# C.A 1510





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# 1.1 INTRODUCTION

Your kit is intended for in situ calibration of the C.A 1510's C02 measurement function. This calibration should be performed at least once a year or whenever drift is found.

The calibration requires calibration software and a tool capable of injecting a gas having a known CO2 content. The software is an application running on a PC using the Windows XP, 32-bit Windows 7\*, 64-bit Windows 7\*, or Windows 8 operating system. It communicates with the C.A 1510 via its USB cord and allows calibration of the sensitivity (gain) and zero (offset) of the C02 measurement.

The gas injection adapter for the C.A 1510 also allows verification before use. If the verification is satisfactory, the calibration is not necessary.

Attention: The calibration operations must be performed by a qualified individual. Incorrect execution could result in measurement errors.

# 1.2 PRINCIPLE

The gas injection adapter is placed over the inlets of the C.A 1510 in order to inject a gas having a known C02 content. After stabilization of the measurement on the C.A 1510 (a few minutes due to the sensor's response time), it is possible to verify or adjust the measurement.

The verification can be performed on the desired number of points.

The calibration is performed either on a single point (ideally at 2500 ppm), for the sensitivity calibration, or on 2 points, starting with calibration of the zero, if possible with a gas at 0 ppm, followed by calibration of the sensitivity

2 parameters are likely to influence the measurement:

- The flow of gas must be sufficient to impregnate the sensor, but not so high as to risk an overpressure of the sensor. The recommended flow rate is 0.5 ± 0.2 L / minute.
- The ambient atmospheric pressure influences the measurement as follows:

 $CO_{2meas} = CO_2 * (1 + \Delta P_{(mbar)} * 0.14\%)$ Where  $CO_{2meas} =$  level of  $CO_2$  measured by the sensor  $\Delta P_{(mbar)} = P_{atm} - 1013$  $CO_2 = CO_2$  value of the gas injected

# 1.3 EXECUTION

Connect the calibration kit (injection adapter with the connecting tube) to the pressure reducing valve of the cylinder of reference gas, via a flow meter. Then place the injection adapter on the top of the C.A 1510, so as to cover the air inlets.



Note: The C.A 1510 must be used in portable mode in order to obtain a stable measurement as rapidly as possible. The ECO mode and recordings are prohibited for verification or calibration. The 1D and 3D modes are not recommended because they query the CO<sub>2</sub> sensor once a minute.

# 2.1 DESCRIPTION OF THE SOFTWARE

The software has one main screen and 3 menus.

- Calibration: Used to adjust the zero and the sensitivity, to reset to the factory settings and to exit from the software

- Language: Used to select the language of the software (French or English)
- Help: Used to access the help file.

### 2.2 CONNECTION

When the C.A 1510 is connected to the PC via the USB cable, the "Connection" command button serves to initiate communication between the software and the C.A 1510.

When the connection succeeds, the "Connected" state is indicated in green:

🎨 Calibration	software for the C.A 1510		
Calibration	Language Help		
	Connection		
Te	est of the connection	Connection of the device	
	Connected	Opening of communication>> OK Search for the device >> OK	

If it has not been possible to establish the connection, the status "Not connected Error" is indicated in red:

Salibration software for the C.A 1510		- • ×
Calibration Language Help		
Connection		
Test of the connection		
Test of the Connection	Connection of the device	
	Search for the device >> OK	
Not connected	Error : No response from the device.	
Error		

#### "CALIBRATION" MENU 2.3

This menu includes 4 items:

- -
- -
- Zero calibration (Offset) Sensitivity calibration (Gain) Factory configuration (Offset & Gain) -
- -Exit

🎨 Calibration software for the C.A 1510		_ <b>_ x</b>
Calibration Language Help		
Zero calibration (Offset)		
Sensitivity calibration (Gain)		
Factory configuration (Offset & Gain)		
Exit		
Connection		
Test of the connection	Connection of the device	
	Opening of communication>> OK Search for the device >> OK	
Connected	<u></u>	

# 2.3.1 Zero calibration

A first window is used to enter the C02 content of the gas injected.

Zero calibration (Offset) Reference gas Concentration of CO2 in ppm	<ul> <li>Here are the steps in the calibration procedure:</li> <li>1/ Set the device on portable mode.</li> <li>2/ Place the support for injecting on the device.</li> <li>3/ Inject the reference gas ( Flowrate = 0.5 +/- 0.2 L/mn ) corresponding to the concentration of CO2 specified to the left.</li> <li>4/ Click on 'OK' to start the calibration procedure.</li> <li>The procedure lasts about a few minutes (response time of the sensor)</li> <li>CAUTION: it is advisable to recalibrate the sensitivity after this operation (intermediate point at 2500 ppm for example).</li> </ul>
	(intermediate point at 2500 ppm for example).

Notes:

- We strongly recommend using a gas at 0 ppm for the zero calibration. With a gas having a concentration other than 0, any error in the sensitivity calibration would lead to an incorrect result. It would then be necessary to perform repeated cycles of "Zero" and "Sensitivity" calibrations.
- After a "zero" calibration, a sensitivity calibration is strongly recommended.

After validation, the software allows enough time for the C.A 1510 to stabilize the measurement, then acquires the measurement(s) and programs the calibration parameters.

🏷 Calibration software for the C.A 1510		_ <b>_</b> ×
Calibration Language Help		
Connection	Calibration in progress. Please wait	
Test of the connection	Zero calibration (Offset)	
	Connection of the device	
	Opening of communication>> OK Search for the device >> OK	
Connected	<u>-</u>	
	10 %	
	Time remaining: 05:23 STOP	

The end of the calibration is reported by the following window:

by Calibration software for the C.A 1510		<b>— — X</b>
Calibration Language Help Connection Test of the connection Connected	Search for the reading The Offset	
	100 % Time remaining: 00:00	

Characteristics:

The zero calibration is limited to the range from -1000 ppm to +1000 ppm. Outside this range, an error message is displayed and the software leaves the previous calibration parameters in place.

🧐 Calibration software for the C.A 1510		x
Calibration Language Help		
Connection	Calibration in progress. Please wait	
Test of the connection	CA 1510_CAL	
Connected		
	99 %. Time remaining: 00:00	

# 2.3.2 Sensitivity calibration

A first window is used to enter the C02 content	(ideally approximately	2500 ppm) and the atmost	pheric pressure.
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Sensitivity calibration (Gain)		
Reference gas Concentration of CO2 in ppm 1500 Atmospheric pressure in mBar 1017 Required CO2 concentration 1508	<ul> <li>Here are the steps in the calibration procedure:</li> <li>1/ Set the device on portable mode.</li> <li>2/ Place the support for injecting on the device.</li> <li>3/ Enter the ambient atmospheric pressure.</li> <li>4/ Inject the reference gas ( Flowrate = 0.5 +/- 0.2 L/mn ) corresponding to the concentration of CO2 specified to the left.</li> <li>5/ Click on 'OK' to start the calibration procedure.</li> <li>The procedure lasts about a few minutes (response time of the sensor).</li> </ul>	
ОК		

After validation, the software allows enough time for the C.A 1510 to stabilize the measurement, then acquires the measurement(s) and programs the calibration parameters.

Calibration software for the C.A 1510		
Calibration Language Help		
Connection	Calibration in progress. Please wait	
Test of the persection	Sensitivity calibration (Gain)	
Test of the connection	Connection of the device *****	Required CO2 concentration
	Opening of communication>> OK Search for the device >> OK	1508
Connected	<u>-</u>	
	10 %	
	Time remaining: 05:22 STOP	

The end of the calibration is reported by the following window:

by Calibration software for the C.A 1510		
Calibration Language Help Connection Test of the connection Connected	Search for the de the senstivity (Ga	Required CO2 concentration
	100 % Time remaining: 00:00	

### Characteristics:

The sensitivity calibration is limited to gains from 0.5 to 1.5. Outside this range, an error message is displayed and the software leaves the previous calibration parameters in place.

Calibration software for the C.A 15	10	
Calibration Language Help		
Connection	Calibration in progress. Please wait	
Test of the connection	CA 1510_CAL Impossible to perform this operation : The values are not in conformity.	Required CO2 concentration
	99 % Time remaining: 00:00	

# 2.3.3 Factory configuration

This command is used to restore the settings of the device when it left the factory, i.e. an offset of 0 ppm and a gain of 1.

🏷 Calibration software for the C.A 1510		
Calibration Language Help		
Connection		
	Factory configuration (Offset & Gain)	
Test of the connection	Opening of communication>> OK Search for the device >> OK Zero calibration (Offset) Ok	
Connected	Sensitivity calibration (Gain) Ok	

# 3. DELIVERY CONDITION

In-situ calibration kit for	C.A 1510	P01651022
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Delivered with:

- Support for injecting the reference gas.
  Flexible hose.
  Calibration software.



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