

OXYGENE ANALYSER AK-1097

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User's manual

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User' s manual of AK 1097 oxygene analyser

It is obligatory for the owner to read this manual and to use the oximeter AK 1097 in accordance with it.

The manufacturer , as well as the distributor are not responsible for the damage caused by incorrect use of the device and its components which is different from this described below, or in case of unauthorised manipulation .

Do not use other current adaptor than homologised, which is sold as an independent component of this device , because of the danger of electric shock.

Do not take apart the oxygene sensor even after its discharge , because of the corrosive content .

1. Purpose of Use

AK 1097 oxygene analyser /oximeter/ is a device powered by a battery or homologised external current adaptor which is designet to measure the oxygene content in gaseous mixtures , applied mostly in medical circumstances.

It evaluates the oxygene concentration in gaseous mixtures used e.g. during oxygene therapy, artificial lung ventilation , in anaesthetic gas mixtures etc.

The oxygene concentration is being expressed as a percentage of O₂ on the device display.

Use in other than medical environment should be consulted with the manufacturer.

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2. Description

Oximeter is placed in a shock-resistant plastic box /1/ with a display /2/ and membrane keyboard /3/ on its front . There is a 3.5 mm jack-connector /4/ on its top , for the connection of a wire /5/ with the oxygene sensor /6/ on its end. On the bottom of the device there is another connector /7/ for the external 9Volt /ss/ power supply /8/. The switch /9/ is placed on left side. The battery /R 622, 9volt type/should be inserted under the cover /10/ in the back of the device. There is also the holder /11/ of the oximeter, which is delivered in accordance with the customer´ s order.

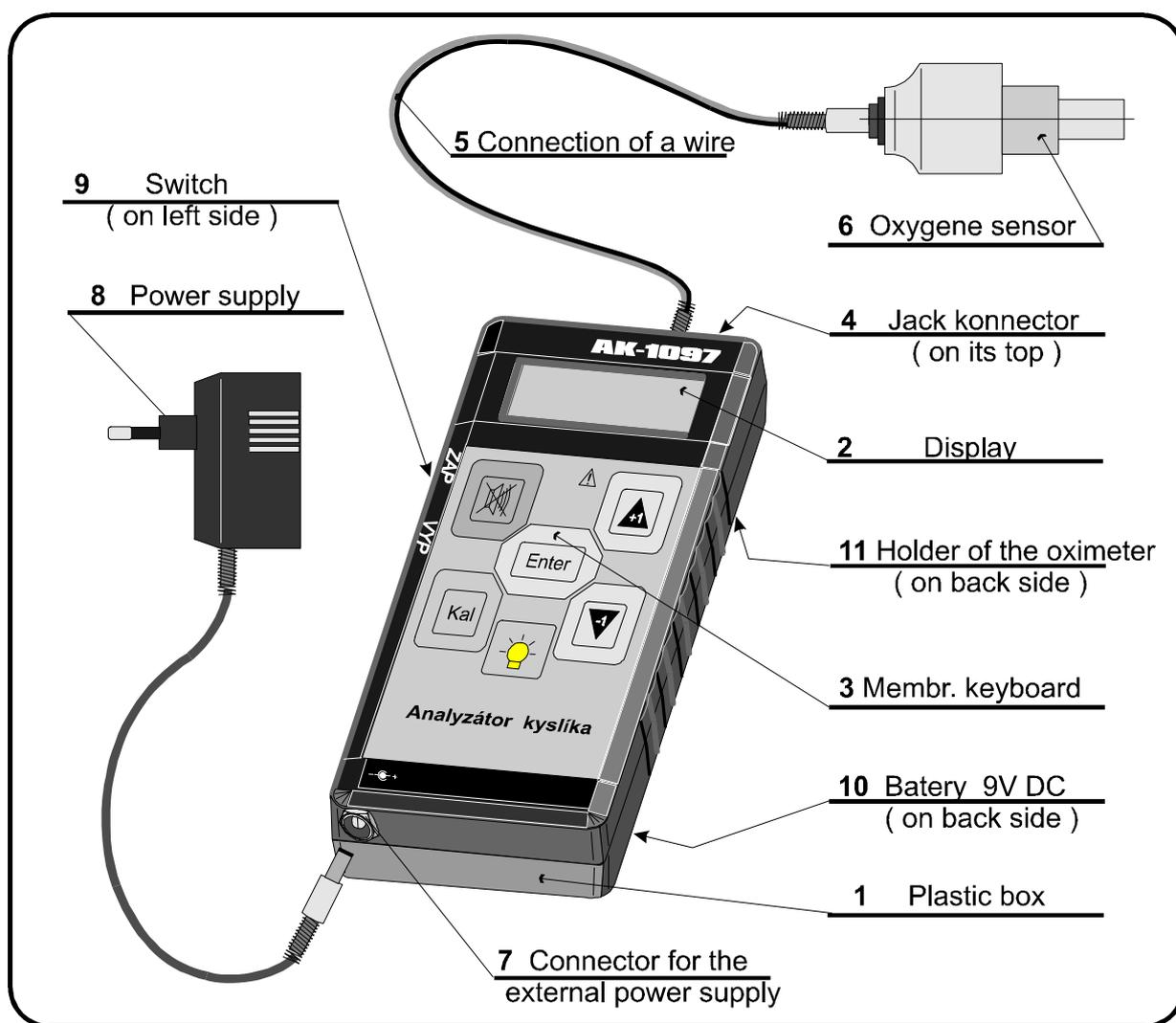


fig. 1: Look of the device.

2.1 Description of the keyboard

Following keys are placed on the membrane-keyboard: **red/22/-with the crossed out speaker sign** , switches off the acoustic alarm after exceeding of the pre-setted limit values of oxygene percentage for 2 minutes, **green /23/ Kal**-pressing of which will initialise automatic calibration for atmospheric oxygene concentration /20.9 %/. **Yellow /23 / signed as ENTER**, which confirms the chosen changes. **Yellow /25/ -arrow directed upwards +1** , which increases alarm limits , **Yellow /26/ -arrow directed downwards-1**, which decreases alarm limits, and finally the **key with a shining bulb /27/**, which switches on the backlight of the display in dark. **The triangel with an exclamation mark /28 /** is a window of visual alarm / red flashing light / , which switches on automatically during situations when alarm is activated.

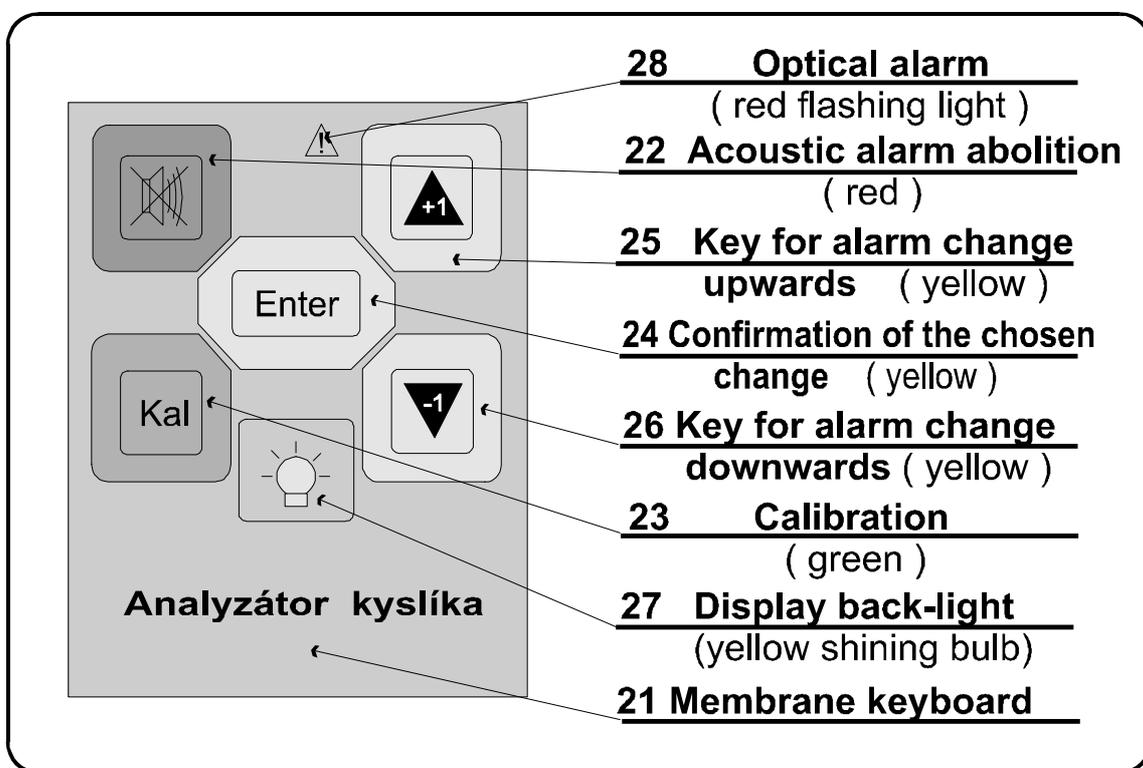


Fig. 2: Keyboard description

3. Measurement principle

The oximeter uses oxygene sensor which is based on the principle of the oxygene fuel element and is bought from distinguished manufacturers. The voltage of the element is proportionately dependent on the oxygene concentration in the measured environment. Voltage of the sensor is processed by a microcomputer and the output is expressed as oxygene concentration percentage.

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4. Basic technical data

Measured gas	oxygene
Unit	oxygene concentration %
Range	15 – 100 % O ₂
Accuracy	± 1 % of the range
Power	9V DC, battery R622 type or external power supply
Battery life	aprox. 1500 hours
Oxygene sensor	electrochemical element
Environment temperature	+15 up to +35 °C
Relative humidity	up to 90 %
Ventilatory circuit connection	ISO 22mm F/M
Size	L 157 x W 84 x D 30 mm
Weight	230 g
Transport temperature	-20 až +75 °C

5. Basic equipment

Complete price of the device includes equipment I and spare parts II.

O.n.	Name	prod.No	Amount-pcs	
			I	II
1	Oxygene analyser	AK-1097	1	-
2	O ₂ sensor connecting cable	1097-10	1	-
3	Oxygene sensor (hermetic package incl.flow coordinator)	1097-13	1	-
4	9V Battery	typ R622	1	-
5	T-shape connector ISO 22M/F	1097-11	1	-
6	User's manual including the guarantee cert.	1097-12	1	-

5.1 Extra equipment

Name	Product No
O ₂ sensor connecting cable	1097-10
Oxygene sensor	1097-13
Power adaptor	1097-14

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6. Model of the device

The device is offered in three models

Model	Name	Order No
1	Oximeter AK-1097 Basic equipment	AK-1097/01
2	Oximeter AK-1097 with a holder for CHIRANA-PREMA a.s. anaesthesia aparatures	AK-1097/02
3	Oximeter AK-1097 equipped with a DC power adaptor	AK-1097/03

7. Attendance

7.1 Completion

After unpacking you should check the completeness and intactness of al parts in accordance with the packaging list. Check the intactness of oxygene sensor packing and if damaged , do not unwrap it but send it back to the manufacturer by your local dealer.

Pull down the battery cover using your nail a screwdriver or other tool and insert the battery into the connector. Close the cover pushing it back to its original position.

Unpack the oxygene sensor cable and plug it into the hole /jack F / on the upper part of the oximeter signed SONDA.

Unpack the oxygene sensor and attach by screwing flow coordinator to the end of oxygene sensor because it is a part of the sensor. Plug the opposite end of the cable ended with a "Jack M" conector into the "Jack F" connector of the oxygene sensor. Sometimes it is a little hard.

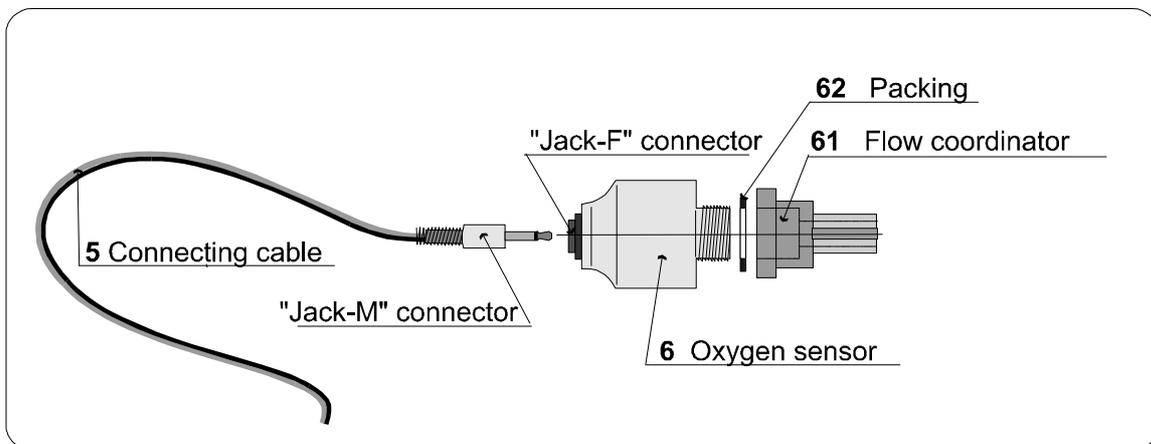


Fig.No4 Scheme of the oxygene sensor and its connection to the cable.

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Pull the packing /62/ on the pneumatic end of the oxygene sensor and screw the flow coordinator /61/ on in order to create a tight connection with the packing /62/. Plug the arrow cable connector into the "Jack F" connector

Do not attach the DC power adaptor at this stage.

7.2 First switch on

Unpacking the oxygene sensor, let it untouched for 15 minutes at the atmospheric condition.

Push the switch /9/ to "ZAP" position. You will hear two acoustic beeps and the red alarm light in the exclamation signed triangle will flash /28/. There will appear an inscription: "KYSLIK" on the display with a digital expression of the oxygene percentage below it. On the right side of the display you will find the upper and lower alarm limit /H and D/ with a certain numeric value / 18% and 99%-setted by the manufacturer /.

In case that the oxygene concentration on display differs from 20.9% ,/ what is the average atmospheric concentration as well as the calibration standard / press the "KAL" key for 2 seconds.

A new inscription: "**Kalibracia 20.9%**" will appear on display. The oximeter will automatically finish calibration in 35 seconds. After this time the original inscription: "Kyslik 20.9%" will be visible on display again.

Acceptable value after calibration is 20.8 - 21.0%

Put the sensor into the T-shaped 22M-22F connector and then try to breathe out the air from your lungs through any end of the T connector. The expired air has an oxygene concentration lower than 18%, thus the value of O₂ concentration on display will decrease below the lower alarm limit. After this you will hear an acoustic signal and the red optic alarm will start to twinkle. You can mute the acoustic alarm by pressing the key /signed with a red crossed sound speaker/ for a period of up to 120 s. The optic alarm is not possible to switch off. Let the sensor on free air and the O₂ concentration value will in a couple of seconds return to 20.9% and the alarm will stop.

During pressing the key /shining bulb/ the display will be back lighted with a green light and thus readable in the dark.

Plug the DC power adaptor into the 220V, 50Hz ,AC current source and the cable connector plug into the hole in the lower part of the oximeter. The display lighting will appear immediately, what means, that the power supply is correct.

If the above described test has been accomplished according to this description, oximeter is capable to functionate and you can start to use it.

7.3 Use of the oximeter

1. Everytime before use . let the oximeter on free air for at least 1 minute and check the display, whether shows /20.8-21.0%/ -typically 20.9% oxygene.

If there is a different O₂ concentration value, press the KAL-signed key and accomplish an automatic calibration. After the calibration the display should show 20.8 - 21.0%, usually 20.9% .

2. Check the battery status following way. Disconnect the DC power adaptor and the display lighting will disappear. If the oximeter continues to operate , everything is all right. In case that the battery is totally discharged, the oximeter will stop to operate and the display will not show anything. If the battery is very low but not totally discharged, display will show another inscription: "Vymen bateriu" . If the battery is borderline charged, there will be an exclamation right after the "Kyslik" inscription. The exclamation means, that you will have to change the battery in a close future.

Plug in DC adaptor into the power source

3. Place the oxygene sensor into the environment where do you want to measure O₂ concentration.

4. Set the upper and lower alarm limits following way:

Press at the same time keys: ENTER and arrow downwards /-1/ for about 2 seconds. The cursor will start to twinkle on the first number of lower alarm limit. Pressing keys + 1, or - 1, will the first number of the alarm limit increase or decrease. Reaching the wanted value of the first number press ENTER .Then cursor will move to the second number of the lower alarm limit and you can repeat the procedure. Repeated pressing of ENTER will stop your editation of lower alarm limit. If you do not want to change the alarm limit, press ENTER twice.

Upper alarm limit can be changed by concomittant pressing of ENTER and arrow upwards /+1/keys. The setting procedure is the same as in lower alarm limit setting.

!!! It is impossible to set lower alarm limit below 18% . In case you will set the lower alarm limit below 18%, after finishing the editation, it will be automatically setted on 18%.

The difference between lower and upper alarm limits is controled by the processor and it is impossible to set the difference lower than 6% of O₂. If your upper limit will be 40% and you will try to set the lower one on 39%, upper limit will be automatically changed for 45%, that means +6%.

5. Setting the oximeter in accordance with the proceeding described above , it is prepared to monitor oxygene concentration.

7.4 Switch off the oximeter

1. Switch off the DC adaptor by pulling it out from the power
2. Switch the oximeter off / VYP position /
3. Pull out the oxygene sensor from the place of oxygene concentration measurement and place it on free air.
4. If necessary, make a surface disinfection and sterilisation of theoxygene sensor connection /seebelow/

8. Alarms

This device is controlled by an intelligent software which protects the attending personnel as well as the patient avoiding possible mistakes.

1. **Disconnection of the oxygene sensor, cable break**-inscription on display: "Chyba sondy" , twinkling of the optical alarm, beeping of acoustic alarm-manipulation impossible , it is necessary to attach the connector, or to change the cable.

2. **Damaged sensor**- the processor was not able to calibrate the sensor during the calibration procedure. Inscription on display: "Kalibracia chyba"-continuous acoustic and optic alarm, manipulation impossible, It is necessary to change the sensor.

3. **Battery power under acceptable value**- inscription on display: Change the battery, manipulation impossible, it is necessary to change the battery.

4. **Low battery power-!** exclamation on display-oximeter continues to operate , it is necessary to prepare a new battery.

5. **Decreased O2 concentration under lower alarm limit/ increase over upper alarm limit**- interrupted optic and acoustic signal.

9. Measurement accuracy control

It is important for the correct functioning to calibrate the device before each use. on free air , but at least once in 24-48 hours.

!!! Once monthly is necessary to accomplish a control measurement of accuracy of oxygene sensor functioning !!!

1. Calibrate the oximeter on air /20.9%/

2. Put the sensor into the environment with 100% oxygene / medical oxygene is about 98.5% /

3. After 60 seconds read the concentration on display which should be about 95.6 - 99.9 %

4. If the concentration on display is lower than 95% , but higher than 90% , the oxygene sensor is still capable to operate, but without satisfactory accuracy /3%/ and you should order a new sensor and to change it.

5. In case that during this test is the displayed concentration lower than 90%, change immediately the sensor.

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10. Desinfection, cleaning and sterilisation

1. Sensor

It can be sterilised exclusively using low temperature technique, e.g. ethylene oxide. It is not allowed to use vacuum during the sterilisation procedure. Frequent ethylene oxide sterilisation can prolongate the sensor response time.

Warning!

The sensor cannot be plunged into any kind of liquid cleaning solution, can not be sterilised in steam and exposed to extreme temperatures.

2. The device

The AK-1097 analyser must not be sterilised.

In case of need can be cleaned by a piece of fabric plunged into a solution of 70% ethylalcohol or 60% isopropan. In ordinary use is suitable a mild cleaner.

Warning!

Neither part of the AK 1097 oximeter is allowed to be exposed to excessive temperature, pressure, radiation, vacuum, steam or chemicals / except of 70% ethylalcohol, 60% isopropanol and mild cleaners /.

Cables and connectors must not be soaked. Solution must not reach connectors.

T shaped 22 F/M connector and flow coordinator after surface disinfection could be sterilised by ethylenoxide, glutaraldehyd, persteril or formaldehyd.

11. Packaging list

Name	Product No	Amount
Oxygene analyser AK-1097	AK-1097	1
Oxygene sensor (hermetic package incl.flow coordinator)	1097-13	1
O ₂ sensor connecting cable	1097-10	1
9V Battery ; type R622	typ R622	1
T-shape connector ISO 22M/F	1097-11	1
User's manual and guarantee certificate	1097-12	1

12. Repair information

12.1 Repairs during guarantee period are provided by **KALAS-COORT-ALS, Povazska Bystrica, Slovakia**

12.2 Repairs after the guarantee period in this country are provided by **KALAS-COORT-ALS , Povazska Bystrica , Slovakia**

In foreign countries are repair services provided by specialised servicing companies , based on particular business contracts.

13. Guarantee

Guarantee conditions are stated in the enclosed guarantee certificate.

Oxygene sensor guarantee: the sensor manufacturer declares , that the sensor will be capable to operate without failures at least 12 months after the date of delivery. The guarantee will loose its validity in case that the device had not been handled by instructions of the manufacturer or by the user´ s manual.

The guarantee is not valid for consumer character goods and for components with special guarantee regime, which is stated in its own guarantee certificate.

14. Transportation and storage

14.1 Transportation

This device should be transported by covered vehicles without bigger shocks , at a temperature -20 up to +40 Celsius degrees /STN 36 4800/ and it must not be exposed to corrosive vapors and excessive humidity.

14.2 Storage

This device should be stored in dry places with maximal relative humidity up to 75% at a temperature +2 up to +40 Celsius degrees without sudden changes.

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