GAS
SENSING
TECHNOLOGIES

ELECTRONIC AFROMETER L.sensor.CO_2

MANUAL

SUMMARY

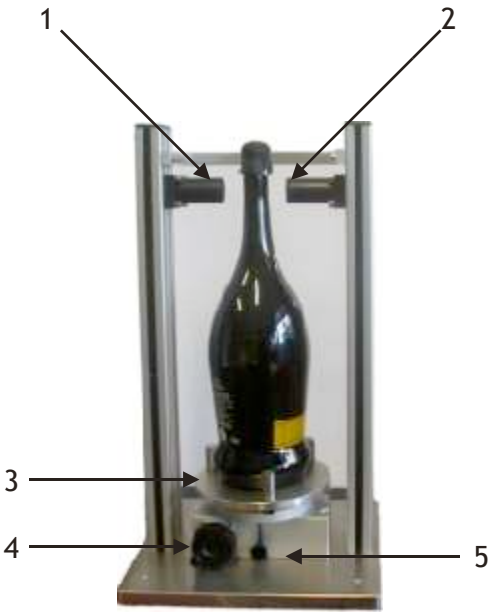
INTRODUCTION

Congratulation for buying L.Sensor.CO2 by LPRO. This user manual will give you instructions for the use of the instrument and important safety regulations (please refer to “SAFETY REGULATIONS” - page 14).
Please read carefully this user manual before using the instrument.
The instrument uses a touch screen PC interface. A normal knowledge of using PC is required to use this instrument.
Instruction course for the use of the instrument are available at L pro srl. Please contact us.

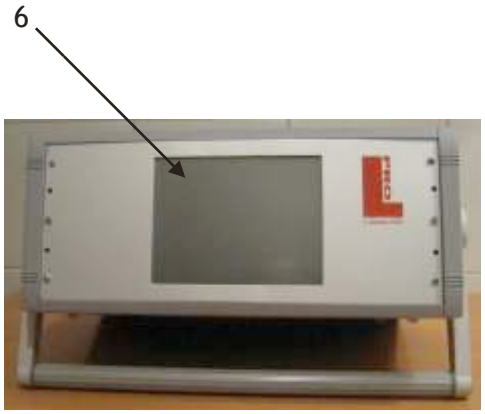
GOODS RECEPTION

This instrument has been completely checked and tested before shipping. When receiving the goods, please verify the following points:
- check the presence of the computer, of the power supply cable and of the main mechanics
- check every part of the instrument to be sure it has not been damaged during transportation
- verify the power supply voltage written in the identify label. If your net power supply voltage is different from the one in the label, DO NOT turn on the instrument. Unplug the power supply cable and contact L pro srl for clarifications.

MECHANICAL CHARACTERISTICS

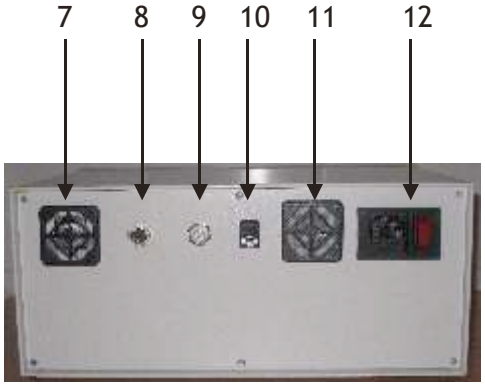


1. Laser ray (not visible)
2. Fotodiode
3. Mechanical centering system for the bottle
4. Bottle height regulation
5. Height arrest warrant
6. Touch screen display
7. Cooling fan
8. Laser multipin connector
9. Fotodiode coaxial connector
10. Ethernet connector (riserved)
11. Air intake
12. Power supply and general switch



DISPLAY

The display is touch screen. With the display you have access to all the instrument's features and to the visualization of the measure results.



START UP

ATTENTION: connect the coaxial and the multipin connectors ONLY when the computer is turned off and unplugged from the power supply net.
Connect the coaxial and multipin connectors on the back of the computer.
Connect the power supply cable to the domestic supply net at 230Vac 50Hz to the connector on the back of the computer.
Turn on the instrument by turning on the main switch and verify that the red light on the switch turns on.
The instrument will start up automatically. Wait for the start up procedure to complete. DO NOT touch the display during the start up procedure.
When the PARAMETERS SELECTION page appears on the display, the instrument L.sensor.CO_2 is ready to be used.

PARAMETERS SELECTION

This is the starting page. Please select the parameters for the measure you are ready to make.

Type of measure:

- Fast: display the results after one single measure.
- High resolution: the instrument executes 3 different measures. Between one measure and the following the operator is asked to turn the bottles in its vertical axis for about 60°. This procedure allows the instrument to interpolate the optical defects of the bottle giving a better result.

Internal neck diameter:

- Select the internal diameter of the neck of the bottle in the point where the laser crosses the neck (in millimeters). To select the correct value, press the left side of the bar for decreasing and the right side for increasing the value. To determine the internal diameter, measure the external diameter of the neck and subtract the double of the glass thickness (about 4-5mm depending on the bottle.

Temperature:

- Select the bottle's temperature at the moment of the measure. To select the correct value, press the left side of the bar for decreasing and the right side for increasing the value.

Preferences:

- Not used at the moment.

Confirm:

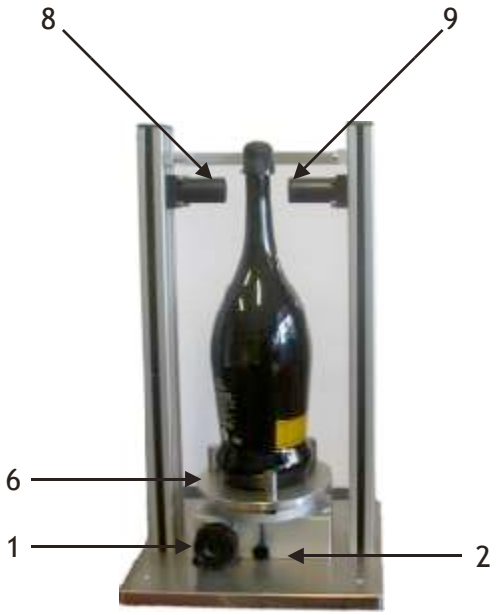
- Confirms the parameter selected and goes to the measure page.

Turn OFF:

- Turns off the instrument. Please wait till the display turns completely off, then turn off the main switch.

NOTE: after some minutes of inactivity the instrument goes back automatically to the PARAMETER SELECTION page. After some more minutes of inactivity, the display turns off to protect itself (screen saver). To turn the display on, please touch the display.

MEASURE



BOTTLE POSITIONING

Put the bottle on the auto-centering mandrel (6).

Turn the rotating base clockwise to lock and center the bottle, counterclockwise to release the bottle. Please check that the bottle does not tilt due to an incorrect positioning. In case, release the bottle and center the bottle again.

Use the regulations (1) and (2) to adjust the correct height of the laser ray (10-20mm over the wine level).

Cut or remove the cup that protects the neck.

For an optimal measure, please check that the welding line of the bottle is not in the direction of the laser ray.

Attention: in sparkling wines DO NOT remove the cork cage before and during the measure

MEASURE

FAST MEASURE

Once selected "FAST MEASURE", setted all the parameters required and pressed "CONFIRM", you will be redirected to the MEASURE page. The instrument is ready to measure the bottle. Put the bottle in the mandrel and press once the "MEASURE" botton.

The instrument shows the following data:

Total pressure (bar)

Indicates the total pressure inside the bottle in absolute bar (atmosphere pressure = 1)

CO_2 pressure at 20°C (bar)

Indicates the absolute pressure relative only to the CO_2 present inside the bottle, referred to 20°C

CO_2 in wine at 20°C (g/l)

Indicates the CO_2 in the wine. Please refer to page 10 for more detail on the coefficient used

Last measure time

Indicates the time when the last measure displayed has been made

Last measure date

Indicates the date (dd.mm.yy) when the last measure displayed has been made

Measure mode

Shows the measure mode selected previously in the parameters page (fast or high resolution)

Diameter selected

Shows the neck diameter selected previously in the parameters page

Temperature of the measure

Shows the temperature selected previously in the parameters page

MEASURE

HIGH RESOLUTION MEASURE

Once selected "HIGH RESOLUTION MEASURE", set all the parameters required and pressed "CONFIRM", you will be redirected to the MEASURE page. The instrument is ready to measure the bottle. Put the bottle in the mandrel and press once the "MEASURE" button to execute the first of three measures.
The instrument executes the first measure, shows a green V on the Position 1 if everything is ok and prompts the user to rotate the bottle to take the second measure.
Rotate the bottle of approx. 60° then press OK to execute the second measure. Repeat the procedure for the third and last measure.

At the end of the three measures the instrument shows the following data :

Total pressure (bar) see page 7

CO_2 pressure at 20°C (bar) see page 7

CO_2 in wine at 20°C (g/l) see page 7

Last measure time see page 7

Last measure date see page 7

Measure mode see page 7

Diameter selected see page 7

Temperature of the measure see page 7

Press TURN OFF once to turn off the instrument (see next chapter).
Press BACK to go back to the PARAMETERS SETTING page.

TURNING OFF

To turn off the instrument, press “OFF” from one of the pages.
Wait for the display to turn completely off then turn off the main switch and check the red light on the switch has turn off.

Note: in stand by (red light on) the measure system is active, so for a correct turning off it is necessary to turn off the main switch and unplug the power supply cable.

MEASURE

ERROR MESSAGES

The instrument will show some error messages in case some problems may prevent the measure execution; some of those errors will be shown by the instrument with error messages. Press OK to exit from the warning window. The system will reboot.
Some other error messages may appear to report problems that prevent the execution of the measure, without the need of a reboot.
When an error message is displayed you must press OK to go back to the normal operation.

Some of the errors displayed are the following:

Low signal (LOW)

it may indicate that the bottle in not correctly positioned. Reposition the bottle. If the problem reappears frequently, please reboot the system.

Execution failed

the instrument did not execute the measure; close the error message and repeat the measure. If the problem persists, reboot the system.

Measure not valid

the instrument did not execute the measure; this happens when the pressure or CO_2 concentration are out of the measuring range.

USER INFORMATION

L.sensor.CO_2 shows measure of:

- total pressure (in Bar) inside the bottle. The value refers to the actual temperature of the bottle at the moment of the measure.
- CO_2 concentration inside the bottle; this value is expressed both as partial pressure at 20°C (in Bar) and as quantity in wine at 20°C (in grams/liter); this last indication refers to a generic wine with an alcoholic gradation of 12°vol, a sugar quantity of 20 g/l and it's in an equilibrium state between wine and gas in the head space. In case the operator wants to refer to different conditions, please refer to the following table with this formula:

concentrationCO2 in g/l = PressureCO2(bar) * coefficient indicated in table

	ALCOHOL									
SUGAR g/l	6	7	8	9	10	11	12	13	14	15
1	1,558	1,539	1,519	1,500	1,480	1,461	1,441	1,422	1,402	1,383
10	1,538	1,519	1,499	1,480	1,461	1,442	1,422	1,403	1,384	1,365
20	1,515	1,496	1,477	1,459	1,440	1,421	1,402	1,383	1,364	1,345
30	1,493	1,474	1,456	1,437	1,418	1,400	1,381	1,362	1,344	1,325
40	1,470	1,452	1,434	1,415	1,397	1,378	1,360	1,342	1,323	1,305
50	1,448	1,430	1,412	1,394	1,376	1,357	1,339	1,321	1,303	1,285
60	1,425	1,408	1,390	1,372	1,354	1,336	1,319	1,301	1,283	1,265
70	1,403	1,385	1,368	1,350	1,333	1,315	1,298	1,280	1,263	1,245
80	1,381	1,363	1,346	1,329	1,312	1,294	1,277	1,260	1,242	1,225
90	1,358	1,341	1,324	1,307	1,290	1,273	1,256	1,239	1,222	1,205
100	1,336	1,319	1,302	1,286	1,269	1,252	1,235	1,219	1,202	1,185
110	1,313	1,297	1,280	1,264	1,247	1,231	1,215	1,198	1,182	1,165
120	1,291	1,274	1,258	1,242	1,226	1,210	1,194	1,178	1,162	1,145

USER INFORMATION

MEASURE METHODOLOGY

L.sensor.CO_2 executes the measure using the absorption of the infrared light by the CO_2 molecules; during the measure, the head space is crossed by an IR ray that is attenuated by the presence of CO_2. The laser wavelength is modified to scan some absorption lines of the gas analyzed. We measure the width of the absorption line (related to total pressure) and its intensity (related to the percentage).

SAFETY REGULATION

The following instructions must be used by the operator and the responsible of the instrument to operate in safe conditions.

ALLOWED USE OF THE INSTRUMENT

-static measure of sparkling wine bottles
-static measure of CO2 concentration in sparkling wine bottles
-the measure must be performed with the instrument positioned on a flat and leveled surface (a desk or table).

NOT ALLOWED USE

- use of the instrument by operator that did not read the manual
- use in outside environments
- use on unstable surfaces or conditions
- modification of mechanical, optical and electrical components
- opening or removing parts of the insturment
- execution of any modifications on the insturments

WARNINGS

The handle of sparkling wine bottles requires care. Those are recipients under pressure and may explode. Please use the maximum attention!

Not allowed use may cause damage to things and persons. The person in charge of the instrument must inform the operator about all the safety rules and the risk of a not allowed use of the instrument.

SAFETY REGULATION

LASER CLASS

L.sensor.CO_2 uses an infrared (not visible) laser ray that is emitted by position (3), crosses the bottle and is received by the photodiode (9).
The signal dissemination by the bottle is not dangerous for the operator.
The laser is in Class 1, in conformity to:

-IEC60825-1: 1993 “Safety radiation of laser products”
-EN60825-1: 1994 “Safety radiation of laser products”

USE OF LASER CLASS 1 PRODUCTS:

They can emit radiations in both visible and not visible range and their beams are not dangerous if observed directly in a non continuos mode, while they can be dangerous if observed with instrument that amplify and concentrate the optical ray (such as microscopes, binoculars, lens etc).

TECHNICAL DATA

Typical measuring acc.cy(*): +-0,1bar(Ptot)/+-0,1bar(PCO_2)
(*) accuracy is higher for PET bottles, lower for glass bottles

Measure time:	5 sec
Measurable range:	Ptot from 1 to 8 bar
	PCO_2 from 1 to 8 bar
	CO_2 in wine from 0 to 11g/l
Minimum unity displayed:	Ptot 0,1 bar
	PCO_2 0,1bar
	CO_2 in wine 0,1 g/l
Laser class:	1
Laser type:	IR, <1 mW
Stand by:	automatic after 20 min
Dimensions:	approx 570x350x400mm
Temperature:	stock from -15°C to +60°C
	work from +5°C to +40°C

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CE

DICHIARAZIONE DI CONFORMITA' ED INCORPORAZIONE
DECLARATION OF ACCORDANCE AND INCORPORATION
DECLARATION DE CONFORMITE' ET INCORPORATION

La Soc. L pro srl di Padova – PD – Italia
Firm L pro srl from Padova – PD – Italy
La S.ètè L pro srl de Padova – PD – Italie

DICHIARA – DECLARES – DECLARE

In qualità di costruttore, sotto la sua responsabilità che i suoi strumenti di misura, sono CONFORMI ai requisiti prescritti dalle Direttive Comunitarie:
Under his own responsibility that his measuring instruments are in ACCORDANCE with the requirements prescribed by the European Directives:
Sous sa responsabilité, que ses moyens de mesure sont CONFORMES aux conditions prescrites par les Directives Communautaires :

*	73/23/EEC	Bassa tensione – Low tension – Basse tension
*	98/37/EC	Direttiva macchine – Machinery directive – Directive machine
*	89/336/EEC	Comp. elettromagnetica – Electromagnetic comp. – Comp. Èlèctromagnetique

relative al materiale elettrico destinato ad essere utilizzato entro il campo di tensione fra 50 e 1000 Volt in corrente alternata.
Concerning electric material used between 50 and 1000 Volt in alternative current.
Relatives au materiel èlèctrique destinè à l'utilisation entre les tensions 50 et 1000 Volt en courant alternatif.

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C.E.O.
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REFERENCES

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