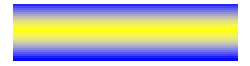


# OLCT60



## TRANSMITTERS

### TECHNICAL MANUAL

#### *Installation and use*



**INDUSTRIAL  
SCIENTIFIC**



Made in  
France



Ref.: NPO60GB  
REV E



## **DETECTION DE GAZ**

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Nous avons pris toutes les dispositions nécessaires pour garantir que votre matériel vous apporte une totale satisfaction.

Il est important maintenant de lire attentivement le document suivant.

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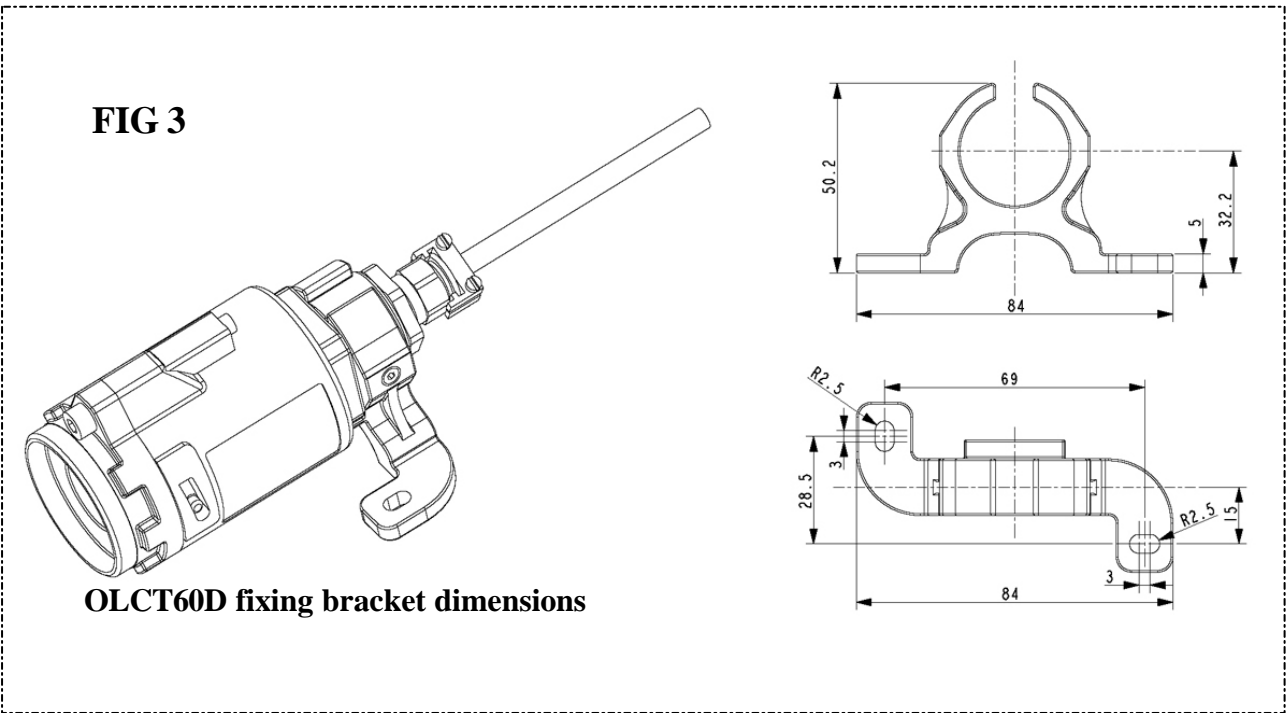
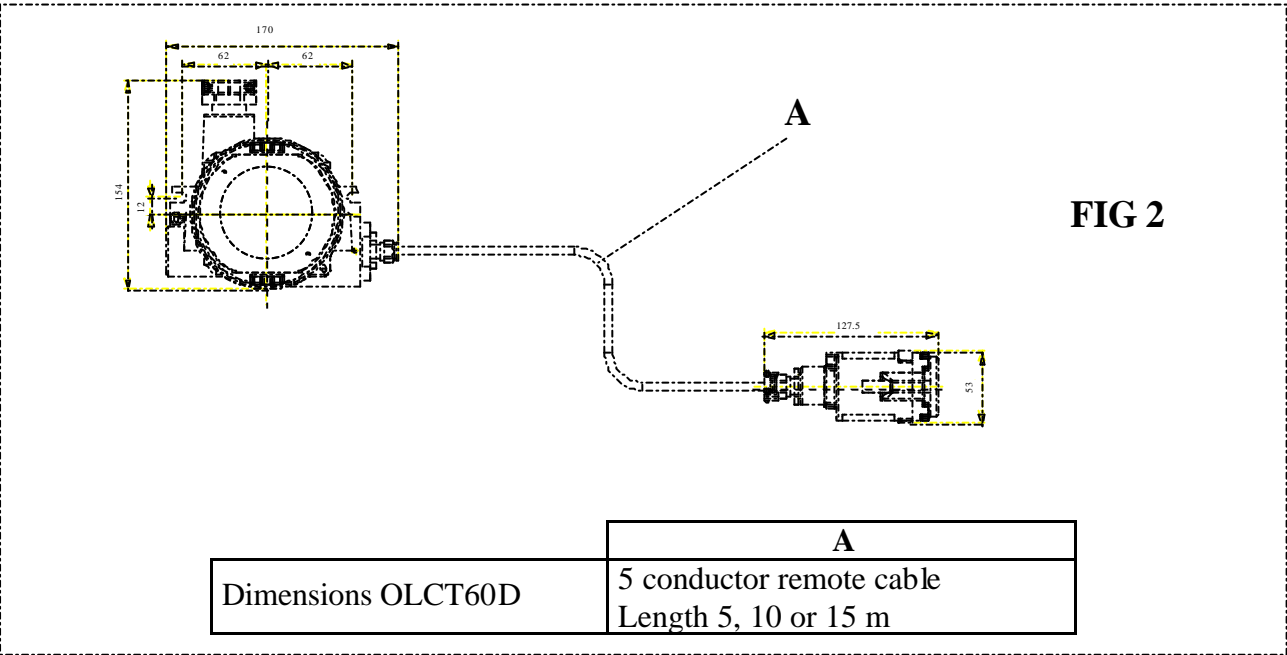
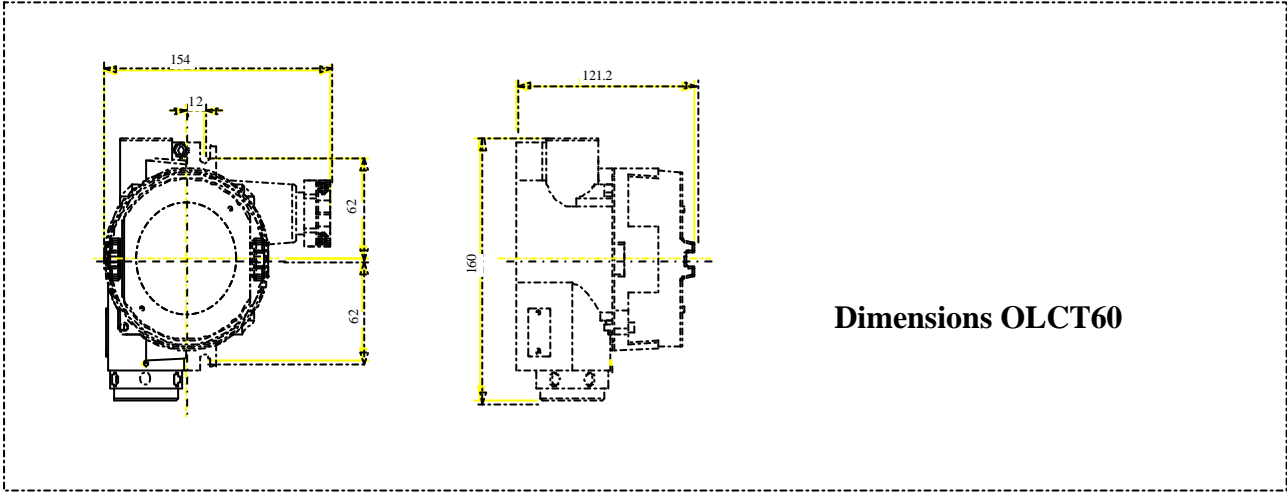
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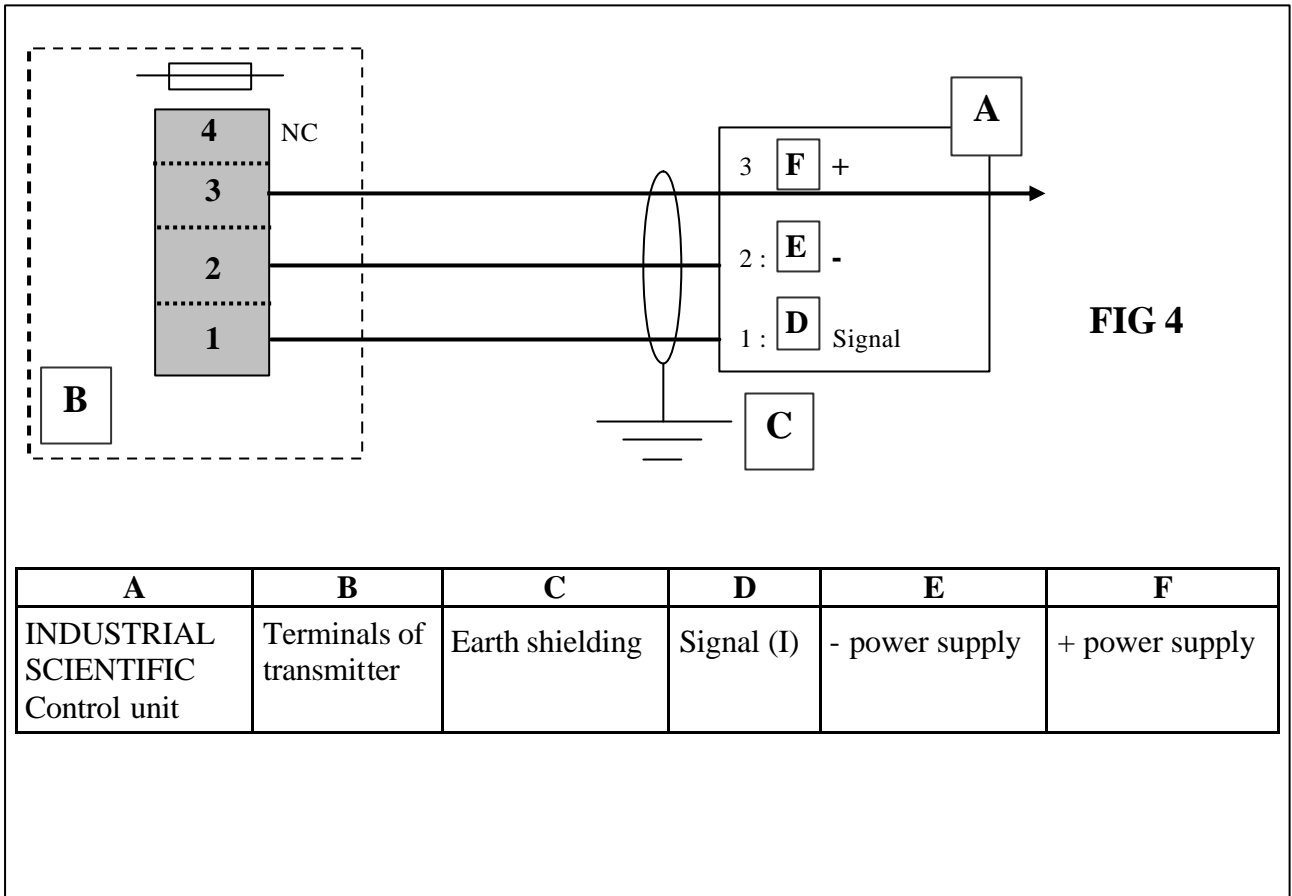
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### **GARANTIE**

- \* Garantie 2 ans dans les conditions normales d'utilisation sur pièces et main d'oeuvre, retour en nos ateliers, hors consommables (cellules, filtres, etc.)





# CONTENTS

<b>I. DESCRIPTION OF THE OLCT60 FAMILY .....</b>	<b>8</b>
1. General.....	8
2. Main characteristics of the various versions.....	9
3. Informations issued of the OLCT60 version.....	10
<b>II. MECHANICAL INSTALLATION OF THE VARIOUS VERSIONS .....</b>	<b>10</b>
1. OLCT60 .....	10
2. OLCT60D (remote version).....	10
<b>III. WIRING .....</b>	<b>11</b>
<b>IV MAINTENANCE.....</b>	<b>11</b>
1. Calibration with a «calibration's bench ».....	11
<i>CALIBRATION SPECIFICATIONS AT THE BENCH .....</i>	<i>13</i>
2. CALIBRATION : OLCT60.....	13
3. INITIALIZATION : OLCT60 .....	19
4. Removing of a cell unit on the whole OLCT60 versions .....	22
5. "doubt removal" during measurement of explosible gas .....	22
6. Scrapping of OLCT 60.....	23
<b>V. LIST OF SPARE PARTS OLCT60.....</b>	<b>23</b>
1 Explosion-proof cell units.....	23
2 Intrinsic safety cell units .....	24
<b>VI. LIST OF ACCESSORIES FOR TRANSMITTERS OLCT60 .....</b>	<b>25</b>
<b>VII. TECHNICAL CHARACTERISTICS OF OLCT60.....</b>	<b>26</b>
<b>VIII. SPECIAL SPECIFICATIONS FOR USE IN POTENTIALLY EXPLOSIVE ATMOSPHERES IN ACCORDANCE WITH EUROPEAN DIRECTIVE ATEX 94/9/EC. ....</b>	<b>28</b>
1. Specifications for mechanical and electrical installation in Classified Areas. ....	28
1.1. <i>Explosion-proof detectors (d) version or explosion-proof (d) and intrinsic safety               (i) detectors version : OLCT 60d or OLCT 60 id .....</i>	<i>28</i>
1.2. <i>Explosion-proof detector (d) version and intrinsic safety (i) detector version :               OLCT60 id with OLCT20i intrinsic safety cell block .....</i>	<i>28</i>
2. Metrological specifications for explosive gas and oxygen measurement detectors .....	29
2.1. <i>Technical Specifications and Special Instructions for explosive gas detectors .....</i>	<i>29</i>
2.2. <i>Technical Specifications and Special Instructions for Oxygen detectors.....</i>	<i>32</i>
3. MARKINGS .....	34
3.1. <i>Explosion-proof safety version: OLCT60d.....</i>	<i>34</i>

3.2. <i>Explosion-proof safety version: OLCT60id</i> .....	34
<b>IX. APPENDICE</b> .....	<b>36</b>
<b>ADDENDUM TO THE OLCT60 MANUAL.</b> .....	<b>37</b>
<b>USE OF OLCT 60 WITH A DETECTION HEAD,TYPE OLCT IR</b> .....	<b>37</b>
1. PRESENTATION.....	37
2. TECHNICAL SPECIFICATION(*).....	39
3. INSTALLATION.....	40
4. COMMISSIONING.....	43
5. MAINTENANCE .....	43
6. OPTIONS AND PART NUMBERS .....	<b>Erreur ! Signet non défini.</b>
7. Special Instructions for use in ATEX explosive atmospheres .....	46
8. MARKING : .....	47

# I. Description of the OLCT60 family

---



## 1. General

---

The **OLCT60** type gas detectors are 4-20 mA transmitters (3-wire T signifies Transmitter) and are intended for the measurement of combustible and toxic gases and oxygen.

They are available :

- in explosion proof protection mode. The approved type is **OLCT60d**. In that case, the whole housing/cell unit is in explosion proof protection mode.
- In explosion proof protection mode and in intrinsic safety protection mode, the approved type is **OLCT60id**. In that case, the housing is in explosion proof protection mode and the cell unit is in intrinsic safety protection mode. This version is only available for the toxic and oxygen versions.

Serie **OLCT60** consists of 2 versions of transmitters:

- a) The **OLCT60**
- b) The **OLC60D** with a remote and pre-calibrated cell unit.



## 2. Main characteristics of the various versions

---

	OLCT60		OLCT60D	
	<i>EXPLO</i>	<i>TOX/O2</i>	<i>EXPLO</i>	<i>TOX/O2</i>
Explosion-proof safety certification	X	X	X	X
Cell unit in intrinsic safety certification		X		X
Outlet via (2 to 12mm) packing gland	X	X	X	X
3-wire cable / 4-20 mA output	X	X	X	X
Remote cell unit			X	X
Catalytic cell	X		X	
Electrochemical cell		X		X
Interchangeable and pre-calibrated unit	X	X	X	X

### **3. Informations issued of the OLCT60 version**

---

#### **3.1 Starting :**

- Test of all the digits and LED for check up
- Information of the used software version
- Serial number
- Date and code
- Stabilization and test of the cell of measurement

#### **3.2 In normal operating :**

- display of the measurement
- display of the gas's type alternatively with the unit
- green LED = no fault
- yellow LED = fault written by code

#### **3.3 In case of failure**

- lighted yellow LED + display of the fault's code

#### **3.4 In case of error of operating**

- Display of "Erxx"

xx = number from 35 to 39

Corresponding to a failure up to parameter memory

- The main various codes are :

64 = internal Ctn out of order  
1 = zero's fault (after a calibration)  
2 = sensitivity's fault after a calibration (too high)  
4 = spoiled cell (after a calibration)  
8 = failures up to memory (parameters)  
16 = too negative signal  
32 = SUP (measurement out of range)  
ABS = absent cell  
256 = supply voltage too low

## **II. Mechanical installation of the various versions**

---

Please ensure you read the paragraph: Special Specifications for use in Potentially Explosive Atmospheres in Accordance with European Directive ATEX 94/9/EC

See **Appendix 1** for general installation instructions.

### **1. OLCT60**

---

- See **Figure 01** (at the beginning of this manual).

### **2. OLCT60D (remote version)**

---

- See **Figures 02 and 03** (at the beginning of this manual).

## III. Wiring

---

Please ensure you read the paragraph: Special Specifications for use in Potentially Explosive Atmospheres in Accordance with European Directive ATEX 94/9/EC

- - See **Figure 04** (at the beginning of this manual)

## IV Maintenance

---

**Caution:** The operations and adjustments described in this chapter must be performed by authorized personnel only as they can affect the appliance's reliability in detection.

**IMPORTANT:** It is prohibited to open the transmitter when energized.

These types of transmitters are equipped with a pre-calibrated cell unit and do not require any adjustment on installation.

Gas detection instruments are potential life-saving devices. Recognizing this fact, Industrial Scientific Corporation recommends that a functional “bump” test be performed on every fixed gas-monitoring instruments as part of a regular maintenance program. A functional test is defined as a brief exposure of the detector to a concentration of gas(es) in excess of the lowest alarm set-point for each sensor for the purpose of verifying sensor and alarm operation and is not intended to be a measure of the accuracy of the instrument.

Industrial scientific further recommends that a full instrument calibration be performed using a certified concentration(s) of calibration gas(es) quarterly, every 3 months.\* Calibrations may be necessary more or less frequently based, for example, on application, field conditions, exposure to gas, sensor technology, and environmental conditions. The frequency of calibration is best determined by company policy or local regulatory agencies.

If an instrument fails to operate properly during any functional “bump” test, a full instrument calibration should be performed successfully prior to use.

These recommendations are based on safe work procedures, industry best practises, and regulatory standards to ensure worker safety. Industrial scientific is not responsible for setting safety practices and policies.

*\* For new installations it may be prudent to carry out bump tests frequently at first (perhaps weekly), increasing the time intervals (to, perhaps, monthly or more) as confidence grows with experience in the installation concerned, on the basis of the maintenance record.*

### 1. Calibration with a « calibration's bench »

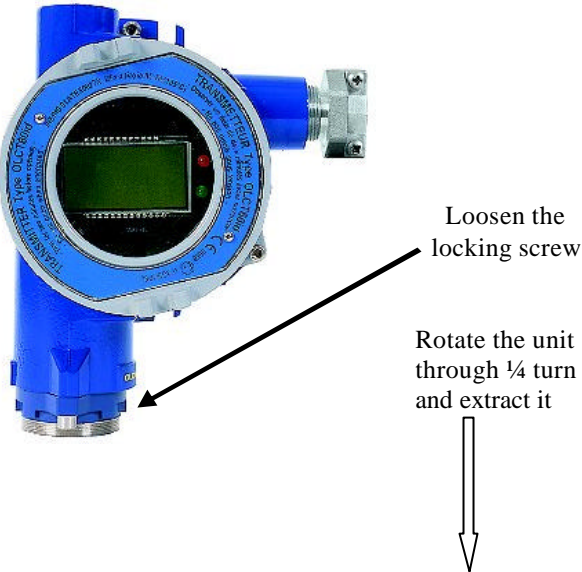
---

These types of transmitters equipped with a pre-calibrated cell unit are designed to allow **quick servicing action** on site.

- After removing the cell block from the transmitter, calibration is performed using a calibrating bench(2) provided for that purpose : see the following procedure.

**(2) : To operate this bench, see the operating procedure supplied with it.**

**Procedure to be followed after obtaining all necessary  
authorisations to conduct work on site**

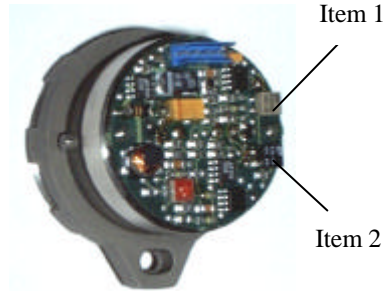
<b>On the data logger</b>	<b>On the TRANSMITTER</b>
<p>Switch off the measuring channel</p> <p>Switch the measuring channel back on and make sure that it is working properly,</p>	 <p>Loosen the locking screw</p> <p>Rotate the unit through <math>\frac{1}{4}</math> turn and extract it</p> <p>Reinstall the same newly calibrated unit or a replacement unit and reinstall the whole assembly.</p> <p>Do <b><u>COMPULSORILY</u></b> an <b><u>INITIALIZATION</u></b> (see chapter IV-3)</p>

## CALIBRATION SPECIFICATIONS AT THE BENCH

### CAUTION:

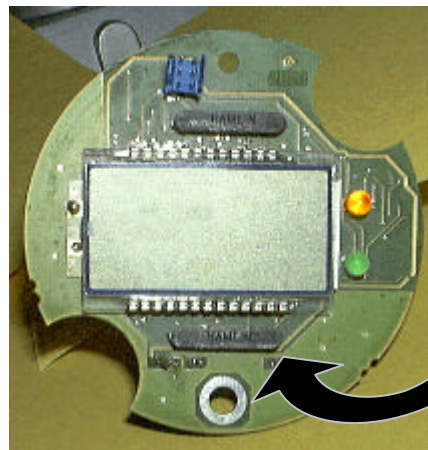
Calibration is to be performed **outside classified areas** and using **suitable equipment** (case) that is described during the training course provided by INDUSTRIAL SCIENTIFIC or by a person approved by INDUSTRIAL SCIENTIFIC

CELL UNIT **OLCT60** (D)  
(explo/tox/O<sub>2</sub>)



- Adjustment of 0 in clean air, using potentiometer (item 1).
- Adjustment of sensitivity (with standard gas), using the potentiometer (item 2).

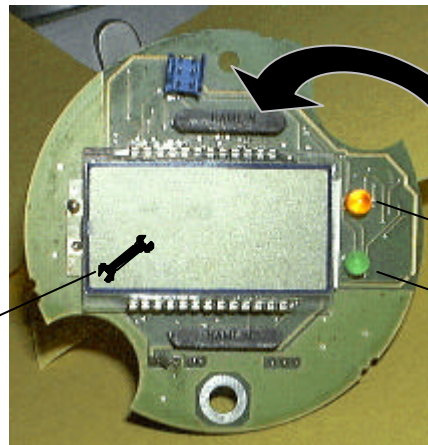
## 2. CALIBRATION : OLCT60



Magnet 6155651

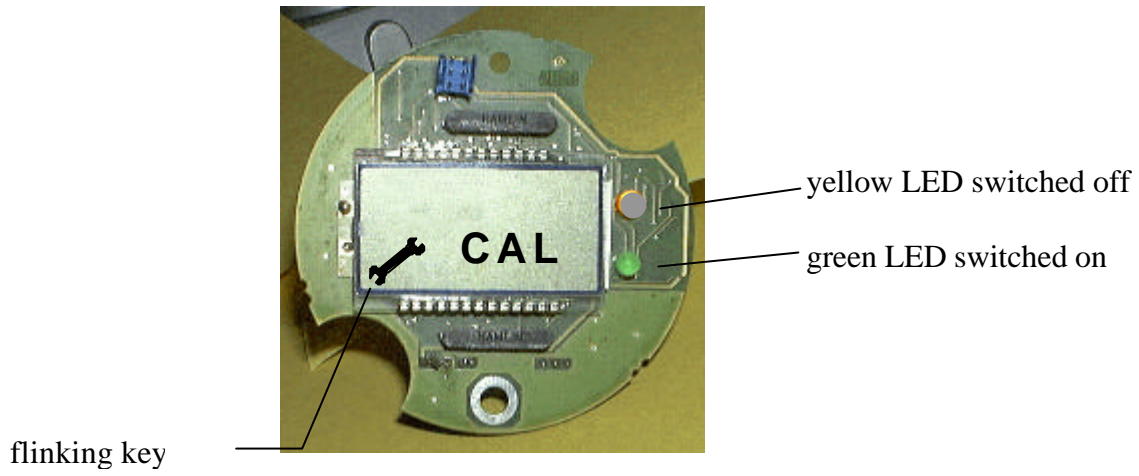
During 5 seconds

5 seconds later

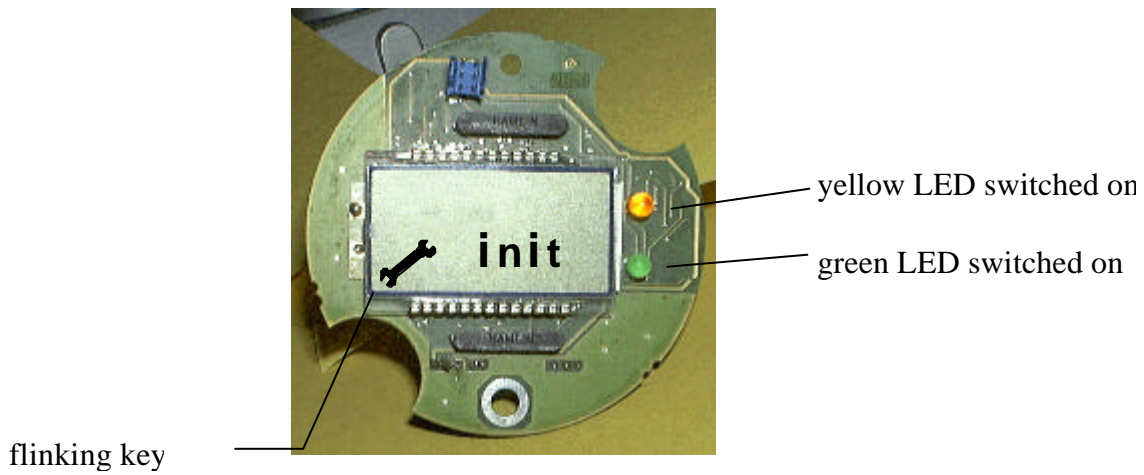


3 times consecutively

- Access to the **CAL** menus (calibration)



And **init** (initialization) menu when the magnet is pressed once the top of the display

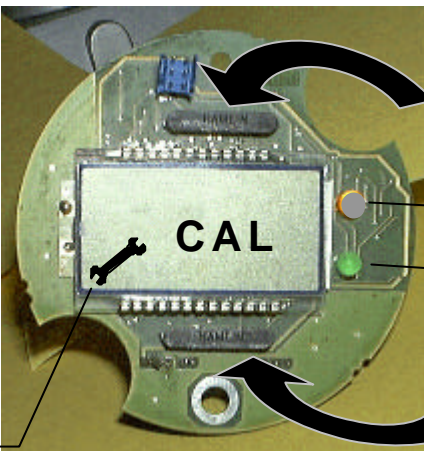


**And so on....**

## ■ Calibration Menu CAL

Display this menu with the magnet (on the top of the display):

**Once**



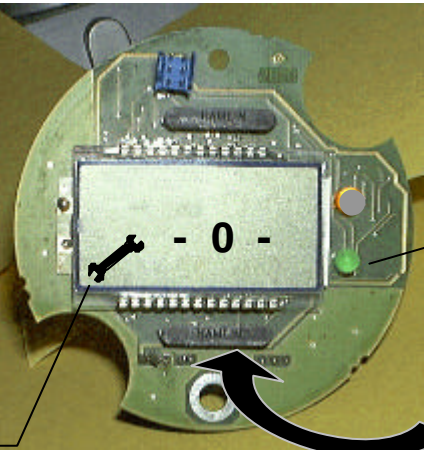
Flicking key

Yellow LED switched off

Green LED switched on

**Once** to validate the menu

**Once**

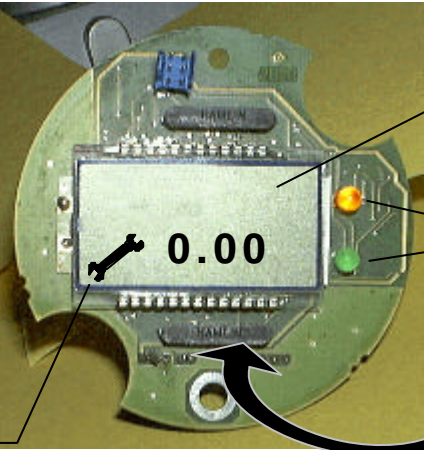


Flicking key

Green LED switched on

**Once** Validate the access of the zero's adjustment

**Once**



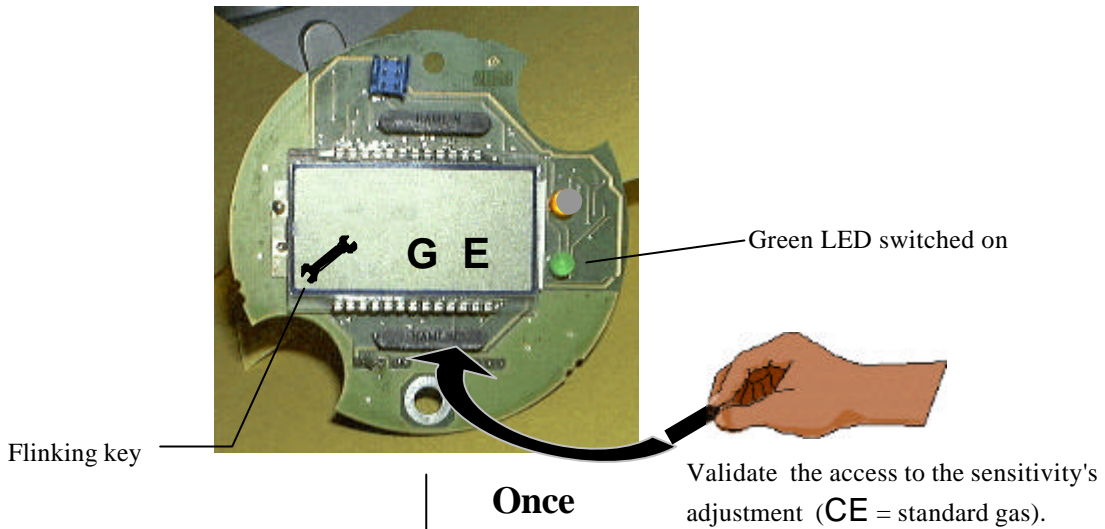
Flicking key

Display of the current **ZERO** measurement

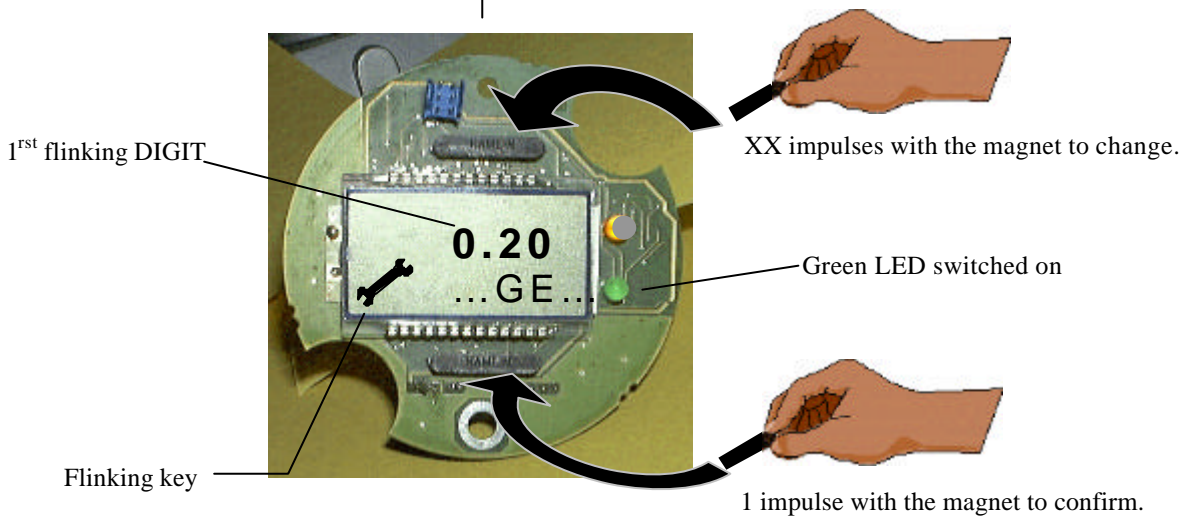
The 2 LEDs flink

**Once** Validate the zero's adjustment after having waited the stabilization

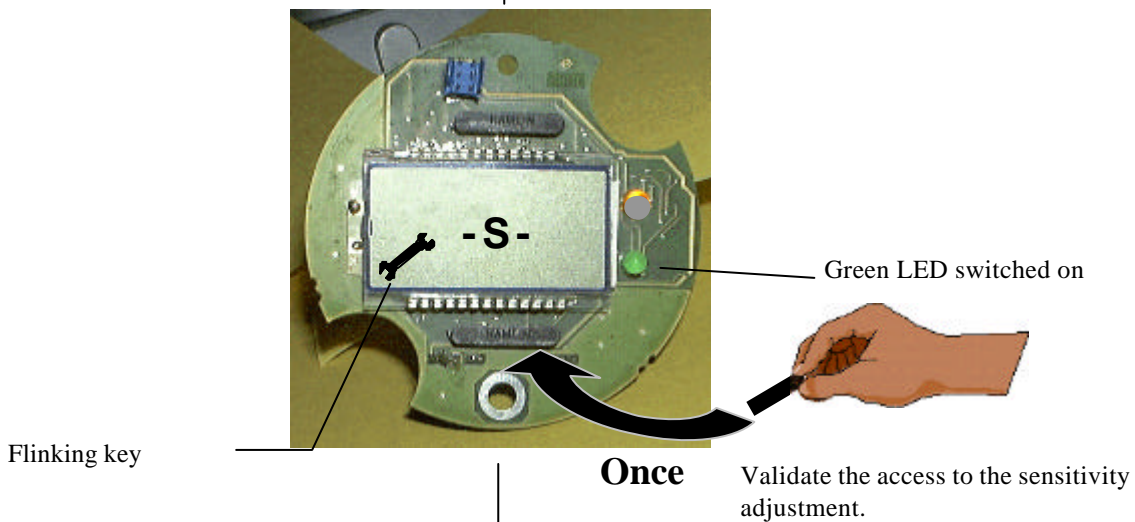




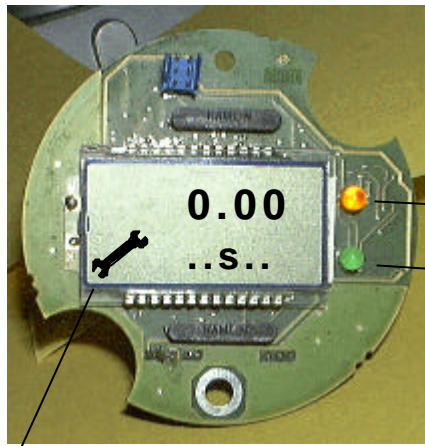
**Now indicate the standard gas concentration which will be injected.**



**Do the same to valid the 3 digits**







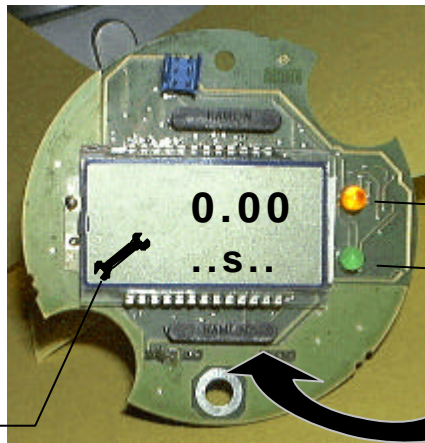
Yellow LED switched on

Green LED flinking

Flinking key

**Once** to validate the menu

**Inject the standard gas**



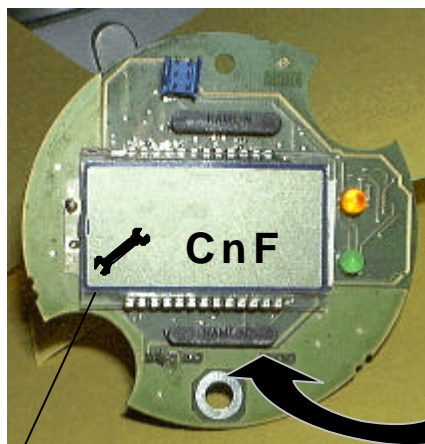
Fixed yellow LED

Green LED flinking

Flinking key

**Once**

Validate the sensitivity after having waited the stabilization of the signal

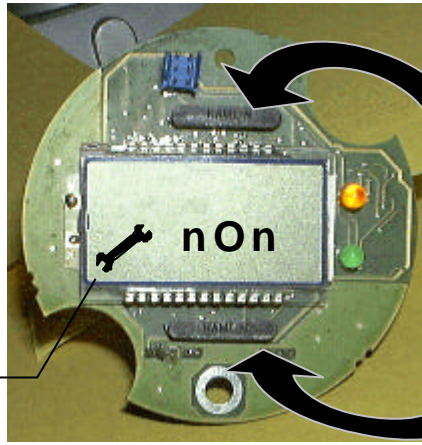


Flinking key

**Once**

Validate the calibration

Flicking key

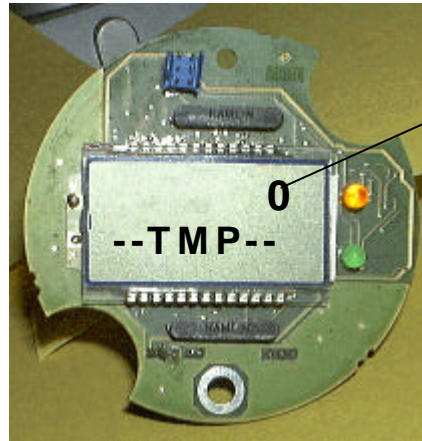


On every impulse, display of **YES** or **NO**

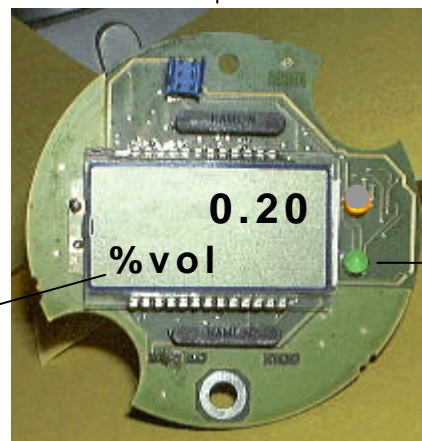
**Once**

Confirm the calibration : **YES** : the calibration is validated,

**NO** : the calibration has not been validated



countdown (60 seconds in STD) which can be pre-programmed by the manufacturer.



Green LED switched on

Alternated display :

- Concentration/unit
- Concentration/gas

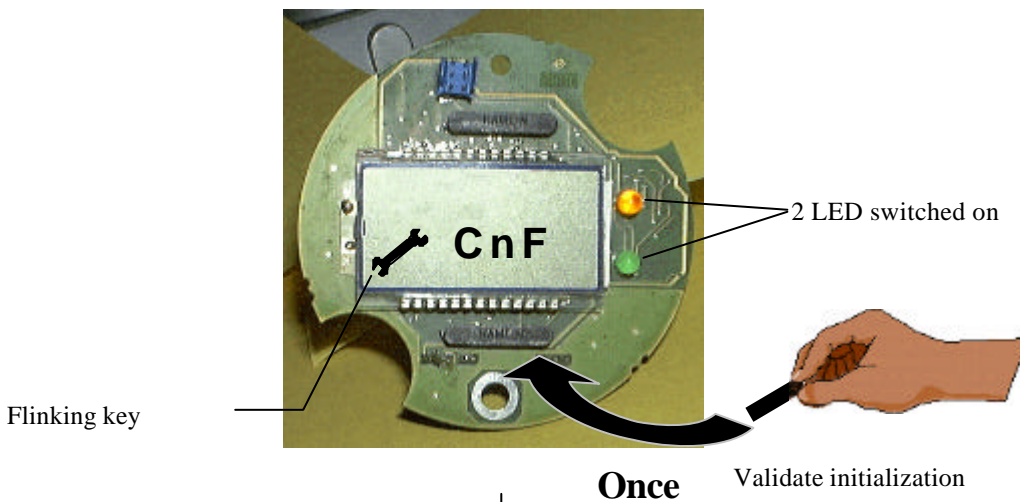
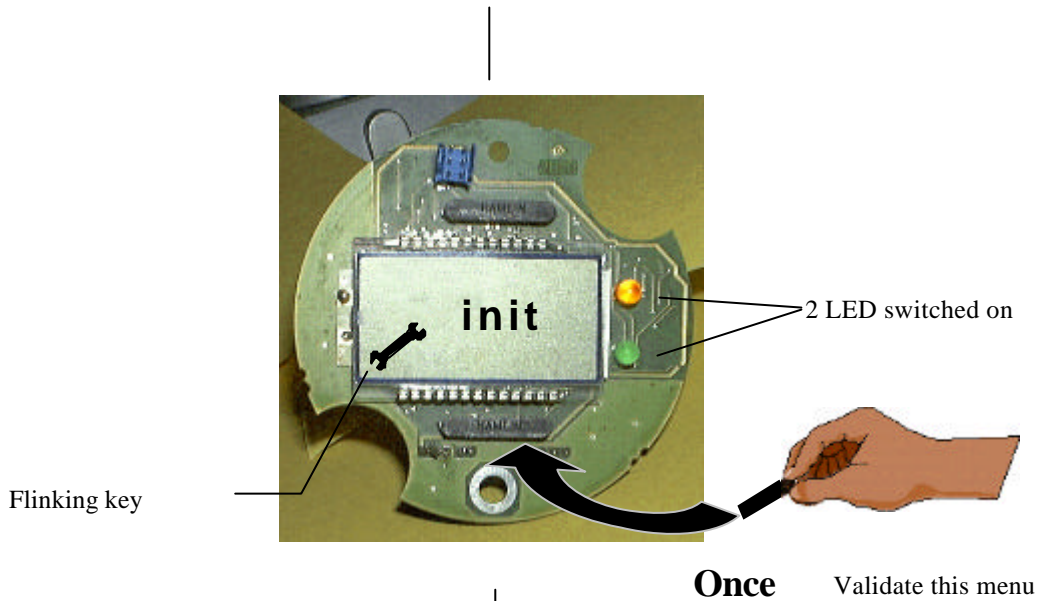
**END**

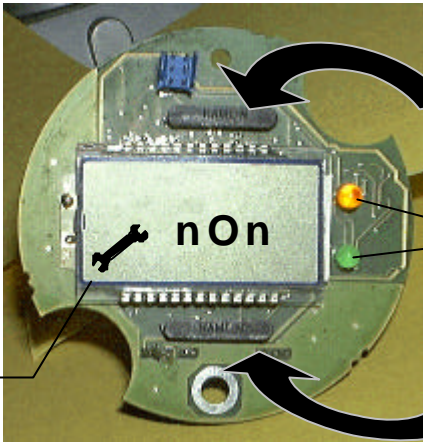
### 3. INITIALIZATION : OLCT60

---

The INITIALIZATION menu shall be used every time that the user will believe it necessary and **COMPULSORILY** after a cell's removing or adjustments on the cell unit.

**FOLLOW THE SAME PROCEDURE AS IN CHAPTER IV-2 (TILL "ACCESS TO THE MENUS") THEN :**





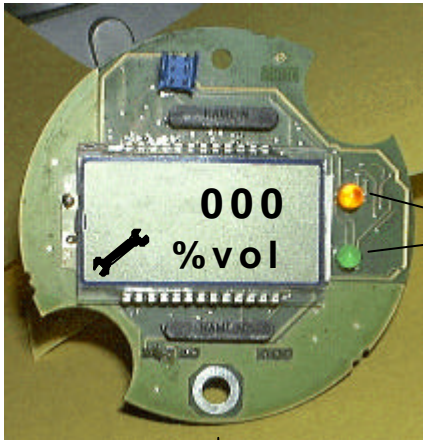
Flicking key

On every impulse, display of **YES** or **NO**

2 LED switched on

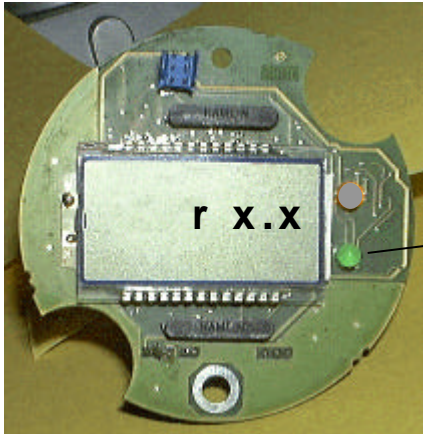
**Once** Confirm the initialization :  
**YES**<sup>(1)</sup> : the initialization is validated,  
**NON** : the initialization has not been validated  
 - return in normal operating mode

(1) if **YES** is validated:



Automatic test of the whole display.

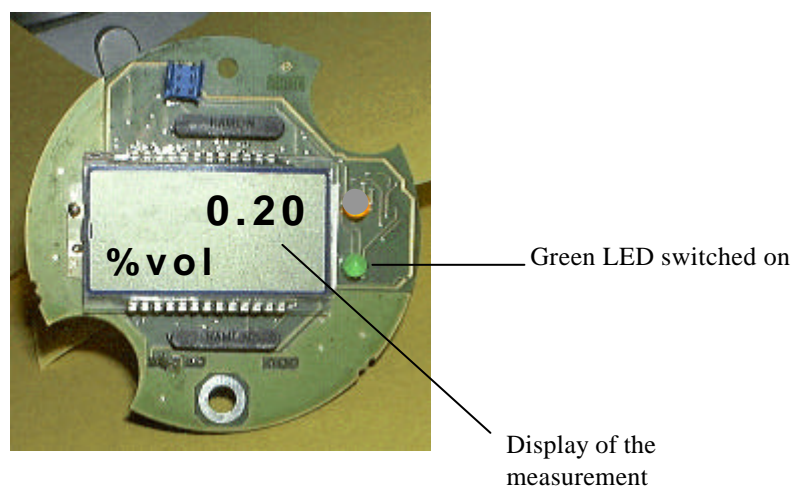
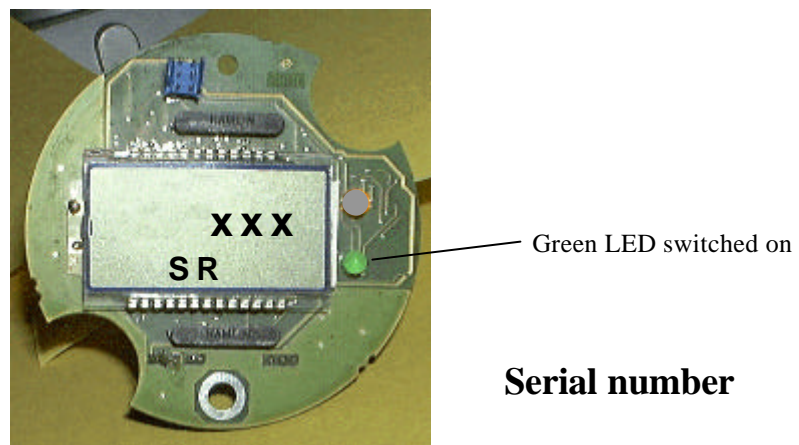
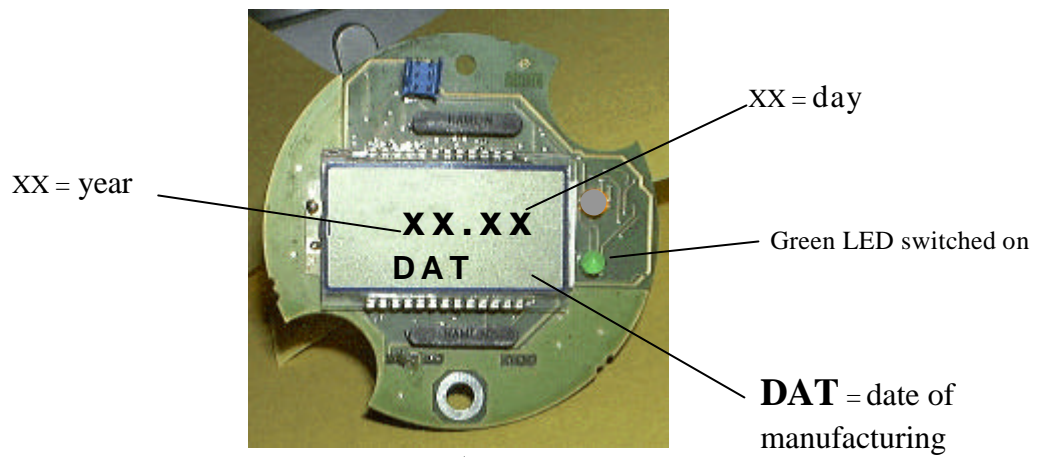
2 LED switched on



Green LED switched on

**Software Version**





**END**

## 4. Removing of a cell unit on the whole OLCT60 versions

---

### When?

- When the cell unit is damaged or cannot be calibrated.
- On a preventive basis.

### How?

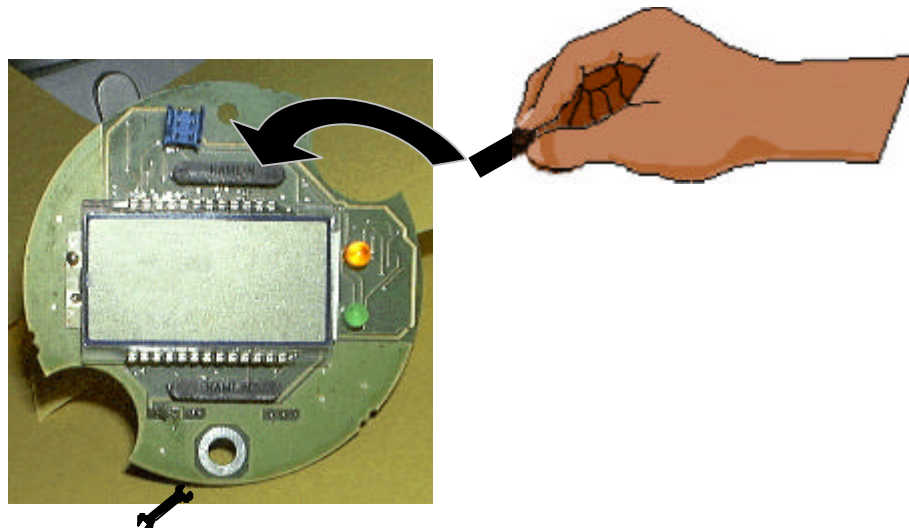
- Switch off the relevant measuring channel.
- Remove the cell unit to be replaced.
- Replace it with a new, pre-calibrated unit.
- Switch the channel back on and check that it operates correctly
- If necessary, do the adjustments of zero (in pure air) and sensitivity (standard gas) up to the data logger.

**COMPULSORY** do an **INITIALISATION** (see chapter IV-3)

## 5. "doubt removal" during measurement of explosible gas

---

- In case of explosible gas concentration measurement upper to the range of the display
  - The "out of range" "explo" measurement is jammed
- To unjam the transmitter :
  - Do 1 impulse with the magnet on the head of the display



## 6. Scrapping of OLCT 60

Concerning the conservation, of the protection and the improvement of the quality of the environment, as well as for the protection of the health of the persons and the careful and rational use of natural resources, **OLCT 60** has to be the object of a selective collection for the electronic equipments and cannot be scrapped with the normal domestic waste. The user thus has the obligation to separate the **OLCT 60** of the other waste so as to guarantee that it is recycled in a sure way at the environmental level. For more details of the existing sites of collection, contact the local administration or the distributor of this product.



## V. List of spare parts OLCT60

**CAUTION:** It is mandatory that spare parts must be guaranteed original INDUSTRIAL SCIENTIFIC parts as, otherwise, the reliability of the equipment could be adversely affected.

### 1 Explosion-proof cell units

EXPLOSION-PROOF CELL UNITS	REFERENCES
CELL UNIT OLCT20 ADF EXPLO C1000	6313685
CELL UNIT OLCT20 ADF EXPLO AP	6313686
CELL UNIT OLCT20 ADF KATHARO C1000	6313687
CELL UNIT OLCT20 ADF NH3 5000PPM	6313688
CELL UNIT OLCT20 ADF CO – 100 PPM	6313690
CELL UNIT OLCT20 ADF CO – 300 PPM	6313691
CELL UNIT OLCT20 ADF CO – 1000 PPM	6313692
CELL UNIT OLCT20 ADF H2S – 30 PPM	6313695
CELL UNIT OLCT20 ADF H2S – 100 PPM	6313696
CELL UNIT OLCT20 ADF H2S – 1000 PPM	6313697
CELL UNIT OLCT20 ADF H2 – 2000 PPM	6313706
CELL UNIT OLCT20 ADF NH3 – 100 PPM	6313707
CELL UNIT OLCT20 ADF NH3 – 1000PPM	6313708
CELL UNIT OLCT20 ADF O2 0–30% vol	6313710



## 2 Intrinsic safety cell units

INTRINSIC SAFETY CELL UNITS		REFERENCES
CELL UNIT OLCT20 SI	CO – 100 PPM CO – 300 PPM CO – 1000 ppm	6313711 6313712 6313713
CELL UNIT OLCT20 SI	H2S – 30 PPM H2S – 100 PPM H2S – 1000 PPM	6313716 6313717 6313718
CELL UNIT OLCT20 SI	NO – 100 PPM NO – 300 PPM NO – 1000 PPM	6313719 6313720 6313721
CELL UNIT OLCT20 SI	NO2 – 10 PPM NO2 – 30 PPM	6313722 6313723
CELL UNIT OLCT20 SI	SO2 – 10 PPM SO2 – 30 PPM SO2 – 100 PPM	6313724 6313725 6313726
CELL UNIT OLCT20 SI	H2 – 2000 PPM	6313727
CELL UNIT OLCT20 SI	NH3 – 100 PPM NH3 – 1000 PPM	6313728 6313729
CELL UNIT OLCT20 SI	HCL – 30 PPM HCL – 100 PPM	6313730 6313731
CELL UNIT OLCT20 SI	HCN – 10 PPM HCN – 30 PPM	6313732 6313733
CELL UNIT OLCT20 SI	CL2 - 10 PPM	6313734
CELL UNIT OLCT20 SI	O3 - 1 PPM	6313735
CELL UNIT OLCT20 SI	COCL2 - 1 PPM	6313736
CELL UNIT OLCT20 SI	PH3 - 1 PPM	6313737
CELL UNIT OLCT20 SI	ASH3 - 1 PPM	6313738
CELL UNIT OLCT20 SI	HF - 10 PPM	6313739
CELL UNIT OLCT20 SI	CIO2 - 3 PPM	6313740
CELL UNIT OLCT20 SI	ETO - 30 PPM	6313746
CELL UNIT OLCT20 SI	SiH4 - 50 PPM	6313747
CELL UNIT OLCT20 SI	O2 – 30% vol	6313748







## VI. List of accessories for transmitters OLCT60

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<b>TOOL KIT</b>	6147870		
<b>GAS INPUT DEVICE</b>	6331141		
<b>GAS CIRCULATION HEAD</b> For explosive gases, CO, H <sub>2</sub> s, O <sub>2</sub>	6327910		
<b>SPLASH GUARD DEVICE</b>	6329004		
<b>PROTECTIVE FILTER, PTFE</b>	6335975		
<b>ACTIVE CARBON FILTER</b>	6335976		
<b>REMOTE GAS INJECTION HEAD</b> (for explosive gases only)	6327911		
<b>GAS COLLECTOR</b>	6323620		
<b>MAGNET</b>	6155651		

## VII. TECHNICAL CHARACTERISTICS OF OLCT60

<b>Principle of detection</b>	Catalytic Electro-chemical
<b>Type of gas</b>	Combustible Toxic Oxygen
<b>Scale of measurements</b>	Following cell unit
<b>Supply voltage on detector terminals</b>	15 à 30 VDC
<b>Maxi power supply with display</b>	Catalytic : 140 mA Electrochemical : 80 mA
<b>Signal output</b>	Normal : 4 to 20 mA fault : < 1 mA scale overtaking : 23.5 or 20 mA when doubt is over
<b>Display</b>	LCD 4 digits + pictograms 1 green LED : ON 1 yellow LED : fault / maintenance
<b>Type of cable</b>	3 shielded wire
<b>Maxi resistance for one conductor of cable ( with the data logger INDUSTRIAL SCIENTIFIC)</b>	Catalytic : 32 ohms in loop mode ( 1 km in 1.5mm <sup>2</sup> ) Electrochemical : 48 ohms in loop mode ( 1.5 km in 1.5mm <sup>2</sup> )
<b>Maxi load resistance on output current</b>	Catalytic or Electrochemical: 250 ohms
<b>Type of input cable</b>	With a M25 integrated packing gland on request M20, M25, ¾ NPT
<b>Diameter of cable</b>	2 to 12 mm for the integrated packing gland
<b>Temperature of operating</b>	Electronic : -25 °C to +55 °C detectors : following the type
<b>Temperature of storage</b>	Electronic : -25 °C to +60 °C detectors : following the type

<b>Electric security</b>	<p>all explosion proof safety Version  Ex d IIC T6  Tamb -20 °C +60°C   II 2 GD</p> <p>Version with cell unit of intrinsic security only toxic or oxygen  Ex d [ia] ia IIC T4  Tamb -20 °C +60°C   II 2 GD</p> <p>Nota : tamb max = 55°C with integrated packing gland</p>
<b>Electro magnetic compatibility</b>	with EN50270 conformity
<b>Protection index</b>	IP66
<b>Maxi Dimensions</b>	L 154 mm x L 186 mm x H 121 mm remote version : L 154 mm x L 200 mm x H 121 mm
<b>weight</b>	1.6 Kg
<b>Materials</b>	Aluminium with epoxy polyester paint

# VIII. Special Specifications for use in Potentially Explosive Atmospheres in accordance with European Directive ATEX 94/9/EC.

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The OLCT 60 detection device complies with the requirements of European Directive ATEX 94/9/EC on potentially explosive atmospheres.

As a result of its metrological performance, as tested by the research and testing organisation INERIS, the /OLCT 60 device, designed to measure explosive gasses and oxygen, are classified as a safety devices and may therefore contribute to limiting the risk of explosion.

The information contained in the following paragraphs should be adopted and complied with by the person responsible for the site on which the equipment is installed. Please refer to the provisions of European Directive ATEX 1999/92/EC on improving health and safety conditions for workers exposed to potentially explosive atmospheres.

## 1. Specifications for mechanical and electrical installation in Classified Areas.

---

Installation will comply with all applicable standards, and particularly with EN 60079-14, EN 60079-17 and EN 50281-1-2.

### 1.1. Explosion-proof detectors (d) version or explosion-proof (d) and intrinsic safety (i) detectors version : OLCT 60d or OLCT 60 id

- These detectors are intended for use in surface industries II, Category 2, zones 1 and 2 (Gas) and zones 21 and 22 (Dust)
- Where the detectors are fitted with an integral standard cable inlet, the ambient operating temperature range is  $-20^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$  in temperature class T6. Where these detectors are fitted with a separate cable inlet, the ambient operating temperature range is  $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  in temperature class T6.
- Cables will be mechanically protected.
- The transmitter casing will be earthed using the external or internal terminal, which should be corrosion-protected. Users should clean detectors regularly in order to prevent any external accumulation of dust.
- Mechanically, detectors will be installed such that the detection cell points downwards. Any variance of over  $45^{\circ}$  from the vertical will result in measurement errors.
- Where connections are located in a classified zone, they will be enclosed in approved envelopes.

### 1.2. Explosion-proof detector (d) version and intrinsic safety (i) detector version : OLCT60 id with OLCT20i intrinsic safety cell block

Please refer to the previous paragraph for details of the OLC60 id detector. The following instructions apply to the remote cell block:

- The cell block is intended for use in surface industries II, Category 2, zones 0, 1 or 2 (Gas) and zones 20,21 or 22 (dust).
- Users should clean detectors regularly in order to prevent any external accumulation of dust.

Comment : The cable linking the OLCT60id to the measuring device is not an intrinsic safety cable. Only the link between the remote cell block and the OLCT60 id detector is an intrinsic safety cable.

## **2. Metrological specifications for explosive gas and oxygen measurement detectors**

---

The OLCT60 transmitter sensors intended to measure explosive gasses and oxygen are classified as safety devices and may therefore contribute to limiting the risk of explosion.

Detectors comply with the following European standards:

### **Explosive gas detectors :**

- OLCT60 explosive gas detectors comply with European standards EN 50054 and EN 50057 for Methane (calibration gas), Propane and Hydrogen (gasses following response curves) where they are used with INDUSTRIAL SCIENTIFIC detection devices SV4B, MX32, MX42A, MX48 and MX52 or where they are connected to measurement devices with 4-20 mA inputs in accordance with paragraph 1.5 of Appendix II of the ATEX 94/9/EC Directive and are compatible with their characteristics (cf. transfer curve).

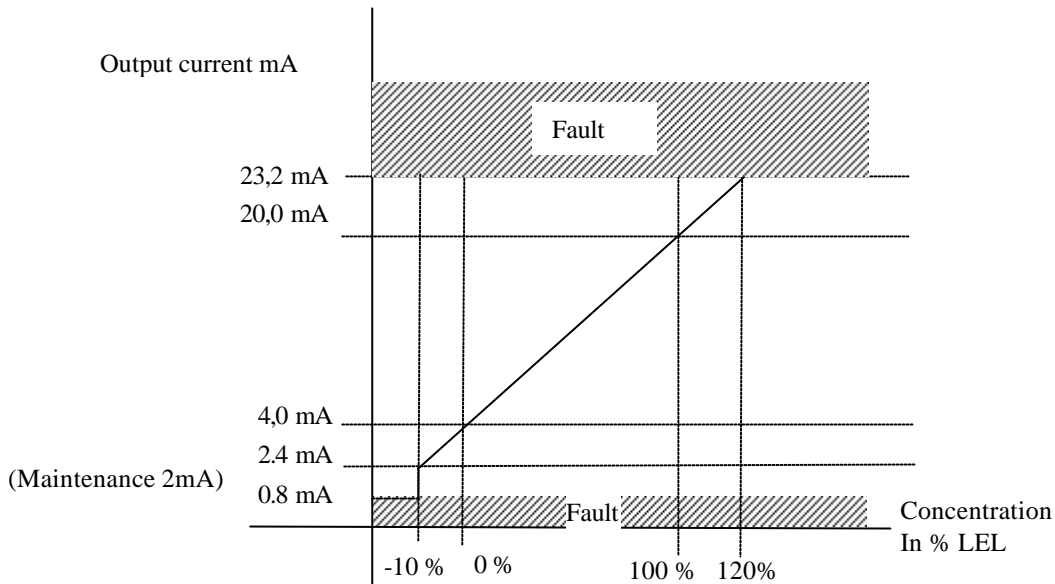
### **Oxygen detectors :**

- OLCT50 oxygen detectors comply with European Standard EN 50104 where they are used with INDUSTRIAL SCIENTIFIC detection devices MX32, MX42A, MX48 and MX52, or where they are connected to measurement devices with 4-20 mA inputs in accordance with paragraph 1.5 of Appendix II of the ATEX 94/9/EC Directive and are compatible with their characteristics (cf. transfer curve).

### **2.1. Technical Specifications and Special Instructions for explosive gas detectors**

#### ***2.1.1. Transfer curves for OLCT 60 detectors***

The following curve shows transmitter output current values as a function of gas concentration. Where the user connects the transmitter to a device other than a device manufactured by INDUSTRIAL SCIENTIFIC, he must check that the transfer curve is fully compatible with its input characteristics to ensure that the information generated by the transmitter is correctly interpreted. Equally, the device must supply a suitable power supply voltage, allowing for cable voltage losses.



### 2.1.2. Metrological details

<b>Type</b>	C1000 filaments - +VQ1	
<b>Maximum concentration</b>	100% LEL	
<b>Principle</b>	Catalytic	
<b>Estimated service life</b>	> 36 months	
<b>Storage</b>	Away from air $-10^{\circ}\text{C} < T < 35^{\circ}\text{C}$ $10\% < \text{RH} < 60\%$ . Maximum 6 months	
<b>Continuous temperature range</b>	$-25^{\circ}\text{C}$ to $+55^{\circ}\text{C}$	
<b>Humidity range</b>	0% RH to 95% RH	
<b>Pressure range</b>	1 bar $\pm$ 10%	
<b>Linearity variance (methane scale)</b>	Between 0% and 70% LEL: $\leq$ 1% LEL Between 70% and 100% LEL: $\leq$ 3% LEL	
<b>Measurement reproducibility</b>	$\pm$ 2% of the value measured, or $\pm$ 1 LEL (or $\pm$ 0.05% CH <sub>4</sub> )	
<b>Long-term drift in normal operating conditions</b>	Zero point: Sensitivity / Methane Propane/Butane	< 5% methane LEL per year Typical drift values < 20% of the value measured per year < 10% of the value measured per year
<b>Effect of humidity (10% to 90% RH) at 40°C</b>	$\pm$ 5% of relative sensitivity	
<b>Maximum recommended interval between calibrations (normal operating conditions)</b>	6 months	

Calibration concentration		30– 80% LEL			
Response time (may vary ± 10% between sensors)	gas and concentration injected	Methane (50% LEL)	Hydrogen (50% LEL)	Pentane (52% LEL)	Styrene (45% LEL)
	<b>t25</b>	4 sec	3 sec	8 sec	12 sec
	<b>t50</b>	8 sec	6 sec	12 sec	40 sec
	<b>t90</b>	15 sec	10 sec	27 sec	60 sec

### 2.1.3. Special precautions for explosive gas detectors

- Cells are sensitive to certain poisons, which can reduce their sensitivity: emission of silicone-containing vapours at concentrations > 10 ppm and chlorinated or sulphurous products at concentrations > 100 ppm.
- A lack of oxygen (< 15% O<sub>2</sub>) or over-oxygenation (> 23% O<sub>2</sub>) may cause under-measurement (in the former case) or over-measurement (in the latter case).
- Cells must be located head downwards at installation or during maintenance work.
- When the OLCT 60 sensor is connected to the MX48 measuring device, the humidity range at 40°C is 5% to 55% RH. Equally, measurement variances above 5% LEL (or 30% of the indication) may occur at operating pressures below 1 bar.

### 2.1.4. Response to other explosive gasses

It is recommended that the detector is calibrated using the gas to be measured. Users wishing to calibrate the detector using a gas other than that detected and factory-programmed should refer to the following table, and use the recommended gas and corresponding coefficient.

**Table 1: CALIBRATION COEFFICIENTS**

Gas	Empirical formula	LEL <sup>1</sup>	UEL <sup>1</sup>	Vapour density	Coefficient <sup>3</sup> CH <sub>4</sub>	Coefficient <sup>3</sup> H <sub>2</sub>	Coefficient <sup>3</sup> But
Acetone	C <sub>3</sub> H <sub>6</sub> O	2.15	13.0%	2.1	1.65	1.2	0.95
Acetylene	C <sub>2</sub> H <sub>2</sub>	1.5%	100%	0.9	2.35	1.75	1.35
Ammonia	NH <sub>3</sub>	15.0	30.2%	0.6	0.9	0.65	0.5
Butane	C <sub>4</sub> H <sub>10</sub>	1.5%	8.5%	2	1.75	1.25	1.0
Unleaded petrol 95	/	1.1%	~6.0%	3 à 4	1.8	1.35	1.05
Ethane	C <sub>2</sub> H <sub>6</sub>	3.0%	15.5%	1.04	1.5	1.1	0.85
Ethanol	C <sub>2</sub> H <sub>6</sub> O	3.3%	19.0%	1.6	1.5	1.1	0.85
Ethylene	C <sub>2</sub> H <sub>4</sub>	2.7%	34.0%	0.98	1.65	1.2	0.95
Natural gas	CH <sub>4</sub>	5.0%	15.0%	0.55	1.0	0.75	0.55
L.P.G.	Prop+But	1.65	~9.0%	1.85	1.65	1.2	0.95
Hexane	C <sub>6</sub> H <sub>14</sub>	1.2%	7.4%	3.0	2.1	1.7	1.2
Hydrogen	H <sub>2</sub>	4.0%	75.6%	0.069	1.25	1.0	0.8
Methane	CH <sub>4</sub>	5.0%	15.0%	0.55	1.0	0.75	0.55
Octane	C <sub>8</sub> H <sub>18</sub>	1.0%	6.0%	3.9	2.7	2.0	1.5
Pentane	C <sub>5</sub> H <sub>12</sub>	1.4%	8.0%	2.5	2.1	1.7	1.2
Propane	C <sub>3</sub> H <sub>8</sub>	2.0%	9.5	1.6	1.5	1.1	0.85
Toluene	C <sub>7</sub> H <sub>8</sub>	1.2%	7%	3.14	4.0	2.95	2.3

Gas recommended for sensor calibration

Example (first row of table): calibration of an Acetone detector using 1% butane (by volume) as the calibrating gas

Value to be displayed:

$$\frac{1\% \text{ (butane injected)}}{1.5\% \text{ (butane LEL)}} \times 100 \times 0.95 \text{ (Butane/Acetone coefficient)} = 63\% \text{ LEL}$$

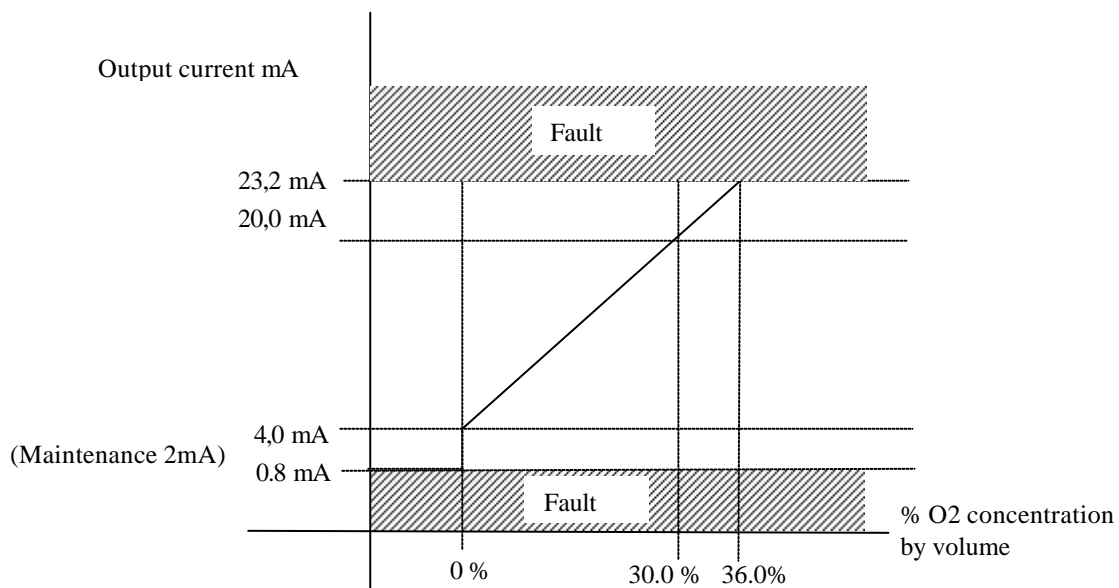
N.B.:

- LELs vary depending on the source. Those values shown here are taken from European Standard EN 50054
- Coefficients are accurate to  $\pm 15\%$

## 2.2. Technical Specifications and Special Instructions for Oxygen detectors

### 2.2.1. Transfer curves for OLCT 60 detectors

The following curve shows the transmitter output current value as a function of gas concentration. Where the user connects the transmitter to a device other than a device manufactured by INDUSTRIAL SCIENTIFIC, he must check that the transfer curve is fully compatible with its input characteristics to ensure that the information generated by the transmitter is correctly interpreted. Equally, the device must supply a suitable power supply voltage, allowing for cable voltage losses.





### 2.2.2. Metrological details

<b>Maximum concentration</b>	30% O <sub>2</sub>
<b>Type and number</b>	CT5020 CELL
<b>Principle</b>	2-electrode electrochemical (Measurement of oxygen concentration by volume)
<b>Estimated service life</b>	30 months
<b>Storage</b>	4°C < T < 12°C 10% < RH < 60%
<b>Temperature range</b>	-10°C to +40°C
<b>Humidity range</b>	20% RH to 95% RH
<b>Pressure range</b>	1 bar ± 10%
<b>Accuracy at 20°C</b>	15 to 21% O <sub>2</sub> ± 0.4% vol O <sub>2</sub> 1 to 14% O <sub>2</sub> ± 0.5% vol O <sub>2</sub>
<b>Repeatability</b>	< 2% of signal
<b>T90 response time</b>	< 15 seconds
<b>Effect of temperature (0 to 40°C)</b>	< 0.3% vol O <sub>2</sub>
<b>Effect of humidity (10% to 90% RH)</b>	The measurement is lower as a result of the air being diluted by water vapour
<b>Sensitivity drift over time</b>	< 2% per month
<b>Zero stabilisation time following power-up</b>	30 to 60 minutes

### 2.2.3. Characteristics and Special precautions for oxygen detectors

- When the sensor is powered up or the measurement cell is replaced, it takes between 30 and 60 minutes for the measurement to stabilise at 20.9% v/v in pure ambient air.
- The use of an oxygen-rich atmosphere (> 25%) can compromise safety.
- When the OLCT60 O<sub>2</sub> sensor is connected to the MX32 measuring device, the certified temperature range is 0°C to +40°C

### 3. MARKINGS

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#### 3.1. Explosion-proof safety version: OLCT60d

OLDHAM Arras

 0080

OLCT60d

 II 2GD

IP66

Ex d IIC T6 (T85°C)

INERIS 01ATEX0027X


Do not open when powered. Wait 2 minutes before opening  
serial number, year of manufacture

#### 3.2. Explosion-proof safety version: OLCT60id

OLDHAM Arras

 0080

OLCT60id

 II 2 GD

IP66

Ex d [ia] ia IIC T4 (T135°C)

INERIS 01ATEX0027X

Do not open when powered. Wait 2 minutes before opening  
serial number, year of manufacture

#### On the remote detection unit

OLDHAM Arras

 0080

OLCT60id

 II 1GD

IP66

Ex ia IIC T4 (T135°C)

INERIS 01ATEX0027X

Do not open when powered.  
serial number, year of manufacture



La Société **Industrial Scientific OLDHAM**, ZI Est, 62000 Arras France, atteste que le matériel neuf destiné à être utilisé en Atmosphères Explosives désigné ci-après, est conforme aux exigences des Directives Européennes suivantes

*(The Company Industrial Scientific OLDHAM, ZI Est 62000 Arras France, declares that the following new material intended for use in Explosive Atmospheres, complies with the requirements of the following European Directives:)*

### Détecteurs de gaz ( Gas detectors) OLCT60

#### D) Directive Européenne ATEX 94/9/CE du 23/03/94 : Atmosphères Explosives

*The European Directive ATEX 94/9/CE of 23/03/94: Explosive Atmospheres*


N° de l'Attestation CE de type du matériel :  
*(N° of EC type examination certificate)*


**INERIS 01ATEX0027X**


Normes européennes de référence *(Reference European Standards)*

a) OLCT 60 règles de Construction *(rules of construction)* : EN50014, 50018, 50020, 50284, 50281-1-1

Catégorie *(category)* :

OLCT60d :  II 2 GD / EEx d IIC T6 (T85°C) IP66

OLCT60i d :  II 2 (1) GD / EEx d [ia] ia IIC T4 (135 °C) IP66

 II 1 GD / EEx ia IIC T4 (135 °C) pour l'élément déporté ( for remote detection head)

*Note: l'équipement n'est pas impacté par les modifications substantielles des normes harmonisées des séries EN 60079-0, -1 et -11 (the equipment is not impacted by the substantial modifications of the applicable harmonized standards series EN 60079-0, -1 and -11)*

b) OLCT60 relié aux centrales de détection *(connected to control units)* MX32, MX42A, MX48, MX52, MX62 ou autres centrales de détection conformes à *( or others control units compliant to )* ATEX 94/9/CE, Annexe II, Ch1.5

Performances métrologiques pour la détection des gaz combustibles et de l'oxygène *( Performance requirements for combustible gases and oxygen )* : EN 50054, EN 50057 (Methane – capteur *(sensor)* standard C1000), EN 50104  
Exigences et essais pour les appareils utilisant du logiciel *( requirements and tests for apparatus using software)*: EN 50271 ( OLCT60 Version  $\geq 1.10$  )

N° de la Notification Assurance Qualité de Production de l'usine de Arras INERIS 00ATEXQ403  
*(N° of the Production Quality Assurance Notification of the Arras factory)*

Délivrés par l' Organisme notifié sous le numéro 0080:  
*(Issued by the Notified Body n°0080)*

INERIS, rue Taffanel, 60550 Verneuil  
en Halatte, France.

#### II) Directive Européenne CEM 89/336/CEE du 3/05/89 : Compatibilité Electromagnétique

*The European Directive EMC 89/336/CEE of 3/05/89: Electromagnetic compatibility*

Normes harmonisées appliquées :  
*(Harmonised applied Standards)*

EN 50270 - 1999

Arras, le 20/10/09

La Personne Autorisée ATEX  
*The ATEX Authorized Representative*

Lionel Witrant



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62027 ARRAS Cedex - FRANCE  
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Fax +33 3 21 60 80 00

  
Directeur Technique  
*Engineering Director*

# IX. APPENDICE

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## Appendix 1

The measuring cell is positioned facing downwards. The physical location of the TRANSMITTER depends on the type of gas to be detected:

- at the high point if the gas is lighter than air,
- at the low point if the gas is heavier than air,
- near outlet vents in the case of mechanical ventilation,
- or, more generally, in locations where the gas is likely to accumulate.

Despite its high degree of protection (IP66), it may be necessary to protect the TRANSMITTER against adverse weather conditions (rain, dust, direct sunlight, etc.) and from direct spraying with cleaning or maintenance products (causing soiling of the detection cell).

The TRANSMITTER must also be positioned so as to allow access to the measuring cell so that it can be replaced..

Detectors must be positioned so as to optimize the detection of accumulations of gas emitted in the air.

### **Factors to be considered in determining optimal detector positioning:**

⇒ potential sources of gas and vapour emissions

⇒ chemical and physical data on gases and vapours which may be present

⇒ liquids with low volatility ⇒ detectors as near as possible to the leak risk area

⇒ type and concentration of gas leaks (high-pressure jet, slow leak, etc.)

⇒ air movements

- indoors: natural and mechanical ventilation
- outdoors: wind speed and direction

⇒ effect of temperature

⇒ installation so as to avoid mechanical damage or deterioration caused by water in summer

⇒ positioning to allow easy maintenance, if possible

⇒ avoiding direct sunlight on the readout area as this would lead to maintenance problems

# **ADDENDUM TO THE OLCT60 MANUAL.**

## **USE OF OLCT 60 WITH A DETECTION HEAD, TYPE OLCT IR**

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### **1. PRESENTATION**

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The OLCT 60D Flameproof gas detector can be used in addition with the infrared gas detector, the OLCT IR, to detect inflammable gas or CO<sub>2</sub> in the atmosphere. Based on the infrared absorption principle, it allows very high detection reliability.

Two versions are currently available:

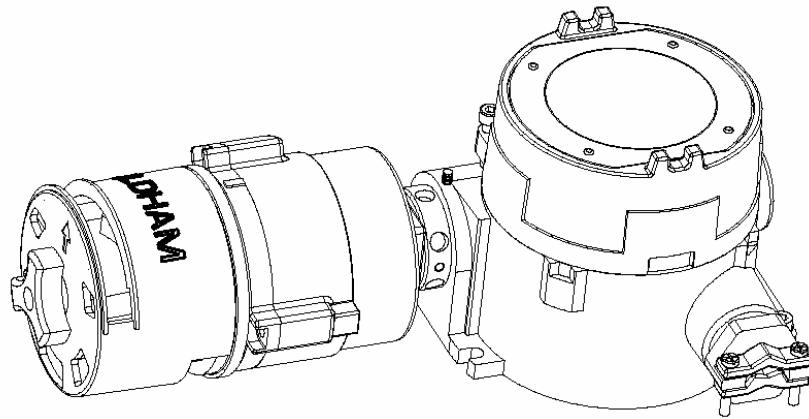
- The OLCT60/OLCT IR, where the OLCTIR (M25 version) is directly screwed on the OLCT60.
- The OLCT60D/OLCTIR, where the OLCTIR (“e” version) is remote from the OLCT60 up to 15 meters maximum.

Powered with direct current, they deliver a normalized current of 4-20mA according to the measured concentration of gas.

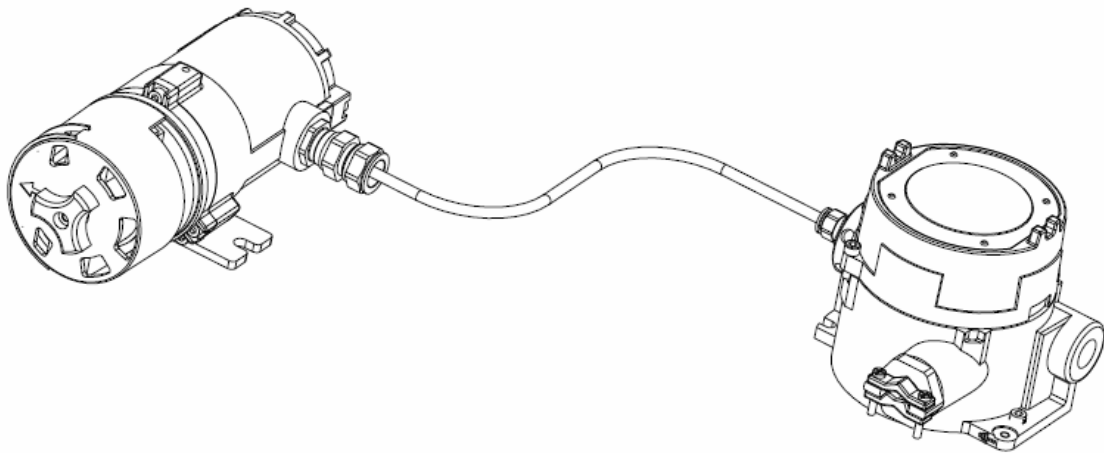
These detectors can be used in potentially explosive atmospheres in accordance with European Directive ATEX 94/9/EC.

The detector is available in 3 versions:

- Methane version (CH<sub>4</sub>): Optimized for methane detection.
- HC version: optimized for saturated hydrocarbons detection (propane, butane, pentane, hexane...), from 0 to 100% LEL.
- CO<sub>2</sub> version: for carbon dioxide detection from 0 to 3% vol.





**Figure 5: OLCT60/OLCTIR Detector, screwed version**



**Figure 6 : OLCT60D/OLCTIR Detector, remote version**

## 2. TECHNICAL SPECIFICATION(\*)

Detection principle	OPTIC : INFRARED ABSORPTION
Gas type	Combustibles : Methane, Propane or butane Note: the gas configuration will be made by INDUSTRIAL SCIENTIFIC personnel in factory.
Measuring range	0 to 100 % LEL
Power supply	16 to 30 VDC
Consumption	3.7 watts in average, with current peaks of 550 mA
Output signal	linear 4-20mA current proportional to gas levels detected: 1mA : fault 2 mA : calibration mode Current higher than 23mA : overscale
Detected gases	The main alkanes : methane, butane, propane...
Cable type	Shielded cable, 3 active wires
Maximum resistance per conductor (with INDUSTRIAL SCIENTIFIC control unit)	4 ohms per conductor (250 m in 1.5 mm <sup>2</sup> )
Max load resistance	300 ohms
Type of cable inlet	M25 Cable gland , diameter of cable : 2 to 12 mm On request M20, M25, ¾ NPT
Operating temperature	- 25 °C to +55 °C
Storage temperature	-25 °C to +55 °C
Electromagnetic Compatibility	Complies with EN50270
Ingress Protection	IP66
Explosives atmospheres	Complies with the European Directive ATEX 94/9/EC
Weight	4,08 Kg
Carter	Inox 316L for the OLCT IR, Aluminium for the body
Accuracy	+/-3 % LEL CH4 or +/- 5% of the value +/-2 % LEL HC or +/- 3% of the value
Temperature drift (from -25°C to +55° C and long-term)	zero : +/-1 LEL Gain : +/-5 LEL or +/- 10 % of the value
Response time	Without protection : T50 < 7 sec, T90 < 8 sec With protection : T50 < 10 sec, T90 < 16 sec
Humidity	0 to 99% HR
Explosives Atmospheres <ul style="list-style-type: none"> <li>• OLCTIR local version</li> </ul>	 II2 GD Ex d IIC T6 (for the OLCT60) Ex de IIC T4 (for the detection head OLCTIR M25)
Explosives Atmospheres <ul style="list-style-type: none"> <li>• OLCTIR remote version</li> </ul>	 II2 GD Ex d IIC T6 (pour l'OLCT60) Ex de ia IIC T4 (pour capteur OLCTIR déporté)
SIL Capability	SIL 2 according to EN61508 (only for OLCTIR )

(\*) Due to the continual improvement of our products, INDUSTRIAL SCIENTIFIC reserves the right to modify the product specifications listed in this document at any time.

### 3. INSTALLATION

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These installation rules are valid for the screwed and the remote version.

**WARNING:** First, refer to the paragraph «Specifications for mechanical and electrical installation in classified areas »

#### 3.1. Cautions

The detector must be absolutely placed at a suitable location for an optimal detection.

The OLCT60-IR must be mounted horizontally and the arrow on the protective cover points up.

#### 3.2. Mechanical installation

- Follow the previous safety instructions carefully
- Please check on site the detector dimensions: see below figure.

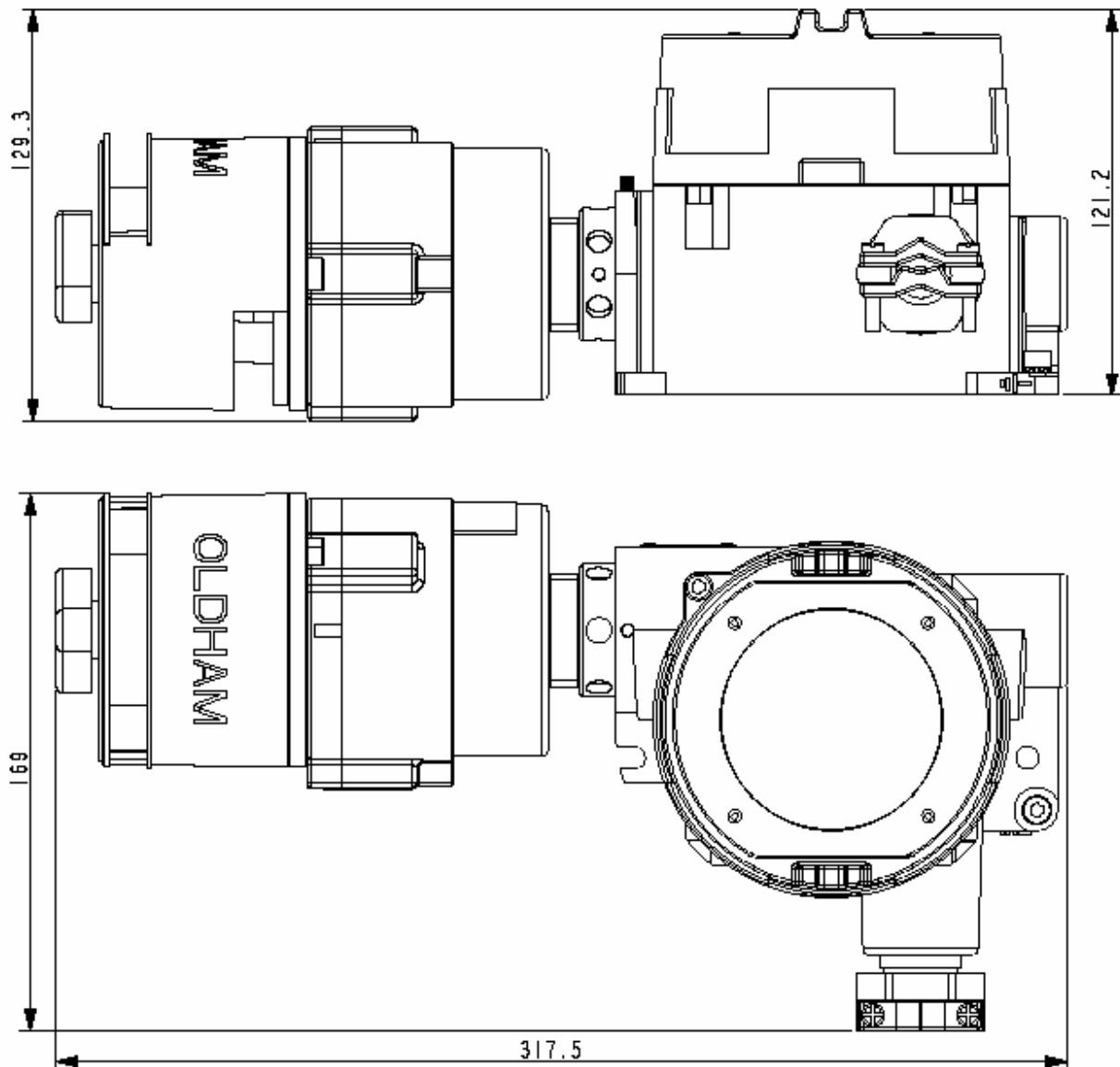


Figure 7: Dimensions of the OLCT60/OLCTIR version



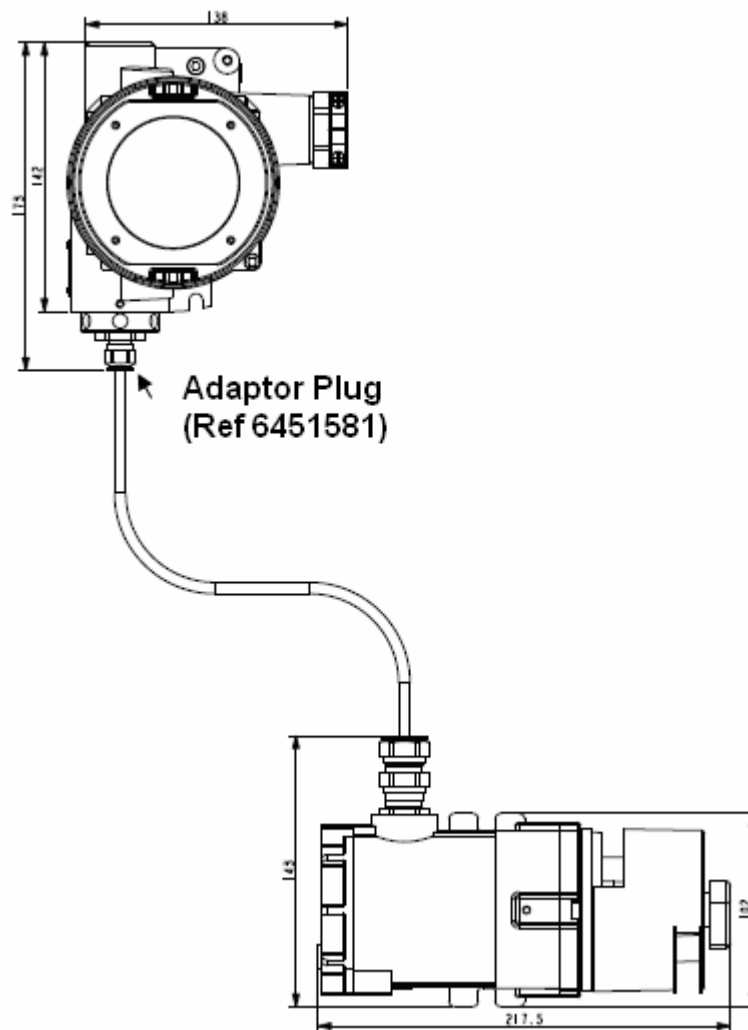


Figure 8: Dimensions of the OLCT60D/OLCTIR version

### 3.3. Electrical installation

#### 3.3.1. OLCT60/OLCTIR

- Ensure that the installation complies with currently enforced standards, EN60079-14, EN60079-17, EN61241-14, area classification or other national standards.
- To ensure the proper operation of the detector, cable resistance should remain within the limits specified in the technical specification table.

Please connect the OLCT60/OLCTIR detector as below:

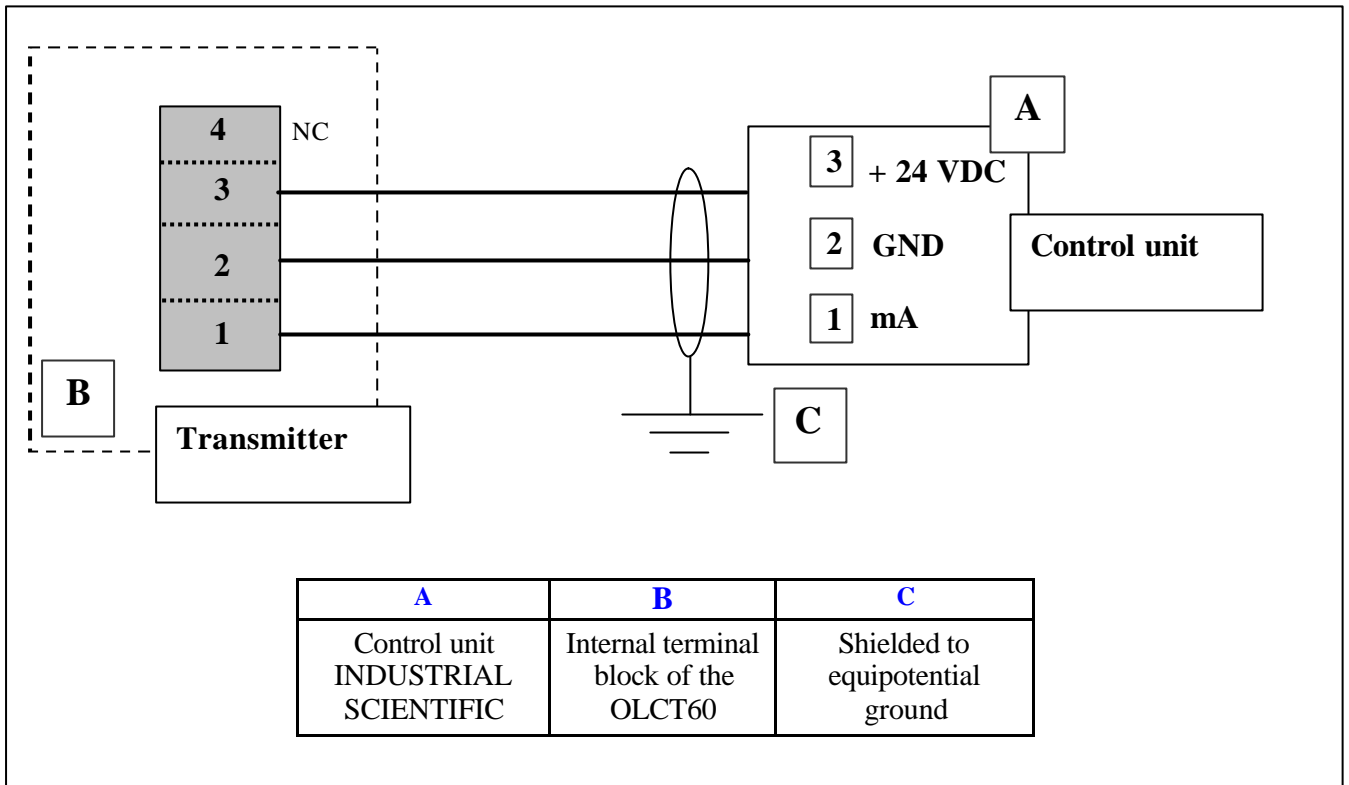


Figure 9 : Connection of the OLCT60/OLCTIR

### 3.3.2. OLCT60D/OLCTIR

- Ensure that the installation complies with currently enforced standards, EN60079-14, EN60079-17, EN61241-14, area classification or other national standards.
- To ensure the proper operation of the detector, cable resistance should remain within the limits specified in the technical specification table.

1. Unplug the adaptor plug (cf. figure 8).

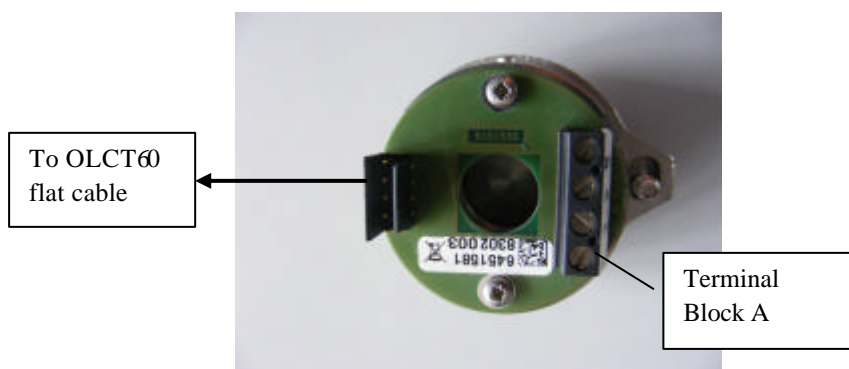


Figure 10 : OLCT 60 Adaptor Plug

2. Please connect as below : (max length 15meters)

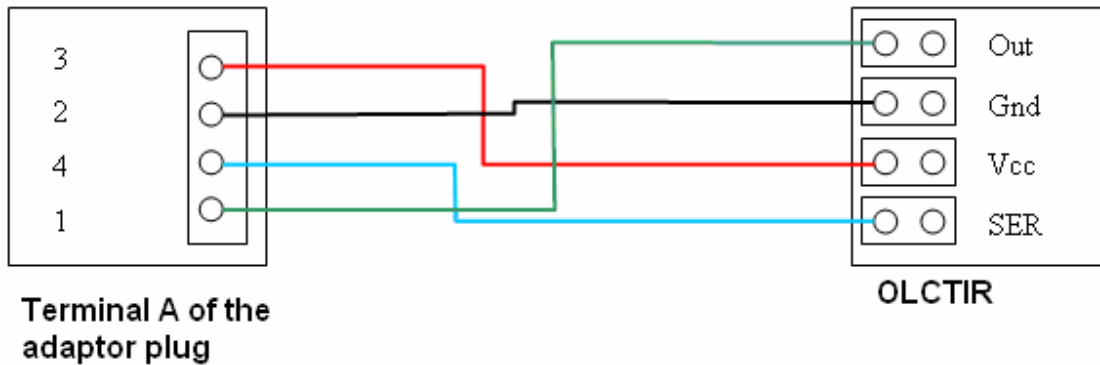


Figure 11 : Connection of the OLCTIR on the OLCT60, remote version

The connection between the control unit and the OLCT60D/OLCTIR is the same that for the OLCT60/OLCTIR version.

## 4. COMMISSIONING

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- Check that equipment connections and installations have been performed correctly.
- To avoid accidental triggering of alarms, start up in the safety mode (alarms are blocked)
- Power up the equipment and wait 2 or 3 minutes to allow it to stabilize.
- During the first minute of warm-up, the detector will deliver a current of 2mA.
- Test the zero (4mA) and gas response
- If necessary, set the zero

Note: Then, the detector made an auto test (continuous check of the optical beam transmission).

## 5. MAINTENANCE

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**Warning: The adjustment operations in this paragraph are reserved for authorized, trained personnel because they may compromise detection reliability.**

### 5.1. Corrective maintenance

Optical surface only need to be cleaned in the case of a fault on the OLCT60 (output current <0,5mA).

- Remote the protective cover
- Clean the optical surfaces with a soft, lint-free cloth and isopropyl alcohol
- If necessary, clean the optical mosquito

## 5.2. Periodic maintenance

Warning: The adjustment operations in this paragraph are reserved for authorized, trained personnel because they may compromise detection reliability.

Gas detectors are safety devices. In consideration of this, Industrial Scientific recommends regular testing of fixed gas detection installations. This type of test consists of injecting a standard gas of sufficient concentration into the sensor to set off the pre-adjusted alarms. This test does not, in any event, replace a full calibration of the sensor.

Industrial Scientific also recommends completely calibrating detectors with a known and certified concentration of gas every 3 or 4 months.

Frequency of gas testing depends on the industrial application in which the sensors are used. Inspection should occur frequently during the months following installation startup, later it may be spaced out if no significant problem is observed. Time intervals between tests should not exceed 3 months.

If a detector does not react upon contact with gas, it must be calibrated. Calibration frequency should be adapted based on test results. However, it should not be greater than one year.

Industrial Scientific recommends using a test gas to calibrate detectors.

**The site manager is responsible for implementing the safety procedures on his site. Industrial Scientific is not responsible for implementing safety procedures.**

### 5.2.1. Calibration procedure

You can calibrate the detector in following situations:

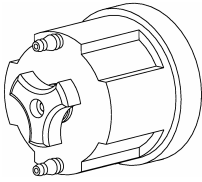

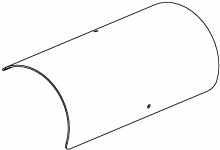
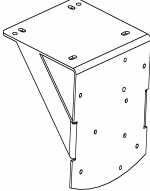


- commissioning
- part replacement
- continuous zero drift
- periodic test

Required equipment :

- A gas calibration kit (gas cylinder and accessories ...)
- A magnet: non-intrusive setting from the OLCT60 (access to the maintenance menu)

Please see page 13 for the calibration. Please note that only the “zeroing” can be set if you use an OLCT IR.

## 6. LIST OF ACCESSORIES

Accessories	Part No.	
Gas flow head / Calibration pipe	6313863	
Test hood	6313829	
Calibration magnet	6155651	
Protection shield (weather and solar radiation shield)	6313858	
Mounting bracket (bolts not included)	6322420	
Anti-projection cover Cross point screw M5 D40	6313862 6903376	
OLCT IR Mosquito cover	6313946	

## **7. Special Instructions for use in ATEX explosive atmospheres**

### **- Operating area :**

The equipment is authorized for use in zones 1, 2, 21 and 22 for ambient temperatures from  $-25\text{ }^{\circ}\text{C}$  to  $+55\text{ }^{\circ}\text{C}$  in the OLCT60/OLCTIR version. In the case of the OLCT60D/OLCTIR version ('remote'), the equipment is authorized for use in zones 1,2,21 and 22 for ambient temperature from  $-25\text{ }^{\circ}\text{C}$  to  $+55\text{ }^{\circ}\text{C}$  for the OLCT60 and from  $-50\text{ }^{\circ}\text{C}$  to  $+65\text{ }^{\circ}\text{C}$  for the OLCTIR.

### **- Installation:**

Installations will comply with all applicable standards, and particularly EN 60079-14, EN60079-17, EN61241-14 or other national standards.

Orientation: the detector will be installed horizontally, with the arrow on the protective cover pointing up.

### **- Wiring/ Connections :**

Wiring must comply with the prevailing regulations for installations in explosive atmospheres. The cable must have mechanical protection.

### **- Grounding :**

The detector OLCT60/OLCTIR must be connected to the ground with the external or internal ground connection with corrosion protection. For the OLCT60D/OLCTIR version, please connect also the OLCTIR detector to the ground.

### **- Power supply :**

Voltage at detectors terminals = 30V max  
Max Power = 4 Watts

### **- Replacing screws :**

If you need to replace a screw from the anti-combustion component of the support structure, use an A4.70 or higher quality screw.

### **- Dusty atmospheres :**

When using the equipment in dusty, explosive atmospheres, the equipment should be thoroughly cleaned on a regular basis to prevent the build up of dust. The maximum thickness for dust buildup is less than 5 mm

## 8. MARKING :

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### On the OLCT IR M25 Detector (screwed version)

OLDHAM S.A  
F- 62027 ARRAS CEDEX  
OLCT IR... (\*)  
INERIS 03ATEX0141X  
(serial number)  
(year of manufacturing)



II 2GD  
Ex de IIC T4  
Ex tD A21 IP66 T135°C  
Tamb : -50 °C +65 °C  
U max : 38V  
P max : 5.8W  
« WARNING »: DO NOT OPEN WHEN ENERGIZED

### On the OLCT IR « e » detector (remote version)

OLDHAM Arras  
F- 62027 ARRAS CEDEX  
OLCT IRE...  
INERIS 03ATEX0141X  
(serial number)  
(year of manufacturing CE0080)  
OLCT50d



II 2GD  
Ex de ia IIC T4  
Ex tD A21 IP66 T135°C  
Tamb : -50 °C +65 °C  
U max : 38V  
P max : 5.8W  
« WARNING »: DO NOT OPEN WHEN ENERGIZED

### on the OLCT 60 d Detector

OLDHAM S.A  
CE0080  
OLCT60d



II 2GD  
IP66  
Ex d IIC T6 (T85°C)  
INERIS 01ATEX0027X  
« WARNING »: DO NOT OPEN WHEN ENERGIZED  
serial number - year of manufacturing

Nous nous engageons

We undertake

### 1 Les Plus

Au travers de notre service client, à répondre rapidement et efficacement à vos besoins de conseil, de suivi de commande, et ce, partout dans le monde.  
A répondre dans les plus brefs délais à toutes questions d'ordre technique.

### 2 Qualité

A vous assurer la meilleure qualité de produits et de services conformément aux normes et directives internationales en vigueur.

### 3 Fiabilité & Contrôles

A vous fournir un matériel fiable. La qualité de notre production est une condition essentielle à cette fiabilité. Elle est garantie grâce à des vérifications très strictes réalisées dès l'arrivée des matières premières, en cours et en fin de fabrication (tout matériel expédié est configuré selon vos besoins).

### 4 Mise en service

A mettre en service, sur demande, votre matériel par nos techniciens qualifiés Ism.ATEX. Un gage de sécurité supplémentaire.

### 5 Formation

A dispenser des formations ciblées.

### 6 Contrat d'entretien

A vous proposer des contrats d'entretien évolutifs au regard de vos besoins pour vous garantir une parfaite sécurité :

- Une ou plusieurs visites par an, garantie totale ou partielle,
- Renouvelable par tacite reconduction,
- Incluant le réglage des détecteurs de gaz fixes ou portables et le contrôle des asservissements.

### 7 Dépannage sur site

A faire intervenir nos techniciens du **Service Après Vente** rapidement. Ceci est possible grâce à nos implantations de proximité en France et à l'étranger.

### 8 Dépannage en usine

A traiter tout problème qui ne pourrait être résolu sur site par le renvoi du matériel en usine. Des équipes de **techniciens spécialisés** seront mobilisées pour réparer votre matériel, dans les plus brefs délais, limitant ainsi au maximum la période d'immobilisation.

Pour toute intervention du Service Après Vente en France, un numéro Indigo a été mis en place : le 0 825 842 843

### 1 Strong points

Through our customer service to respond to your needs for advice and order follow-up services wherever in the world you may be.  
To answer all your technical questions as quickly as possible.

### 2 Quality

To provide you with products and services of the best quality, in accordance with current international directives and regulations.

### 3 Reliability and inspections

To supply you with reliable equipments. The quality of our production is essential to achieve reliability. Quality is ensured by extremely strict verifications carried out as soon as raw materials are received, during production and at the end of manufacture (all shipped equipments are configured to meet your requirements).

### 4 Start-up

That our Ism.ATEX qualified technicians will start up your equipment, if you wish so. This gives you the guarantee of additional safety.

### 5 Training

Will train on risks, on products and on consulting: Highlights that meet your needs.

### 6 Maintenance contract

To offer you open-ended maintenance contracts according to your needs so as to give you the guarantee of complete safety:

- One or more visits a year, comprehensive or partial warranty,
- Renewal by tacit agreement,
- Including the adjustment of fixed or portable gas detectors, the calibration of equipment and the verification of servo-control systems.

### 7 Field servicing

To send out our **After-Sales Service** technicians quickly for servicing on your site. This is made possible by our efficient network in France and other countries.

### 8 Factory repairs

We give the undertaking that any problem that cannot be solved in the field will be dealt with by the return of the equipment concerned to our factory. Teams of **specialized technicians** are on hand to ensure the immediate repair of your equipment in the shortest possible time, so keeping downtimes for your equipment to a minimum.

For any specific technical question, please contact our technical support service : 00 33 3 21 60 80 80

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Protéger l'Homme dans ses activités professionnelles.  
Fournir la plus haute qualité et le meilleur service client à chaque échange, à chaque instant.

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Preserving human life on, above and below the earth.  
Delivering highest quality, best customer service...  
every transaction, every time.

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