY WORLDS

A

ABE 1000.....8
ALARM..... 16;25
ANALOGIC INPUT19;20;21
ANALOGIC OUTPUT22;23;24

C

CARBON ANHYDRIDE8
CARBON MONOXYDE8
CPU18

M

METHANE8

O

OPTIONS..... 8;9;10;11;12
OXYGEN..... 8;16;29

P

PASSWORD..... 17

T

TEMPERATURE..... 16;26
TREND..... 15

W

WINDOWS DYSPLAY 14;15;16;17



Declaration of Conformity
Attestato di Conformità

The manufacturer
Il Costruttore

A.B. Energy S.r.L.

Via Amendola 340 13836 COSSATO (BI) Italy

declare under sole responsibility that the products
dichiara sotto la piena responsabilità che i prodotti

model/modello: ABE_1000

type/tipo: Portable gas analyzer/Analizzatore di gas portatile

as originally delivered comply with the essential requirements of the following applicable European Directives
così come originariamente consegnati, rispondono ai requisiti essenziali delle seguenti applicabili Direttive Europee

Electromagnetic Compatibility Directive 2004/108/EC

and conform with the following product standards
e sono conformi ai seguenti standard di prodotto:

EMC **EN 61131-1, EN 61131-2**
 EN 61000-4-2, EN 61000-4-3, EN 61000-4-4
 EN 61000-4-6, EN 61000-4-11, EN 61000-6-4



The products carry the CE marking accordingly
I prodotti riportano il marchio CE in accordo a quanto sopra

Cossato 01/10/2011

General Manager
Andrea Ing. Baroni

A handwritten signature in purple ink, with the text 'A.B. Energy S.r.L.' printed in red below it.