# Explosimeter, toxic gas and oxygen detector OLCT60 model

***User manual***

*Ref : NPO60GB rev A*

OLDHAM
An Industrial Scientific Company
*The Fixed Gas Detection People*

First edition, English version



All of the information that is provided in this document is accurate to the best of our knowledge.

As a result of continuous research and development, the specifications of this product may be changed without prior notice.

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# Contents

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All of the necessary actions have been taken in order to ensure your complete satisfaction with this equipment.

It is important that you read this entire manual carefully and thoroughly.

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- 2-year warranty on defective parts and workmanship including return to the factory and unless misuse. The warranty does not cover consumable parts as sensors, filters, etc.

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**European Union (and EEE) only.** This symbol indicates that, in conformity with DEEE Directive (2002/96/EC) and according to local regulations, this product may not be discarded together with household waste.

It must be disposed of in a collection area that is set aside for this purpose, for example at a site that is officially designated for the recycling of electrical and electronic equipment (EEE) or a point of exchange for authorized products in the event of the acquisition of a new product of the same type as before.

# Chapter 1 | Presentation

## Purpose

OLCT60 gas detectors are 4-20mA and 3-wire transmitters designed for measuring combustible and toxic gas as well as oxygen.

They are available:

- As anti explosion protection system with explosion proof enclosure and sensor block **This version is approved and listed as OLCT60d**.
- As anti explosion protection and inbuilt safety system with explosion-proof enclosure and safety sensor block. This version is available for electrochemical sensors only. **This version is approved and listed as OLCT60id.**

The versions that are presently available are listed on the following table.

| | OLCT60d (1) | OLCT60 id (2) |
|---|---|---|
| Catalytic sensor | ☑ | |
| Electrochemical sensor | ☑ | ☑ |
| XPIR Infrared sensor | ☑ | |
| OLCTIR Infrared sensor | ☑ | |

1: OLCT60 anti-explosion transmitter with inbuilt explosion-proof detector
2: OLCT60 anti-explosion transmitter with inbuilt intrinsically safe detector.

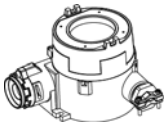
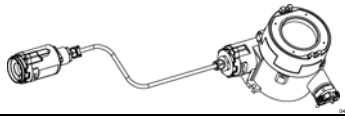
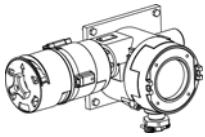
**Table 1: Comparative table for gas detectors, OLCT60 series.**

For detailed sensor features please see page 64 and following ones.

The OLCT60 series includes 2 transmitter versions:

- The OLCT60 version with fixed sensor. By this name one can tell whether the anti explosion transmitter is or is not combined with an inbuilt, intrinsically safe detection unit.
- The OLCT60D version with movable sensor By this name one can tell whether the anti explosion transmitter is or is not combined with an intrinsically safe, movable sensor.

The versions that are presently available are listed on the following table.

| Name | Description | Illustration |
|---|---|---|
| OLCT60 | ADF housing with inbuilt sensor block (ADF or intrinsically safe*). |  |
| OLCT60D | ADF housing with 15 m movable sensor block (ADF or intrinsically safe*). |  |
| OLCT60 / OLCT IR | ADF housing with ADF fixed sensor block type OLCT-IR. |  |
| OLCT60D / OLCT IR | ADF housing with ADF movable sensor block type OLCT-IR. |  |

(*) The intrinsically safe version is distinguished - among other features - by the color of the sensor block that is blue for intrinsically safe versions and raw stainless steed for explosion proof versions.

## Operating principle

The measuring sensor converts the target gas into current. The current value is amplified, corrected temperature wise, linearised, and converted into a 4-20 mA proportional signal to the concentration of the measured gas and then conveyed through connecting cable to a centralized unit (measurement unit or industrial automation system).

The measuring sensor changes depending on the type of detector as shown in 2: OLCT60 anti-explosion transmitter with inbuilt intrinsically safe detector.

, on page 7.

# Detector parts and components

OLCT60 detectors are made up of the following parts:

| Id. | Description |
|---|---|
| 1. | Manufacturer's Label |
| 2. | Cover |
| 3. | Display unit |
| 4. | Electronic circuit board |
| 5. | Fixed sensor block<br>(explosimeter, toximeter and oxygen detector, infrared XP-IR). |
| 6. | Enclosure |
| 7. | Cable inlet gland |
| 8. | Movable sensor block<br>(explosimeter, toximeter and oxygen detector, infrared XP-IR) |
| 9. | Connection cable for movable sensor block |
| 10. | Adapter |
| 11. | OLCT IR fixed sensor block |
| 12. | OLCT IR movable sensor block |

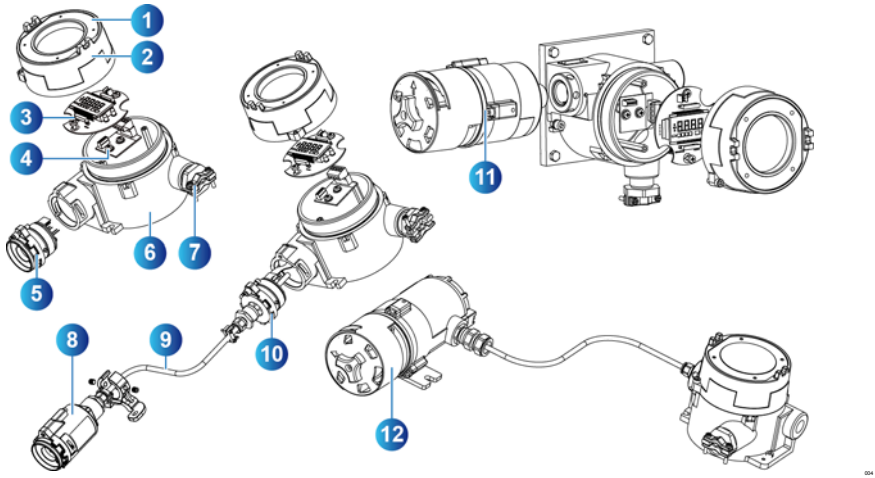


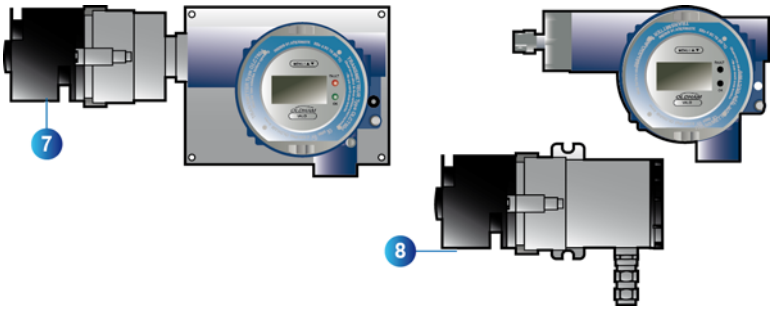

**Figure 1: Main components of OLCT60 detectors.**

# External elements

## Overview

| Id. | Description |
|---|---|
| 1. | Digital display  See Figure 3 for more details |
| 2. | Ground terminal |
| 3. | Cover fixation screw |
| 4. | Cable gland |
| 5. | Inbuilt sensor block  See 7 for more details |
| 6. | Movable sensor block  See 7 for more details |
| 7. | Infrared sensor block, fixed type OLCT-IR. See 7 for more details |
| 8. | Infrared sensor block, movable type OLCT-IR. See 7 for more details |


*OLCT60*  *OLCT60 D with movable sensor block*




*OLCT60/OLCT-IR fixed*  *OLCT60/OLCT-IR movable*

**Figure 2: View of the OLCT60 detectors from the outside.**

## Difference between ADF and SI sensors

Although they have different ATEX marking, the intrinsically safe, explosionproof sensors are visually distinguished by the color of the sensor block as following:

- Explosionproof sensor: Non-painted, stainless steel sensor equipped with sinter metal.
- Intrinsically safe sensor: Blue painted, stainless steel sensor equipped with sinter metal.

## Display and LEDs

| Id. | Description |
|---|---|
| 1. | Digital display exhibiting the following readings:<br>- gas measure and type alternated with gas unit. If an error occurs, the respective error code is displayed instead of the measure. Error codes are displayed along with the orange LED. Please revert to section *Readings on the display*, page **Erreur ! Signet non défini.**.<br>- Maintenance menus after accessing. Please revert to section *Menus*, page 14. |
| 2. | Magnetic contact for menu selection |
| 3. | Orange Error LED (detector fault or sensor configuration in progress) |
| 4. | Green LED for electric power supply. |
| 5. | Magnetic contact for validation. |
| 6. | Magnet for magnetic contacts activation (marking 2 and 5). |


**Figure 3: Detailed view of the display and its related peripheries (LED and active zones).**

# Internal elements

The following internal components can be accessed by the user:

| Id. | Description |
|---|---|
| 1. | Electronic circuit board |
| 2. | Terminal board |

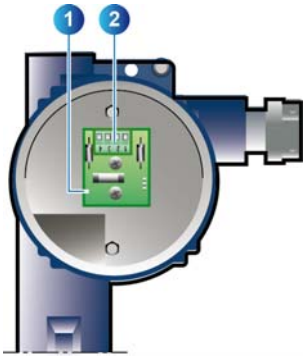



**Figure 4: Detector internal view, display block taken off.**

# Labels and pictograms

The detectors has two identification labels, as shown below:

## Manufacturer label

On the cover: this label features the main characteristics of the detector:

| Id. | Description |
|---|---|
| 1. | ATEX marking |
| 2. | Type of product |
| 3. | Manufacturer's name |
| 4. | IECx marking and maximum ATEX certification temperature (excluding metrological performance) |
| 5. | Warning |
| 6. | EC and Ex certification mark |


**Figure 5: Manufacturer label**

## Side label

This label is located on the housing and includes the following information:

| Id. | Description |
|---|---|
| 1. | Reference of the detector without sensor (P/N) |
| 2. | Disposal pictogram |
| 3. | Detector production number (S/N). |

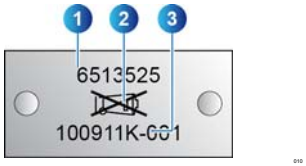



**Figure 6: Side label**

# Operation labels

## At startup

The display will then show:

- An overview of the display segments and the LEDs to assess their troublefree operation.
- Sensitivity adjustment
- The manufacturing date code.
- The production number.
- The display of gas concentration after stabilization and test of the sensor.


**Figure 7: Display steps at power up.**

## In normal operation

In normal operation, the display alternately shows the measured gas concentration, the type of gas and the gas unit. The *OK* green indicator is lit; the *FAULT* default indicator is off.

| Indicator | Lit | Off |
|---|---|---|
| OK | Detector under voltage. | Detector off. |
| FAULT | Detector default or detector in maintenance mode.<br>See the *In operation with default or error* paragraph below. | Lack of detector default. |

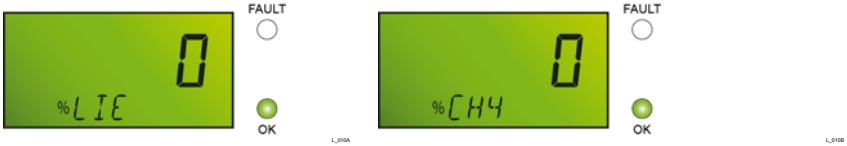



**Figure 8: Display in normal operation.**

## In operation with default or error

The display shows the error or default code (list of defaults on page 70). Simultaneously, the orange *FAULT* indicator is lit and the icon is displayed.

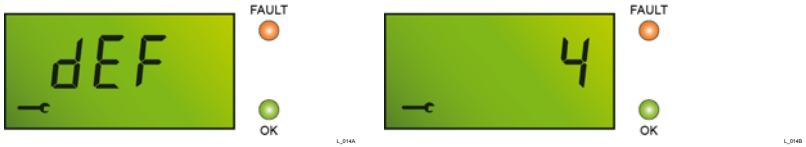



**Figure 9: In case of an error or fault, the error or fault code is displayed. Concurrently, the orange *FAULT* indicator is lit.**

### The maintenance menus

These let you carry out maintenance operations (calibration, zeroing of the sensor's settings, internal zero adjustment in the case of an infrared sensor)

Access to maintenance menus is done when the cover is closed. All the necessary steps should be taken before opening the lid of the enclosure if it is installed in an ATEX zone, in particular:

- A fire permit from the appropriate department;
- Continuous use of a portable explosimeter;
- Use of an intrinsically safe multimeter;
- Reduction to an absolute minimum of the time involved.

This observation applies to all OLCT60 versions that are equipped with an intrinsically safe and explosion-proof sensor block.

## Access

The access to the menus is done without opening the cover, with the use of a magnet (pos. 1) that will be positioned on the VALID (pos. 2).


**Figure 10: The positioning of the magnet on the VALID area allows access to the menu.**

## List of menus

An OLCT60 type sensor usually has two menus while OLCT 60 sensors with infrared sensor (XP-IR or OLCT - IR) have three menus.

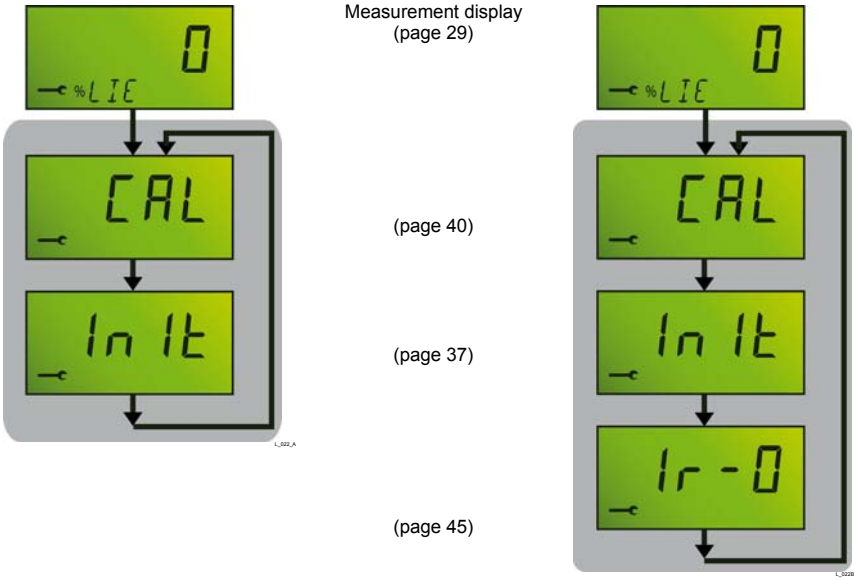



**Figure 11: Menus accessible on an OLCT60 (left) and an OLCT60 equipped with an infrared detection module (right).**

## Main functions in the menus

- **CAL**: access to the zero setting and sensitivity menu. See page 40.
- **Init**: initialization of the setting parameters. This function is only used after the changing of a sensor. See page **Erreur ! Signet non défini.**.
- **Ir-0**: Zero adjustment of the optical part. This function is only used with an XP-IR or OLCT IR infrared sensor after the cleaning of the optical parts (lense and mirror on the OLCT IR). See page 45.

## Use of the menus

Their detailed use is the subject of 0.

# Chapter 2 | Installation

It is recommended to read the installation guide for use and maintenance of the detectors for flammable gases and oxygen (EN/IEC 60079-29-2) and toxic gases (EN 45544-4).

The installation will be done according to current standards, the classification of the area, in compliance with the current editions of standards EN/IEC 60079-14, EN/IEC 61241-14 and other national and/or local regulations.

## Regulations and conditions of use

- The installation will be done according to current standards for installation in explosive areas especially regulations IEC/EN 60079-14 and IEC/EN 60079-17 (current editions) or according to other national standards.
- Generally, temperature conditions, the power supply voltages and power mentioned in this document are relative to explosion safety. **This is not the operating temperatures of the detector.**
- The equipment is authorized for use in Zones 1, 2, 21 and 22 for ambient temperatures ranging from -50 °C to + 70 °C.
- In the case of the OLCT60 D id version, the sensor block can be used in zones 0, 1, 2, 20, 21 and 22 if there is a remote transmitter. The transmitter itself may not be used in Zone 0 or 20.
- The detector must always be in contact with the ambient air. Thus:
  - Do not cover the detection module.
  - Do not use paint on the detection module.
  - Avoid dust deposits.

## Necessary equipment

- Complete detector.
- Connector cable
- Fixing tools.
- Fixing material.

# Location of the detector

The detector shall be positioned at the ground level, or on the ceiling at the same height as the airflow, or near to the air extraction ducts depending on the density of gas to detect or use. Heavy gases may be detected at the ground level, while light gases will be found at ceiling height. Gas densities are found on page 46.

# Detector positioning

## All version of the integrated measuring block excluding OLCTIR

The detector will be installed with the detector sensor pointing downwards. For explosive gas detectors only, any tilt of more than 45° from the vertical will lead to an inaccurate measurement.

Fixture of the enclosure shall be secured with 2 x M6 screws and the appropriate plugs for the supporting material. A special holder is available for mounting the detector on the ceiling (see section on *Accessories*).

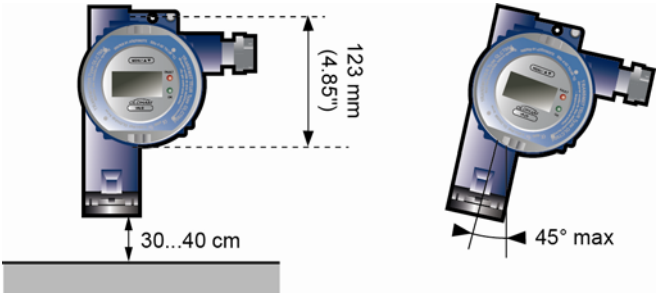



**Figure 12: Sensor pointing downwards (left) and maximum tilt angle for an explosimeter (right).**

## All version of the remote measuring block excluding OLCTIR

For explosive gas detectors only, any tilt of more than 45° from the vertical will lead to an inaccurate measurement.

Fixture of the enclosure shall be secured with 2 x M6 screws and the appropriate plugs for the supporting material. That of the block sensor will be done with at least 2 x M6 screws and the appropriate plugs for the supporting material. A special holder is available for mounting the detector on the ceiling (see section on *Accessories*).

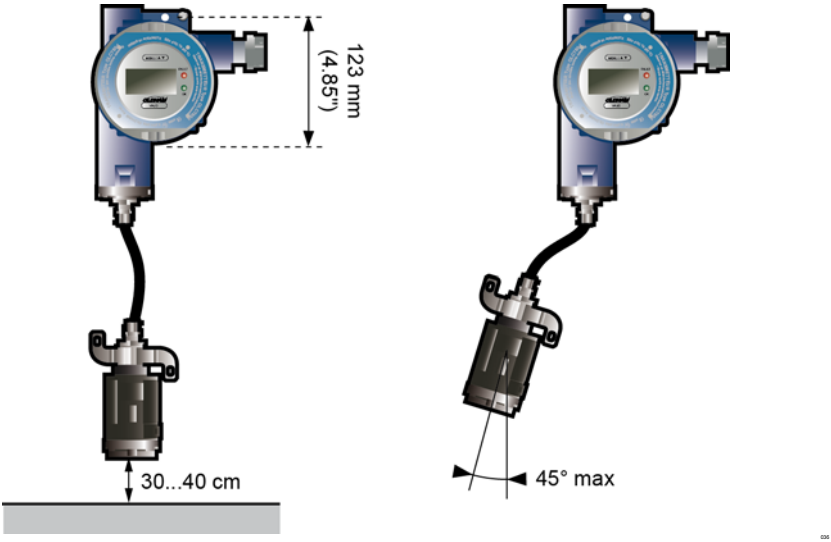



**Figure 13: Sensor pointing downwards (left) and maximum tilt angle for an explosimeter (right).**

## OLCTIR version with integrated measuring block only

The detector will be installed with the horizontal detector sensor and the arrow on the anti-projection device pointing upwards.

Fixture of the enclosure shall be secured with 2 x M6 screws and the appropriate plugs for the supporting material

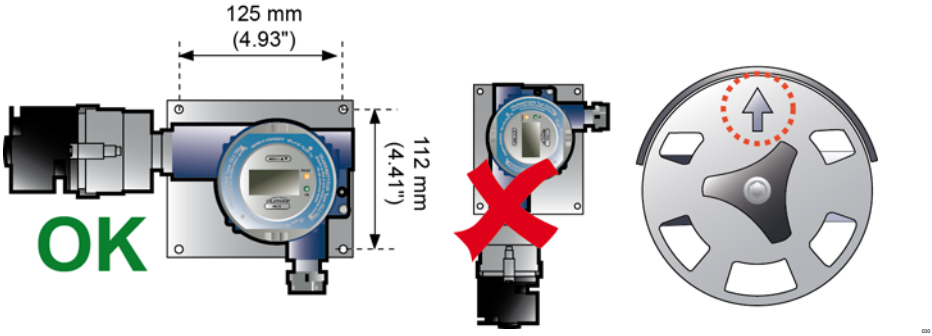



**Figure 14: OLCT IR detector MUST be laid horizontally, arrow pointing upwards.**

### OLCTIR IR version with remote measuring block only

The OLCT-IR detector will be installed with the horizontal detector sensor and the arrow on the anti-projection device pointing upwards.

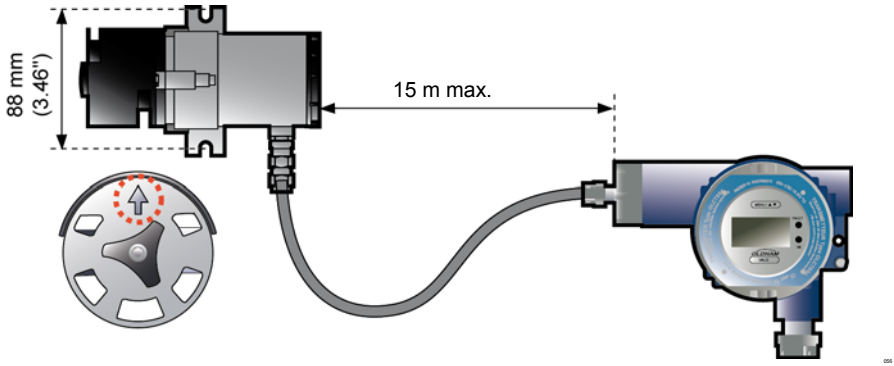



**Figure 15: OLCT IR must be laid horizontally, arrow pointing upwards.**

## Electrical power supply

| Type of detector | Type of sensor | Power supply (Vcc) | Maximum current (mA) | Power consumed (W) |
|---|---|---|---|---|
| Explosimeter | Catalytic | 16 to 32 | 140 | 2,24 |
| Explosimeter | Infrared (XP-IR) | 16 to 32 | 120 | 1,92 |
| Explosimeter | Infrared (OLCT IR) | 16 to 32 | 550 | 8,80 |
| Toximeter | Electrochemical | 16 to 32 | 80 | 1,28 |
| Oxygen detector | Electrochemical | 16 to 32 | 80 | 1,28 |
| Freon | Semiconductor | 16 to 32 | 140 | 2,24 |

## Connector cable

The detector shall be connected to the central unit (measurement and automation unit) by a 3-wire shielded instrumentation cable, armoured if necessary. The choice of cable will be dictated by the particular requirements of the installation, distance, and type of detector (see table below).

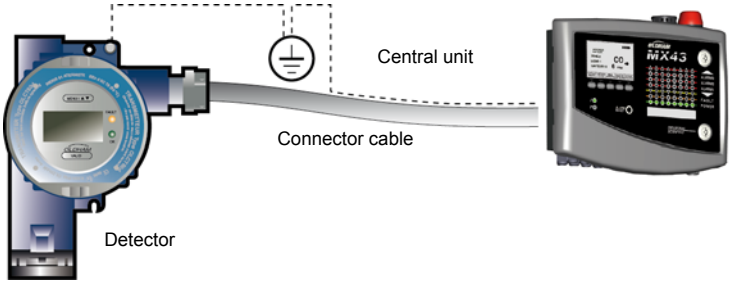



**Figure 16: The cable connecting the detector to the central unit should be chosen with care.**

| Type of detector | Type of sensor | Maximum length (km) for cable of cross-section as indicated | | | Maximum load resistance (Ω) |
|---|---|---|---|---|---|
| | | 0.5mm² | 0.9mm² | 1.5mm² | |
| Upstream line voltage (Vcc) | | 24 | 24 | 24 | |
| Explosimeter | Catalytic | 0,55 | 1,0 | 1,7 | 250 |
| Explosimeter | Infrared (XP-IR) | 0,65 | 1,2 | 2,0 | 250 |
| Explosimeter | Infrared (OLCT IR) | 0,13 | 0,25 | 0,45 | 300 |
| Toximeter | Electrochemical | 1,0 | 1,8 | 3,0 | 250 |
| Oxygen detector | Electrochemical | 1,0 | 1,8 | 3,0 | 250 |
| Freon | Semiconductor | 0,55 | 1,0 | 1,7 | 250 |

**Table 2: Table of line lengths.**

The cable must have a braided screen to reduce the influence of electrical and radio-frequency interference. A cable such as AFNOR M 87-202-01-IT-15-EG-FA (Nexans) may be used. It shall be selected according to the type of detector and in accordance with the table shown hereinabove. Here are some more examples of suitable cables:

Non ATEX zone: CNOMO FRN05 VC4V5-F
ATEX zone: GEVELYON (U 1000RHC1)
ATEX zone: GVCSTV RH (U 1000)
ATEX zone: xx-xx-09/15- EG-SF or EG-FA or EG-PF (U 300 compatible with M87202)

The maximum permissible length will depend on the cross-section of the cable conductors (see table) and on the minimum admissible supply voltage at the detector terminals.

# Cable connection

## Switch off line power supply

On the central unit:

1. Inhibit any installation alarms to avoid unexpected triggering during operation.
2. Switch off the power to the detector.

## Opening of the detector

Remove the 4mm hex screw locking the lid (notch 1) before unscrewing the lid of the detector.


**Figure 17: Locating the hex screw (4 mm) locking the lid.**

## Cable preparation.

The cable shall be taken from the central unit (measurement and automation) to the point of measurement (see Figure 16). The passage, support, and protection of the cable shall be according to best practice .

## Cable passage

It is essential that the instructions provided by the manufacturer of the compression gland are followed and the braided screen is correctly connected.

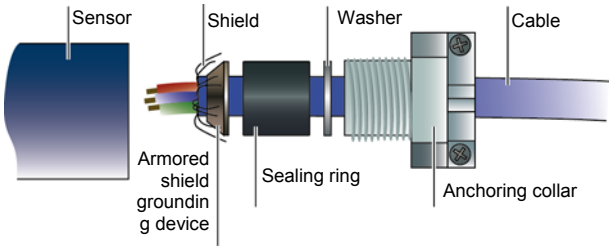



**Figure 18: Example of connection of armored and unarmored cable.**

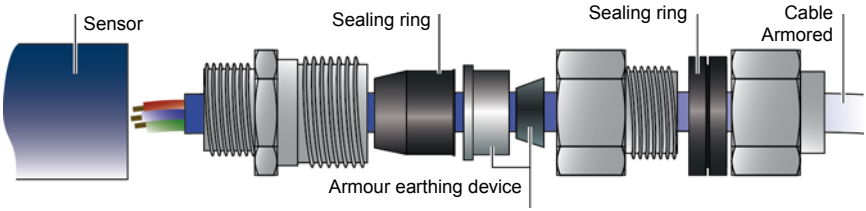



**Figure 19: Example of double compression cable gland for armored cable clamp.**

## Cable connection (OLCT60)

The connection of the cable between the detector and central unit should be made with the power off. The site must be equipotential.

Connect the cable to the detector side before connecting the central unit side. After the wiring has been completed, connect the cable shield to the ground terminal of the central unit.

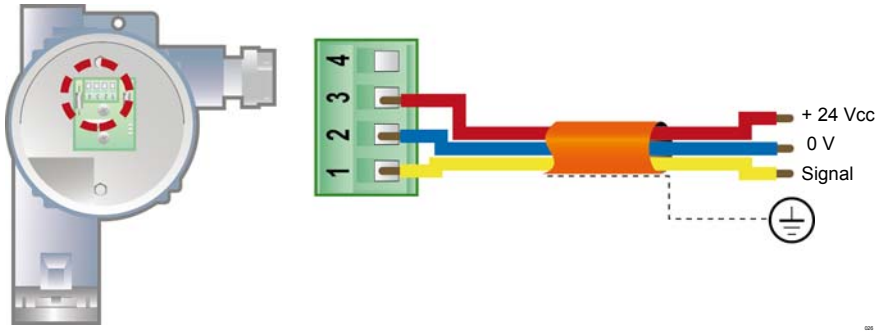



**Figure 20: Connections for a OLCT60 (d or id version).**

## Connection of the cable (OLCT60/OLCT IR remote)

The connection of the cable between the detector and central unit should be made with the power off. The site must be equipotential.

First carry out the connection between the OLCT IR cable (A notch and the detector ( B-notch ), as shown in Figure 21. The maximum distance is 15 meters. The type of cable to use is 02-IP-09-EG-FA or EG-SF or similar; see page 21.

Then connect the cable (C notch to the detector before the connection to the central unit as shown in Figure 20. After the wiring has been completed, connect the cable shield to the ground terminal of the central unit.

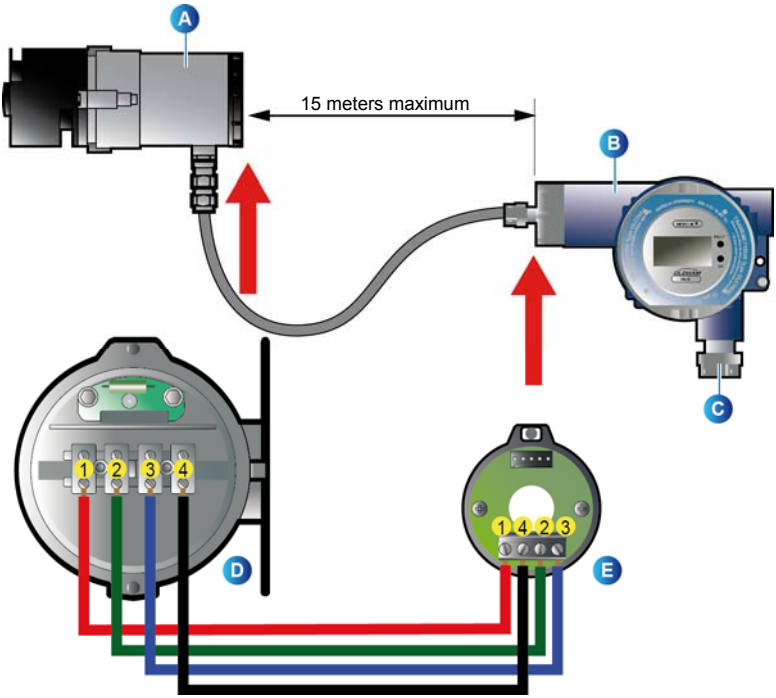



**Figure 21: Connection for a OLCT60D/OLCT-IR. Ensure the specificity of the numbering of the connector marked «D» compared to the connector marked «E».**

### Connecting the enclosure to ground

Connect the enclosure ground terminal to earth according to the regulations.

In the OLCT60, this grounding can also be done by using the dedicated ground terminal located inside the housing.

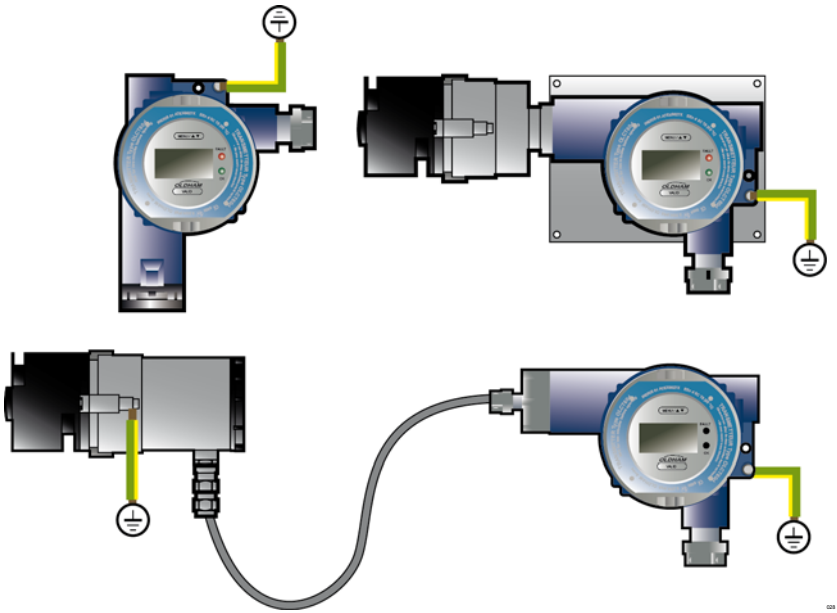


**Figure 22: Ground connection terminal**

### Closing the cover

Before connecting the cable to the terminal on the central unit, it is essential that the cover is completely closed. Firmly tighten the locking screw (see Figure 17, on page 22).

## Use limitations

The gas detector sensors have certain limitations; it is essential to fully recognize these limitations (see 0).

### Presence of specific components

- Vapor from silicone or sulphur-containing components can affect the catalytic gas detector sensors and thereby distort the measurements. If the sensors have been exposed to these types of compounds, an inspection or calibration will become necessary.

- High concentrations of organic solvents (e.g. alcohols, aromatic solvents, etc.) or exposure to quantities of gas greater than the specified range of measurement can damage the electrochemical sensors. Inspection or calibration is then recommended.
- In the presence of high concentrations of carbon dioxide (CO2 > 1% vol.), the oxygen-measuring electrochemical sensors can slightly overestimate the concentration of oxygen (0.1 to 0.5% volume).

### Operation under low oxygen levels

- If an electrochemical detector sensor is used in an atmosphere comprising less than 1% oxygen for over one hour, the measurement may be an underestimate.
- If a semiconductor detector sensor is used in an atmosphere comprising less than 10% oxygen, the measurement may be an underestimate.
- If a semiconductor detector sensor is used in an atmosphere comprising less than 18% oxygen, the measurement may be an underestimate.

## Transfer curve

The curve shown gives the transmitter output current as a function of the gas concentration. If you connect the transmitter to a different unit than the one provided by ISC Oldham, make sure that the transfer curve is fully compatible with the input characteristics of your device to ensure proper interpretation of the information provided by the transmitter. Similarly, the unit should provide sufficient voltage to compensate for any voltage drop in the cable.

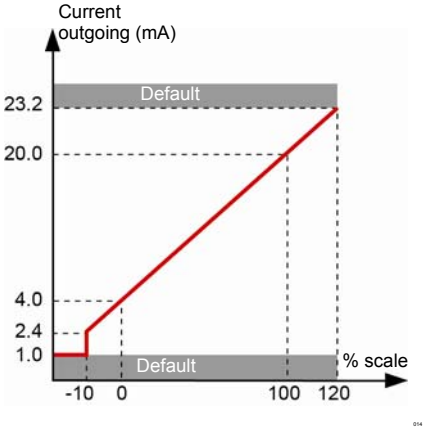



**Figure 23: transfer curve for a 4-20 Ma detector.**

# Chapter 3 | Commissioning

**The actions described in this chapter are restricted to authorized and trained personnel as they are likely to undermine the reliability of detection.**

This chapter describes:

- Zero adjustment.
- Sensitivity adjustment.
- The eventual adjustment of zero and sensitivity.

## Purpose of control

Upon delivery, each sensor has been tested and calibrated. There is normally no need for a new calibration.

However, for safety, it is advisable to carry out checks of zero and sensitivity as shown below.

The detector lid shall remain completely closed; the adjustments are carried out through the window.

For a explosimetric detector, we recommended to calibrate the detector with the gas to be detected. When the user wishes to calibrate the detector with a gas other than that detected and programmed, refer to the table on page 46 for the use of recommended gas and the corresponding coefficient.

## Necessary equipment

- Bottle of pure air.
- Bottle of standard gas, of suitable concentration for the measurement range (between 30 and 70% of the measurement range).

# Commissioning

## Prior checks

Check the following points:

- Wiring completed.
- Detector housing grounded.
- Connection made between the connector cable braided screen and central unit ground.
- Integrity of the mechanical mounting (fixings, cable gland, and cover) ensured.

## Powering up detector

1. Inhibit any installation alarms to avoid unexpected triggering during operation.
2. Connect power to the detector line in accordance with the manufacturer's instructions.

# Stabilization time

Filter mounting, it is essential to allow the detector temperature to stabilize. In addition, after turning the power on, certain sensors require a further pre-heating time. Any adjustment before the time indicated will result in an incorrect measurement, which may in turn compromise the safety of the goods and personnel. The total waiting time is summarized below:

- Explosimeter: 2 hours.
- Oxygen detector: 1 hour.
- Electrochemical detector: 1 hour, excluding
  - NO (nitrogen monoxide): 12 hours.
  - HCl (hydrochloric acid): 24 hours.
  - ETO (ethylene oxide): 24-36 hours.
- Semiconductor sensor: 4 hours.
- Infra-red detector (XP-IR): 2 hours.
- Infra-red detector (OLCT IR): 2 hours.

# Display of the gas measure

## Normal mode

Alternately, the display shows the measured concentration and type of gas.

The *OK* green indicator is lit; the *FAULT* default indicator is off.


**Figure 24: Display in normal operation.**

## Sensor default

In case of a failure, the display shows «dEF» followed by a fault number.

In case of an internal electronic error, the display shows «E» followed by an error number.

In the two cases, the *FAULT* (default) indicator is lit. Proceed with the corrective action in compliance with page 35. The display shows the error or default code is found on page 70.


**Figure 25: Display in case of default.**

## Ambiguity resolution

(only the catalytic version)

For safety reasons, when measuring a concentration of a flammable gas above 100% LEL, the display shows the «SUP» message and the default «FAULT » indicator is lit. Meanwhile, the measure is inactivated and the output signal is frozen at 23.2 mA.

To exit this mode, add the magnet to the MENU / ▲▼ area after having verified the absence of the ATEX with a portable explosimeter for example.


**Figure 26: Readings displayed when the explosimeter detects a high concentration.**

# Zeroing

Proceed as follows:

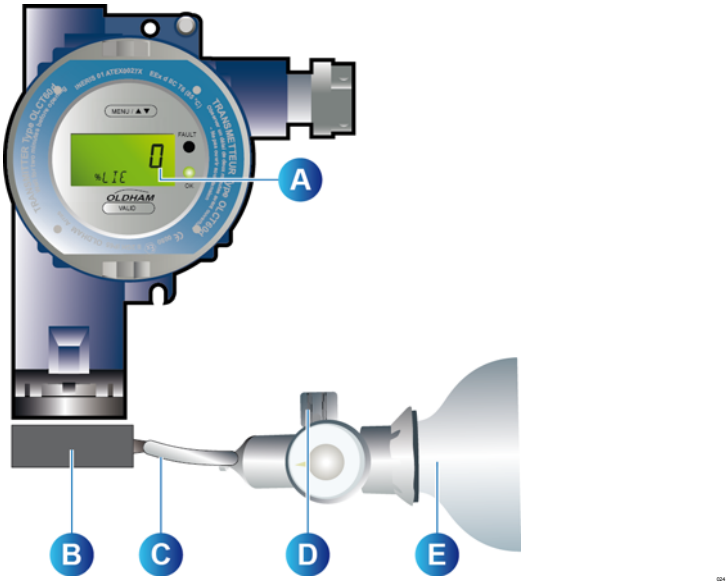



**Figure 27: Zeroing.**

1. Inhibit alarm signals on the central unit.
2. Place the calibration shroud onto the detector head (Figure 27, rep. B).
3. Branch the calibrator shroud to the pure air bottle (Pos. E) using a flexible hose (Pos. C).
4. Open the valve on the pure air bottle (flow rate 30 to 60 liters/hr or 60 to 120 liters/hr in the case of OLCT IR versions) (rep. D).
5. After the measurement has stabilized (approx. 2 minutes), read the display of the central measuring unit (rep. A).
6. If the expected value does not comply, proceed with the calibration (paragraph *Zeroing and sensitivity*, on page 40).
7. See paragraph *Adjustment of gas sensitivity*, on the next page.

# Adjustment of gas sensitivity

For safety reasons, this procedures must come after the zeroing (page 29). Proceed as follows:

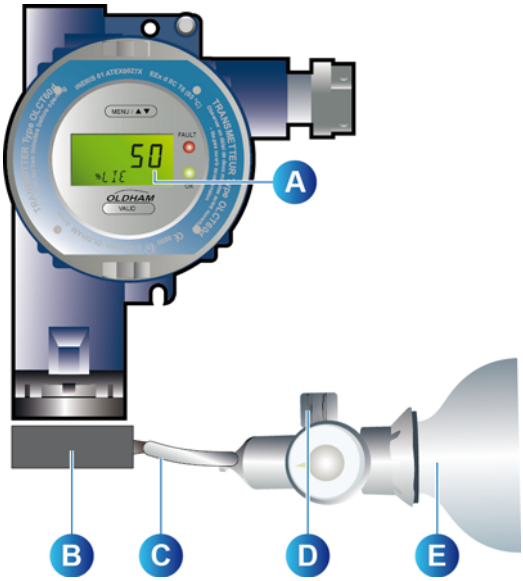



**Figure 28: Sensitivity adjustment.**

1. Once zeroing is completed, connect the calibration shroud to the standard gas bottle (Pos. E) using a flexible hose (Pos. C).
2. Open the valve on the standard gas bottle (flow rate 30 to 60 liters/hr or 60 to 120 liters/hr in the case of OLCT IR versions) (rep. D).
3. After the measurement has stabilized (approx. 2 minutes), read the display of the central measuring unit.
4. If the expected value does not comply, proceed with the calibration (paragraph *Zeroing and sensitivity*, on page 40).
5. Close the valve (rep. D) of the bottle and remove the calibration shroud (rep. B). Walt for the measured signal to return to zero and reset the alarm signals on the central unit. The zeroing and gas sensitivity procedure is completed. The detector can be used.

# Chapter 4 | Preventive maintenance

*Periodic checks enable the equipment and installation to remain in conformity and ensure reliable detection. This chapter describes what preventative action should be taken and at what intervals. Inspection and maintenance are carried out in accordance with standards in force EN60079-17 or IEC 60079-17, with whatever editions are in force or with other national standards.*

## Maintenance schedule

Gas detectors are safety devices. OLDHAM recommends the regular testing of fixed gas detection installations. This type of test consists of injecting standard gas into the detector at a sufficient concentration to activate the pre-set alarms. . It is to be understood that this test is in no way a replacement for a detector calibration.

The frequency of gas tests depends on the industrial application where the detector is in use. Frequent inspections should be made in the months following the commissioning of the installation, and should then become more widely spaced provided that no significant deviation is observed. The interval between tests should not exceed 3 months. If a detector should fail to react in contact with the gas, calibration is essential. The frequency of calibrations shall be adjusted according to the results of the tests (humidity, temperature, dust, etc.); however, no longer interval than one year should occur.

The general manager should put safety procedures in place on-site. INDUSTRIAL SCIENTIFIC cannot be held responsible for their enforcement.

**To attain a *SIL capability level* according to European standard EN 50402, *Requirements relating to the safety operation of fixed gas detection systems*, the maintenance interval for explosive gas detectors must be no more than 6 months. To obtain the *SIL capability 2 level*, the maintenance interval must be no more than 3 months.**

# Actions

## OLCT60

Periodic maintenance comprises the following actions:

- Removal of dust from the sensor's protective housing, using only a dry cloth. No water or solvents should be used. Severely dusty heads or sensors should be replaced immediately.
- For use in dusty explosive atmospheres, the user should undertake full and regular cleaning to avoid the build-up of dust. The maximum permissible thickness of a dust layer must be less than 5 mm.
- Replacement of screws: if the screws on the fire-proof part "d" of the body need to be replaced, screws of equal quality or better than A4.70 should be used.
- Zero inspection with pure air; see page 29. Comply with the actions described in this paragraph in case of deviation.
- Gas sensitivity check; see page 30. Comply with the actions described in this paragraph in case of deviation.

## OLCT60/ OLCT IR

Refer to the specific OLCT IR manual.

# Chapter 5 | Maintenance

*Maintenance primarily comprises changing any sensors that no longer meet their initial metrological characteristics.*

**Since they are liable to affect detection reliability, the tasks described in this chapter are reserved for authorized trained personnel only. Inspection and maintenance shall be carried out in accordance with standards EN60079-17 or IEC 60079-17, with whatever editions are in force or with other national standards.**

## Possible errors

The table below summarizes the various possible detector errors.

| Observed default | Possible cause | Action | (page ) |
|---|---|---|---|
| Line current 0 mA | Connector cable | Check cable | 49 |
| | Power supply | Check voltage to the detector terminals | - |
| | Electronic card | Change sensor | - |
| 0 mA < Line current < 1mA | Sensor | Change sensor | 49 |
| | Line resistance too high | Check cable | - |
| | Power supply | | - |
| | | Check voltage to the detector terminals | |
| | | | - |
| | Standard gas not consistent | Check the contents of the standard gas | - |
| Zero setting not possible | Sensor | Change sensor | 49 |
| | Electronic card | Change sensor | |
| Sensitivity adjustment not possible | Sensor | Change sensor | 49 |
| | Electronic card | Change sensor | |
| «SUP» display | Ambiguity resolution activated | Inhibit the ambiguity resolution with the magnet. | 29 |
| | | Check the sensitivity | 42 |

# Replacing sensor block (Explo, $O_2$, Tox, XP-IR)

This paragraph is not applied to OLCT IR. Refer to the two paragraphs *Replacing the OLCT IR* on the next page.

The sensor block or detection module encloses the actual detector sensor and the corresponding electronics. A sensor block can only be associated with a defined detector; so an oxygen detection module will not be installed in the place of a explosimetric block.

## Frequency of replacement

The sensor block needs to be replaced every time when zeroing, performing gas calibration or preventive maintenance are no longer possible.

## Exchanging of the sensor

| Step | Action |
|---|---|
| 1. | Prepare the following elements:<br>▪ New sensor block.<br>▪ 4 mm Allen wrench.<br>▪ Calibration set (bottle, shroud, etc.) |
| 2. | Inhibit alarm signals on the central unit. |
| 3. | Turn the OLCT60 off. |
| 4. | Loosen the locking screw in the sensor head and rotate the sensor head 30 degrees counterclockwise. |
| 5. | Unplug the connector and remove the defective sensor head. |
| 6. | Replace the worn out detector head with an identical new one. |
| 7. | Reassemble in reverse order and tighten the locking screw. |
| 8. | Restore power by OLCT60 to the central unit. |
| 9. | Install the OLCT60 as explained in detail in the *Initialization of the sensor block* pagraph on page 37. |

## Replacing the OLCT IR – integrated version

Contact the manufacturer or distributor.

## Replacing the OLCT IR – remote version

### Exchanging the detector

| Step | Action |
|---|---|
| 1. | Prepare the following elements:<br>▪ New OLCT IR detector.<br>▪ 4 mm Allen wrench.<br>▪ Calibration set (bottle, shroud, etc.) |
| 2. | Inhibit alarm signals on the central unit. |
| 3. | Turn the OLCT60 off. |
| 4. | Open the defective OLCT-IR connection terminal and disconnect it. |
| 5. | Dismount the defective OLCT-IR and put the new one in. |
| 6. | Carry out the connections. Refer to the *Connection of the cable (OLCT60/OLCT IR remote version)* paragraph on page 23. |
| 7. | Reassemble in reverse. |
| 8. | Restore power by OLCT60 to the central unit. |
| 9. | Install the OLCT60 as explained in detail in the *Initialization of the sensor block* paragraph on page 37. |

# Initialization of the sensor block

## Selection of the initializing menu (*Init*)

| Step | Action | Illustration |
|---|---|---|
| 1a. | After the startup phase, the screen will shows the gas content (it may be wrong at this point). Position the magnet on the VALID for 3 seconds. |  |
| 1b. | Until the icon is displayed... |  |
| | ...present the magnet 3 consecutive times on the MENU / ▲▼ in the 3 seconds. |  |
| 1c. | The calibration menu (CAL) is displayed. |  |
| 1d. | Present the magnet on the MENU / ▲▼. | |
| 1e. | The initialization menu (Init) is displayed. |  |

## Initialization of the sensor block

This procedure performs zeroing of the electrical parameters of the measuring detector.

| Step | Action | Illustration |
|---|---|---|
| 2a. | The *Init* screen is displayed, present the magnet once on VALID. |  |
| 2b. | The display indicates « CnF » (*Confirmation*). |  |
| 2c. | Position the magnet on the VALID. | |

| | | |
|---|---|---|
| 2d. | The display indicates « nOn » (*No*). |   |
| 2e. | Position the magnet once on the MENU / ▲▼ to change *No* to *Yes*. |   |
| 2f. | Position the magnet once on the VALID to validate the choice. The procedure is then ended and the detector automatically resets. | |
| 2g. | Wait 4 seconds during the display of the startup page. |   |
| 2h. | The version number of the software is displayed. |   |
| 2i. | The manufacturing date code is displayed. |   |
| 2j. | The serial number is displayed. |   |
| 2k. | Display count-down starts. |   |
| 2l. | When count-down is over, the measuring page is displayed on screen.<br>The sensor is operational. |   |
| 2m. | Subsequently check the gas operation as explained on pages 29 and 30. | |

# Zeroing and sensitivity adjustment (calibration)

This paragraph will be followed in measuring or control of the zero (page 29) and/or the sensitivity (page 30) to show deviation from the expected values.

For safety reasons, it is important to adjust zeroing and gas sensitivity.

If you purposely or automatically exit the application, the previous values will be maintained.

The sensor leaves the maintenance mode and returns to the measuring mode after 10 minutes of inactivity on the VALID or MENU / ▲▼.

## For infrared sensor versions

**This paragraph will be used for the XP-IR or OLCT IR sensor.** This menu is not available on other types of sensors.

In this case, the use of a XP-IR or OLCT-IR type infrared detection module it is imperative to zero the optics before proceeding as indicated in the *Optical zeroing* on page 45.

## Passage in calibration mode

| Step | Action | Illustration |
|---|---|---|
| 1a. | Position the magnet on the VALID for 3 seconds. |  |
| 1b. | Until the icon is displayed... |  |
| | ...present the magnet 3 consecutive times on the MENU / ▲▼ in the 3 seconds. |  |
| 1c. | The calibration menu (CAL) is displayed. |  |

## Zeroing

| Step | Action | Illustration |
|---|---|---|
| 2a. | The calibration menu (CAL) is displayed. |   |
| | Position the magnet once on VALID. | |
| 2b. | The display now shows a zero indicating the starting of the zero-setting phase. |   |
| 2c. | Position the magnet once on the VALID. | |
| 2d. | The display indicates the actual zero value (potential offset value). |   |
| 2e. | Place the injection cap and inject pure air from the bottle (flow at 30 to 60 liters/hr).<br>Wait approximately 2 minutes for the stabilization of the measure.<br>The zero of a CO2 sensor block must be tested with recycled bottled air or, even better, with nitrogen. Never consider ambient air as a zero value. | |
| 2f. | The display eventually indicates a value that is different than zero.<br>Position the magnet once on the VALID. The zero adjustment is validated. |   |
| 2g. | «GE» (*Standard gas*) is displayed to indicate that the system has switch over to the sensitivity adjustment phase. |   |

## Adjustment of gas sensitivity

### Accessing the sensitivity adjustment menu

| Step | Action | Illustration |
|---|---|---|
| 3a | «GE» (*Standard gas*) is displayed to indicate that the system has switched over to the sensitivity adjustment phase. |  |

### Establishing the concentration of standard gas

| Step | Action | Illustration |
|---|---|---|
| 4a | Position the magnet once on the VALID. | |
| 4b. | The displayed value corresponds to the default standard gas value, that is 50 in this case.<br>The hundredths digit flashes. |  |
| 4c. | ***Adjusting the second digit after decimal point***<br>Adjust the value of the hundredth figure by setting the magnet each time on MENU / ▲▼. Each time you activate the magnet, you increase the second digit after decimal point. |  |
| 4d. | Adjust the value of the hundredths by setting the magnet once on VALID. | |
| 4e. | ***Adjusting the first digit after decimal point***<br>The tenths digit flashes. Repeat the same procedure as for the hundredths. |  |
| 4f. | ***Adjusting the number of units***<br>The unit digit flashes. Repeat the same procedure as for the hundredths. |  |
| 4g | Validate the digit of the units by setting the magnet once on VALID. | |
| 4h. | End of the setting of the standard gas value. | |

**Injecting standard gas**

| Step | Action | Illustration |
|---|---|---|
| 5a. | The display indicates «S» (Sensitivity). |   |
| 5b. | Place the calibration shroud on the detector head and open the cock of the standard gas bottle (flow at 30 to 60 l/hr). | |
| 5c. | Position the magnet once on the VALID. | |
| 5d. | The displayed value keeps changing until it stabilizes. Wait approximately 2 minutes for the stabilization of the measure. |   |
| 5e. | As soon as the instrument stabilizes at a value, set the magnet on VALID once to exit the sensitivity adjustment function. Now go the next step as described on the following page. |   |

## Validating your calibration

| Step | Action | Illustration |
|---|---|---|
| 6a. | The display indicates «CnF» (*Confirmation*). |   |
| 6b. | Position the magnet once on the VALID. | |
| 6c. | The display indicates «nOn» (*No*). |   |
| 6d. | To validate and confirm your calibration values set the magnet once on MENU / ▲▼ to change *N* into *Yes* and then on VALID to confirm.<br>Continue as under paragraph *End of zero-poir adjustment and calibration*. |   |
| 6e | Otherwise place the magnet once on VALID.<br>When you do so, the detector will return to the measuring mode after 1 minute countdown without applying any of the previous adjustments. |   |

## End of the zero-setting and calibration procedure

| Step | Action | Illustration |
|---|---|---|
| 7a | The display will show for instance «59» and start counting these seconds down before switching the detector back on.<br>Please note: This value will depend on the typ of sensor. |  |
| 7b. | Close the cock of the standard gas bottle and remove the calibration shroud. | |
| 7c. | As soon as the countdown is over, the gas ambient concentration must be shown on the display. The detector is now active.<br>Restore the alarm signals on the central unit. |  |
| 7d. | If the display shows «dEF» (Default) followed by the fault number, it means that the detector is not active.<br>Check the fault code number (page 70) and implement the recommended remedies. See page 35. |  |

# Adjusting the optical zero (Ir-0)

(as in the case of XP-IR and OLCT-IR versions)

**This menu strictly applies for detectors types XP-IR and OLCT IR prior to calibration of the zero-point and the sensitivity or after cleaning of the optical parts (see page 40).**

**Cleaning of the optical parts is described in the manual of the OLCT-IR.**

## Selecting the menu

| Step | Action | Illustration |
|---|---|---|
| 1a. | Position the magnet on the VALID for 3 seconds. |   |
| 1b. | Until the icon is displayed... |   |
| | ...present the magnet 3 consecutive times on the MENU / ▲▼ in the 3 seconds. |   |
| 1c. | The calibration menu (CAL) is displayed. |   |
| 1d. | Place the magnet twice on MENU / ▲▼. | |
| 1e. | The calibration menu (*Ir-0*) is displayed. |   |
| 1f. | Inject pure air for 2 minutes and then just place the magnet on VALID. | |
| 1g. | The display indicates « CnF » (*Confirmation*). |   |
| 1h. | Position the magnet once on the VALID. | |

| | | |
|---|---|---|
| 1i. | The display indicates « nOn » (*No*). |  |
| 1j. | Position the magnet once on the MENU / ▲▼ to change *No* to *Yes* and adjust the optical zero point.<br>Position the magnet once on the VALID to validate the choice.<br>Please continue as in paragraph *Changing over to calibration mode*, page 40. |  |
| 1k. | Position the magnet on VALID to confirm *No* and exit the calibration function. |  |

# Applicable coefficients for explosive gas calibration

## Catalytic sensor type VQ1

The applicable coefficients are shown in the following table.

| Gas | Gross formula | LEL (%) | LSE (%) | Flash point(°C) | Vapour density | Coefficient Calibration of methane gas CH4 | Coefficient Calibration of methane gas CH4 | Coefficient Calibration of methane gas CH4 | Coefficient Calibration of methane gas CH4 |
|---|---|---|---|---|---|---|---|---|---|
| Acetone | C3H6O | 2,15 | 13,00 | -18 | 2,1 | 1,65 | 1,20 | 0,90 | 0,80 |
| Acetylene | C2H2 | 1,50 | 100 | -18 | 0,9 | 2,35 | 1,75 | 1,25 | 1,15 |
| Ammonia | NH3 | 15,00 | 30,20 | < -100 | 0,6 | 0,90 | 0,65 | 0,50 | 0,45 |
| Butane | C4H10 | 1,50 | 8,50 | -60 | 2,0 | 1,90 | 1,50 | 1,00 | 0,90 |
| Ethane | C2H6 | 3,00 | 15,50 | 135 | 1,0 | 1,50 | 1,10 | 0,80 | 0,75 |
| Ethanol | C2H6O | 3,30 | 19,00 | 13 | 1,6 | 2,15 | 1,70 | 1,30 | 1,00 |
| Petrol - Super SP95 | / | 1,10 | ~6,0 | 21 | 3 to 4 | 1,80 | 1,35 | 1,00 | 0,90 |
| Ethylene | C2H4 | 2,70 | 34,00 | - 135 | 1,0 | 1,65 | 1,20 | 0,90 | 0,80 |
| L.P.G. | Prop+But | 1,65 | ~9,0 | < -50 | 1,9 | 1,65 | 1,20 | 0,90 | 0,80 |
| Gas oil | Rocket fuel | 0,60 | ~6,0 | 55 | > 4 | 3,20 | 2,60 | 1,70 | 1,55 |
| Natural gas | CH4 | 5,00 | 15,00 | -188 | 0,6 | 1,05 | 0,75 | 0,60 | 0,55 |
| Heptane | C7H16 | 1,10 | 6,70 | -4 | 3,5 | 2,20 | 1,80 | 1,20 | 1,05 |
| Hexane | C6H14 | 1,20 | 7,40 | -23 | 3,0 | 2,10 | 1,70 | 1,15 | 1,05 |
| Hydrogen | H2 | 4,00 | 75,60 | - | 0,069 | 1,25 | 1,00 | 0,70 | 0,60 |
| Methane | CH4 | 5,00 | 15,00 | -188 | 0,55 | 1,00 | 0,75 | 0,55 | 0,50 |
| Nonane | C9H20 | 0,70% | 5,60 | 31 | 4,4 | 4,00 | 3,20 | 2,65 | 2,10 |
| Octane | C8H18 | 1,00 | 6,00 | 12 | 3,9 | 2,70 | 2,00 | 1,45 | 1,30 |
| Pentane | C5H12 | 1,40 | 8,00 | -49 | 2,5 | 2,10 | 1,70 | 1,15 | 1,00 |
| Propane | C3H8 | 2,00 | 9,5 | -104 | 1,6 | 1,55 | 1,10 | 0,85 | 0,75 |
| Propylene | C3H6 | 2,00 | 11,70 | -107,8 | 1,5 | 1,65 | 1,20 | 0,90 | 0,80 |
| Styrene | C8H8 | 1.1 | 8,00 | 31 | 3.6 | 6,30 | 5,30 | 3,50 | 3,00 |
| Toluene | C7H8 | 1,20 | 7 | 5 | 3,1 | 4,00 | 2,95 | 2,15 | 1,90 |
| Xylene | C8H10 | 1,00 | 7,60 | 25 | 3,7 | 4,00 | 2,90 | 2,15 | 1,90 |

: *recommended gas for detector calibration*

**Table 3: Coefficients for the calibration of catalytic detectors equipped with a standard sensor VQ1**

## Anti-poison sensor type 4F

The reference coefficients are:

| Raw | Formula gas | LEL LEL | LSE % | Vapour density | CH Coefficient$_4$ | H Coefficient$_2$ | Butane Coefficient |
|---|---|---|---|---|---|---|---|
| Acetone | $C_3H_6O$ | 2,15 | 13,0 | 2,1 | 2,24 | | 1,1 |
| Acetylene | $C_2H_2$ | 1,5 | 100 | 0,9 | 1,22 | 1,1 | |
| 2-Butanone | $C_4H_8O$ | 1,8 | 11,5 | 2,5 | 2,46 | | 1,2 |
| Ethylene | $C_2H_4$ | 2,7 | 34,0 | 0,98 | 1,47 | | |
| Natural gas | $CH_4$ | 5,0 | 15,0 | 0,55 | 1,05 | | |

: *recommended gas for detector calibration*

**Table 4: Coefficients for the calibration of catalytic detectors equipped with an anti-poison sensor 4F.**

***Example*** *(first line of the table)*
Calibration of an «acetone» detector with standard gas at 1% butane concentration.
Value to be entered when defining standard gas («GE», step 4b, page 42):
1% (injected butane) x 100 x 0.95 (butane/acetone coefficient) = 63 % LEL
1.5 % (LEL butane)

Please note:

- LEL values vary according to the source
- Coefficients are accurate to ± 15 %.
- For other gases/vapors consult our technical service.

.

## Checking the line current

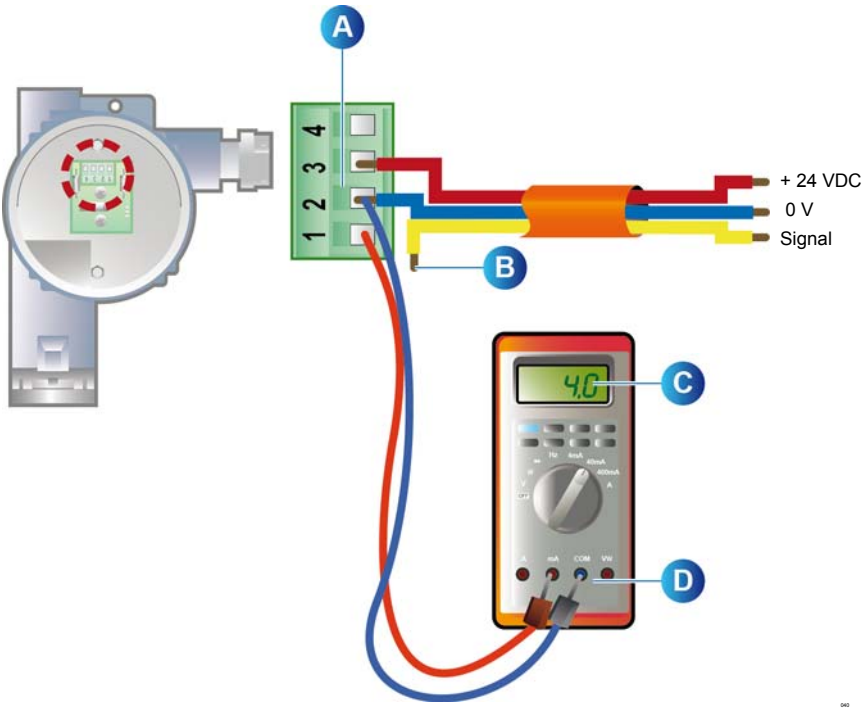



**Figure 29: Checking the current generator of the detector.**

Proceed as follows:

1. Checking the detector for proper power supply (+24V between terminal 2 and 3).
2. Switching the multimeter over to current measurement (0.20 or 0.40 mA scale).
3. Make sure to first inhibit the collection system in order to avoid any interference. Disconnect the signal wire (terminal 1, Pos. B) by branching the detector to acquisition system. Branch the «COM» terminal to the multimeter (Pos. D) to terminal 2 (0 V) of the detector (Pos. A).
4. Branch «mA» terminal to the multimeter (Pos. D) to terminal 1 (signal) of the detector (Pos. A).
5. The current must be 4 mA (Pos. C) when pure air is injected onto the sensor and 20 mA at standard gas concentrations of 100% of the reference measuring scale.
6. At end of all checks and controls, branch the signal wire on terminal 1 (Pos. B) with the acquisition system of the detector.

# Chapter 6 | Accessories

*The following accessories do not apply for OLCT60/OLCT-IR. For the latter please revert to the OLCT-IR manual.*

| Accessories | Utilization | Illustration | Illustration |
|---|---|---|---|
| Set of tools | Set of maintenance tools |  | 6147870 |
| OLCT60/OLCT IR calibration set | Please read OLCT IR manual The shroud is difference and the gas flow is adjustable between 60 and 120 l/h. |  | |
| Gas inlet pipe | makes standard gas filling into the sensor easier.<br>Effects on the measurement: similar measurement as for a natural distribution pattern.<br>Effects on response time: none. |  | 6331141 |
| Gas recirculation head | Allows *bypass* measuring.<br>Effects on measurement: no effect if calibration is done at the same conditions (pipe, flow).<br>Effects on response time: none. |  | 6327910 |
| Splash-guard | Protects the detector against splashing liquids.<br>Effects on measurement: none.<br>Effects on response time: the response time at natural diffusion may increase for certain gases.<br>Please consult our technical office. |  | 6792844 |
| Remote gas injection head | Allows the detection of ambient gases and concurrent detection of the presence of standard gas injection hose. Strictly for explosive gases.<br>Effects on the measurement: none.<br>Effects on response time: disregardable. |  | 6327911 |

| Accessories | Utilization | Illustration | Illustration |
|---|---|---|---|
| Mobile PTFE protection filter | Protects the gas inlet against splashing and powder contamination.<br>Effects on the measurement: no effect, but can be used to detect $O_3$, HCL, HF, $CL_2$.<br>Effects on response time: increased response time<br>(please ask our technical office for high-density gas > 3 and low concentrations < 10 ppm). |  | 6335975 |
| Ceiling gas collector | Allows the sensor to detect gas more quickly. (ceiling mount)<br>Effects on the measurement: none.<br>Effects on response time: may increase by 10% |  | 6323620 |
| Magnet | Used for menu selection through the detector glass. |  | 6155651 |

# Chapter 7 | Spare parts

*Spare parts list for different detectors*

Spare parts must be original INDUSTRIAL SCIENTIFIC parts. Use of non-original spare parts may impair safety of the instrument.

## Explosionproof sensor block

| Illustration | Description |
|---|---|
| 6 313 685 | OLCT60 0-100% LEL sensor block type VQ1 |
| 6 313 872 | OLCT60 0-100% LEL butadiene/acetylene sensor block type VQ1 |
| 6 313 974 | OLCT60 Anti-poison 0-100% LEL sensor block type 4F |
| 6 313 687 | OLCT60 0-100% vol CH4 sensor block |
| 6 313 986 | Sensor block OLCT60, 0-100% vol H2 or SF6 |
| 6 314 060 | Infrared sensor block 0-100% LEL CH4 (5% vol) for OLCT60 XP IR |
| 6 314 093 | Infrared sensor block 0-100% LEL CH4 (4.4% vol) for OLCT60 XP IR |
| 6 314 094 | Infrared sensor block 0-100% LEL C3H8 (propane) for OLCT60 XP IR |
| 6 314 095 | Infrared sensor block 0-100% LEL C4H10 (butane) for OLCT60 XP IR |
| 6 314 096 | Infrared sensor block 0-100% LEL Isobutane for OLCT60 XP IR |
| 6 314 098 | Infrared sensor block 0-100% LEL GPL (5% vol) for OLCT60 XP IR |
| 6 314 099 | Infrared sensor block 0-100%vol CH4 for OLCT60 XP IR |
| 6 314 100 | Infrared sensor block 0-5% vol. CO2 for OLCT60 XP IR |
| 6 314 101 | Infrared sensor block 0-10% vol. CO2 for OLCT60 XP IR |
| 6 313 710 | Sensor block OLCT60 02 0 – 30% vol |
| 6 313 688 | Cathalytic sensor block NH3 0-5000 ppm for OLCT60 |
| 6 313 707 | Sensor block OLCT60 NH3 0-100 ppm |
| 6 313 708 | Sensor block OLCT60 NH3 0-1000 ppm |
| 6 313 894 | Sensor block OLCT60 NH3 0-5000 ppm |

| Illustration | Description |
|---|---|
| 6 313 690 | Sensor block OLCT60 CO 0-100 ppm |
| 6 313 691 | Sensor block OLCT60 CO 0-300 ppm |
| 6 313 692 | Sensor block OLCT60 CO 0-1000 ppm |
| 6 313 693 | H2-compensated sensor block OLCT60 CO 0-1000 ppm |
| 6 313 695 | Sensor block OLCT60 H2S 0-30 ppm |
| 6 313 965 | Sensor block OLCT60 H2S 0-30 ppm, no HC-interference |
| 6 313 696 | Sensor block OLCT60 H2S 0-100 ppm |
| 6 313 697 | Sensor block OLCT60 H2S 0-1000 ppm |
| 6 313 698 | Sensor block OLCT60 NH3 0-100 ppm |
| 6 313 699 | Sensor block OLCT60 NH3 0-300 ppm |
| 6 313 700 | Sensor block OLCT60 NH3 0-1000 ppm |
| 6 313 706 | Sensor block OLCT60 H2  0-2000 ppm |
| 6 313 772 | Sensor block ADF OLCT60 methylene – methylene chloride |
| 6 313 773 | Sensor block ADF OLCT60 R12 |
| 6 313 774 | Sensor block ADF OLCT60 R134A |
| 6 313 775 | Sensor block ADF OLCT60 MOS |

## Intrinsically safe sensors

| Illustration | Description |
|---|---|
| 6 313 748 | Sensor block OLCT60 SI 02 0 – 30% vol |
| 6 313 728 | Sensor block OLCT60 SI NH3 0-100 ppm |
| 6 313 729 | Sensor block OLCT60 SI NH3 0-1000 ppm |
| 6 313 895 | Sensor block OLCT60 SI NH3 0-5000 ppm |
| 6 313 694 | H2-compensated sensor block OLCT60 SI CO 0-1000 ppm |
| 6 313 711 | Sensor block OLCT60 SI CO 0-100 ppm |
| 6 313 712 | Sensor block OLCT60 SI CO 0-300 ppm |
| 6 313 713 | Sensor block OLCT60 SI CO 0-1000 ppm |
| 6 313 716 | Sensor block OLCT60 SI H2S 0-30 ppm |
| 6 313 717 | Sensor block OLCT60 SI H2S 0-100 ppm |
| 6 313 718 | Sensor block OLCT60 SI H2S 0-1000 ppm |
| 6 313 719 | Sensor block OLCT60 SI NO 0-100 ppm |
| 6 313 720 | Sensor block OLCT60 SI NO 0-300 ppm |
| 6 313 721 | Sensor block OLCT60 SI NO 0-1000 ppm |
| 6 313 722 | Sensor block OLCT60 SI NO2 0-10 ppm |
| 6 313 723 | Sensor block OLCT60 SI NO2 0-30 ppm |
| 6 313 727 | Sensor block OLCT60 SI H2 0-2000 ppm |
| 6 313 730 | Sensor block OLCT60 SI HCl 0-30 ppm |
| 6 313 731 | Sensor block OLCT60 SI HCl 0-100 ppm |
| 6 313 724 | Sensor block OLCT60 SI SO2 0-10 ppm |
| 6 313 725 | Sensor block OLCT60 SI SO2 0-30 ppm |
| 6 313 726 | Sensor block OLCT60 SI SO2 0-100 ppm |
| 6 313 734 | Sensor block OLCT60 SI Cl2 0-10 ppm |
| 6 313 746 | Sensor block OLCT60 SI ETO 0-50 ppm |
| 6 313 732 | Sensor block OLCT60 SI HCN 0-10 ppm |
| 6 313 733 | Sensor block OLCT60 SI HCN 0-30 ppm |
| 6 313 736 | Sensor block OLCT60 SI COCl2 0-1 ppm |
| 6 313 740 | Sensor block OLCT60 SI ClO2 0-3 ppm |
| 6 313 735 | Sensor block OLCT60 SI O3 0-1 ppm |

| Illustration | Description |
|---|---|
| 6 313 737 | Sensor block OLCT60 SI PH3 0-1 ppm |
| 6 313 739 | Sensor block OLCT60 SI HF 0-10 ppm |
| 6 313 738 | Sensor block OLCT60 SI ASH3 0-1 ppm |
| 6 313 747 | Sensor block OLCT60 SI SiH4 0-50 ppm |

# Chapter 8 | IEC Statement of compliance

The page below reproduces the EC statement of compliance for the detector series OLCT60.

**DECLARATION DE CONFORMITE CONSTRUCTEUR**
**Manufacturer Declaration of Conformity**

**INDUSTRIAL SCIENTIFIC**

CE

ATMOSPHÈRES EXPLOSIVES – INERIS – EXPLOSIVE ATMOSPHERES

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

**I) 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** : **INERIS 01ATEX0027X**
*( N° of EC type examination certificate )*

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

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

Ex 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, Annex 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 >=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**: INERIS, rue Taffanel, 60550 Verneuil en Halatte, France.
*(Issued by the Notified Body n°0080)*

**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** : EN 50270 - 1999
*(Harmonised applied Standards)*

CE/ATEX119 rev d

*Arras, le 20/10/09* **La Personne Autorisée ATEX**
*The ATEX Authorized Representative*

**Lionel Witrant**
Directeur Technique
*Engineering Director*

AFAQ ISO 9001 VERSION 2000

**Industrial Scientific Oldham**
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62027 ARRAS Cedex – FRANCE
Tel +33 3 21 60 80 80
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INDUSTRIAL SCIENTIFIC
OLDHAM

# DECLARATION DE CONFORMITE CONSTRUCTEUR

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:

## Détecteur de gaz OLCT IR

**I) Directive Européenne ATEX 94/9/CE du 23/03/94 : Atmosphères Explosives**

N° Attestation CE de Type du matériel : **INERIS 03ATEX0141X**

**Normes européennes de référence :**

a) Règles de Construction: EN 60079-0, EN60079-1, EN60079-7, EN60079-11, EN 61241-0, EN61241-1
T ambiante : -50°C +65°C

Version OLCT IR E: II 2 GD / Ex d e ia IIC T4 Ex tD A21 IP66 T135°C

Version OLCT IR M25 ou ¾ NPT : II 2 GD / Ex d e IIC T4 Ex tD A21 IP66 T135°C

b) Quand relié aux centrales de détection MX32, MX42A, MX48, MX52, MX62 ou autres centrales de détection conformes à la Directive ATEX 94/9/CE, Annexe II, Ch1.5

- Performances métrologiques pour la détection des gaz combustibles:
  EN 61779-1, EN 61779-4 (gaz de référence Méthane et Propane)
- Exigences et essais pour les appareils utilisant du logiciel
  EN 50271 (Version logicielle OLCT IR >=1.35)

c) Sécurité de fonctionnement pour: la détection des gaz combustibles : EN50402 (Version logicielle OLCT IR >=1.4)

Processus de développement : EN61508 (niveau SIL2, phases 1 à 9, 13 à 15)

Données de fiabilité :

| SIL Capability | $\lambda_{DU}$ | $PFD_{AVG}$ | SFF | DC | MTBF |
|---|---|---|---|---|---|
| SIL 2 | 3.5 10-7/h | 1.6 10-3 | 90% | 72.3% | 28 ans |

(Note : se reporter à la notice d'utilisation pour les conditions d'utilisation)

**N° de la Notification Assurance Qualité de Production de l'usine d'Arras :** INERIS 00ATEXQ403

**Délivrés par l'Organisme notifié sous le numéro 0080:** INERIS, rue Taffanel, 60550 Verneuil en Halatte, France.

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

**Normes harmonisées appliquées :** EN 50270

*Arras, le 17/02/09* **La Personne Autorisée ATEX**

**Lionel Witrant**

Directeur Technique
*Engineering Director*

CE/ATEX 109 rev G

**Industrial Scientific Oldham**
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Fax +33 3 21 60 80 00

# Chapter 9 | Technical specifications

## Dimensional characteristics

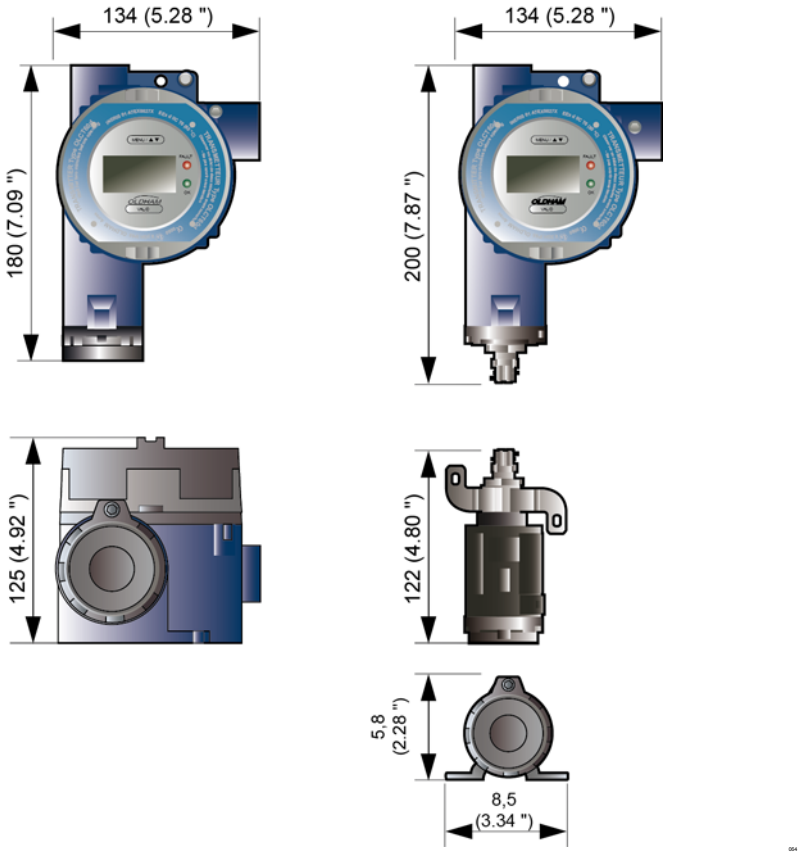


**Figure 30: Dimensional characteristics of OLCT60 detectors with fixed and mobile sensor.**

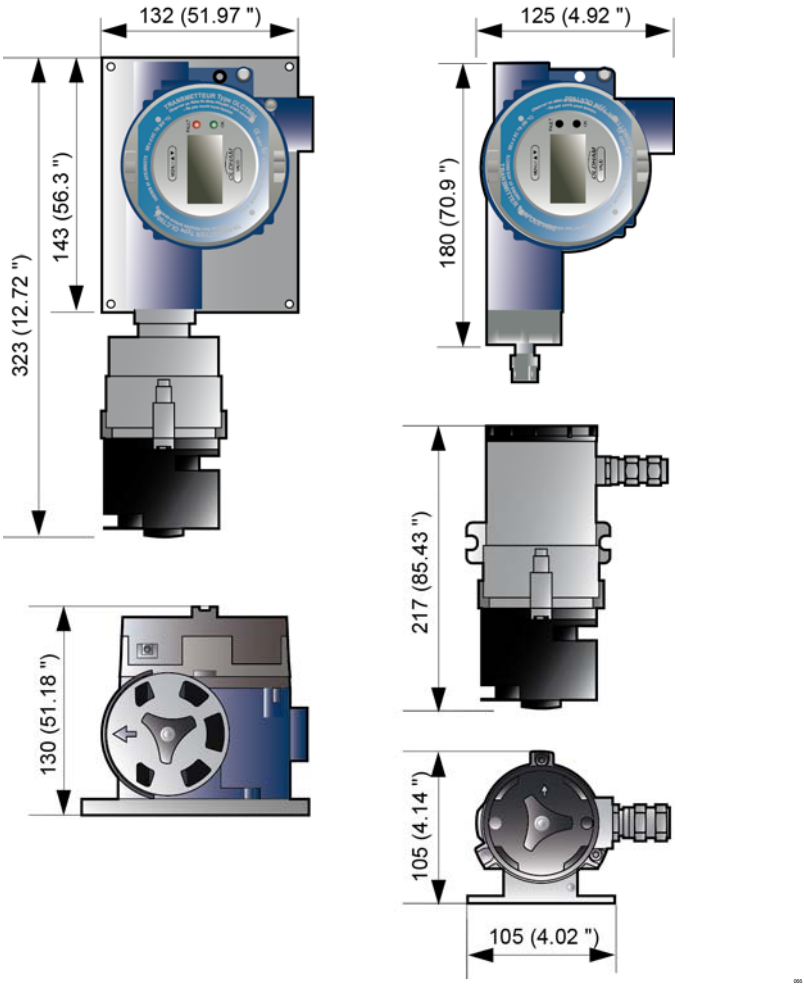


**Figure 31: Dimensional characteristics of OLCT 60/OLDT-IR detectors with fixed and mobile sensor.**

## Complete detector

| | |
|---|---|
| Power supply to the detector terminals: | 15 - 30 Vcc. |
| Average consumption based on the sensor block type (active display): | ▪ Catalytic: 140 mA.<br>▪ Electrochemical: 80 mA.<br>▪ XP-IR infrared: 120 mA.<br>▪ Infrared OLCT IR: 550 mA. |
| Output current (signal) : | ▪ Current source encoded from 0 - 23 mA (non isolated)<br>▪ Linear 4 to 20 mA current reserved for measurement<br>▪ Electronic fault or no power supply : 0 mA.<br>▪ Fault: <1 mA.<br>▪ Maintenance mode: 2 mA.<br>▪ Off-scale: Current greater than 23 mA.<br>▪ Uncertainty factor: 20 mA. |
| Maximum resistance per cable conductor (with *Oldham* control unit) : | ▪ Catalytic: 32 Ω loop (1 km and 1.5 mm2)<br>▪ Electrochemical: 48 Ω loop (1.5 km and 1.5 mm2)<br>▪ XP-IR infrared: 48 Ω loop (1.5 km and 1.5 mm2)<br>▪ infrared OLCT IR: 8 Ω loop (250 m and 1.5 mm2) |
| Maximum load resistance | ▪ 250 Ω (catalytic or electrochemical sensor block).<br>▪ 250 Ω (XP IR sensor block).<br>▪ 250 Ω (XP IR sensor block). |
| Display : | ▪ 4 digit LCD with background illumination.<br>▪ Pictograms indicating the active function.<br>▪ Menu display<br>▪ Green LED (OK): Powering up.<br>▪ Orange LED (FAULT): fault or maintenance. |
| Type of cable: | 3 active wires screened between detector and centralized unit. |
| Cable inlet: | Integrated gland type M25 is standard. Other types on request. |
| Maximum cable diameter handled by the detector : | 2 -12 mm for integrated glands. |
| Electromagnetic compatibility: | to EN 50270. |
| Protection class | IP66. |

| | |
|---|---|
| Explosive environments: | *(ADF version)*<br>Ex d IIC T6. Ambient temperature: –20 °C à +60°C.<br>  II 2 GD.<br>*Version with SI sensor block, toxic gas and oxygen only*<br>Ex d [ia] ia IIC T4<br>Ambient temperature: –20 °C à +60°C.<br>  II 2 GD.<br>Please note: Ambient temp. = 55°C with inbuilt gland.<br>*Fixed version OLCT IR*<br>Ex d IIC T6 (for OLCT60)<br>Ex de IIC T4 (for OLCT IR M25)<br>  II 2 GD.<br>*Mobile version OLCT IR*<br>Ex d IIC T6 (for OLCT60)<br>Ex de ia IIC T4 (for mobile OLCT IR)<br>  II 2 GD. |
| Mass weight: | ▪ 1.6 kg without sensor block.<br>▪ 2.1 kg with sensor block.<br>▪ 4,1 kg with OLCT-IR block. |
| Materials: | Painted aluminum with epoxy polyester coating. |
| Operation temperature: | Electronics: -25 °C à +55 °C.<br>Sensors: according to the type of sensor. |
| Stocking temperature: | Electronics: -25 °C à +60 °C.<br>Sensors: according to the type of sensor. |
| Type of detected gas and range of measurement: | Depending on the connected sensor block. See following paragraphs. |

# Measuring sensors

| Type of gas | | Measuring range (ppm) | ADF sensor | SI sensor | Temperature range (°C) | % HR | Precision (ppm) | Average life (months) | Tps pos. T50/T90 (s) | Storage time and conditions |
|---|---|---|---|---|---|---|---|---|---|---|
| Explosive gas | Infrared OLCT IR | 0-100% LEL | ■ | | -25 to +55 | 0 – 99 | +/- 5% (CH4)<br>+/- 3% (HC) | >60 | 9/15 (CH4) (e)<br>7/8 (CH4) (f) | (a) |
| | Infrared XP IR | 0-100% LEL | ■ | | -25 to +55 | 0 – 95 | +/- 5% | 48 | 11/30 (CH4) | (a) |
| | Catalytic | 0-100% LEL | ■ | | -25 to +55 | 0-95 | +/-1 % LEL (from 0 through 70% LEL) | 40 | 6/15 (CH4) | (b) |
| AsH3 | Arsine | 1,00 | | ■ | -20 to +40 | 20 – 90 | +/- 0,05 | 18 | 30/120 | (a) |
| Cl2 | Chlorine | 10,0 | | ■ | -20 to +40 | 10 – 90 | +/- 0,4 | 24 | 10/60 | (a) |
| ClO2 | Chlorine dioxide | 3,00 | | ■ | -20 to +40 | 10 – 90 | +/- 0,3 | 24 | 20/120 | (a) |
| CO | Carbon monoxide | 100<br>300<br>1000 | ■<br>■<br>■ | ■<br>■<br>■ | -20 to +50 | 15 – 90 | +/- 3<br>(range: 0-100) | 40 | 15/40 | (a) |
| CO2 | Carbon dioxide | 0-5% vol. | ■ | | -25 to +55 | 0 – 95 | +/- 3% | 48 | 11/30 | (a) |
| COCl2 | Phosgene | 1,00 | | ■ | -20 to +40 | 15 – 90 | +/- 0,05 | 12 | 60/180 | © |
| ETO | Ethylene oxide | 30,0 | | ■ | -20 to +50 | 15 – 90 | +/- 1,0 | 36 | 50/240 | (a) |
| H2 | Hydrogen | 2000 | ■ | ■ | -20 to +50 | 15 – 90 | +/- 5% | 24 | 30/50 | (a) |
| H2S | Hydrogen sulphide | 30,0<br>100<br>1000 | ■<br>■<br>■ | ■<br>■<br>■ | -25 to +50 | 15 – 90 | +/- 1.5<br>(range: 0-30) | 36 | 15/30 | (a) |
| HCl | Hydrogen chloride | 30,0<br>100 | | ■ | -20 to +40 | 15-95 | +/- 0.4<br>(range: 0-30) | 24 | 30/150 | (a) |
| HCN | Hydrogen cyanide | 30,0 | | ■ | -25 to +40 | 15-95 | +/- 0.3<br>(range: 0-10) | 18 | 30/120 | © |
| HF | Hydrogen fluoride | 10,0 | | ■ | -10 to +30 | 20 – 80 | +/- 5% | 12 | 40/90 | © |
| NH3 | Ammonia | 100<br>1000<br>5000 | ■<br>■<br>■ | ■<br>■<br>■ | -20 to +40 | 15 – 90 | +/- 5<br>+/- 20<br>+/- 150 or 10% | 24 | 25/70<br>20/60<br>60/180 | (a) |
| NO | Nitrogen monoxide | 100<br>300<br>1000 | ■<br>■<br>■ | ■<br>■<br>■ | -20 to +50 | 15 – 90 | +/- 2<br>(range: 0-100) | 36 | 10/30 | (a) |
| NO2 | Nitrogen dioxide | 30,0 | | | -20 to +50 | 15-90 | +/-0,8 | 24 | 30/60 | (a) |
| O2 | Oxygen | 0-30% vol. | ■ | ■ | -20 to +50 | 15 – 90 | 0,4% Vol (15 through 22% O2) | 28 | 6/15 | (a) |
| O3 | Ozone | 1,00 | | ■ | 0 to +40 | 10 – 90 | +/- 0,03 (0 through 0,2 ppm) +/- 0,05 (0,2 through 1 ppm) | 18 | 40/120 | © |
| PH3 | Phosphine | 1,00 | | ■ | -20 to +40 | 20 – 90 | +/- 0,05 | 18 | 30/120 | (a) |
| SiH4 | Silane | 50,0 | | ■ | -20 to +40 | 20 – 95 | +/- 1,0 | 18 | 25/120 | (a) |

| Type of gas | | Measuring range (ppm) | ADF sensor | SI sensor | Temperature range (°C) | % HR | Precision (ppm) | Average life (months) | Tps pos. T50/T90 (s) | Storage time and conditions |
|---|---|---|---|---|---|---|---|---|---|---|
| SO2 | Sulphur dioxide | 10,0<br>30,0<br>100 | | ■<br>■<br>■ | -20 to +50 | 15 – 90 | +/- 0.7 (range: 0-10) | 36 | 15/45 | (a) |
| CH3Cl | Chloro-methane | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| CH3Cl | Dichloro-methane | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R12 | | 1 % vol. | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R22 | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R123 | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| FX56 | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R134 a | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R142 b | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R1 1 | | 1 % vol. | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R23 | | 1 % vol. | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R141 b | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R143 a | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R404 a | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R507 | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R410 a | | 1000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R32 | | 1000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |

| Type of gas | | Measuring range (ppm) | ADF sensor | SI sensor | Temperature range (°C) | % HR | Precision (ppm) | Average life (months) | Tps pos. T50/T90 (s) | Storage time and conditions |
|---|---|---|---|---|---|---|---|---|---|---|
| Freon R227 | | 1 % vol. | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R407 c | | 1000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Freon R408 a | | 1000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/90 | (d) |
| Ethanol | | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/60 | (d) |
| Toluene | | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/60 | (d) |
| Isopropanol | | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/60 | (d) |
| 2-Butanone (MEK) | | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/60 | (d) |
| Xylene | | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (20 through 70% PE) | 40 | 25/60 | (d) |

a) +4°C through +20°C.
20 % □hrough 60 % HR
1 bar ± 10 %
maximum 6 months

b) -25°C through +60°C.
20 % □hrough 60 % HR
1 bar ± 10 %
maximum 6 months

© +4°C through +20°C.
20 % □hrough 60 % HR
1 bar ± 10 %
maximum 3 months

(d) -20°C through +50°C.
20 % □hrough 60 % HR
1 bar ± 10 %
maximum 6 months

e) with shroud

f) without shroud

# Chapter 10 | Special instructions for use in explosive environments and functional safety

## General comments

The OLCT60 sensors conform to the requirements of European Directive ATEX 94/9/CE relating to explosive Dust and Gas atmospheres. On account of their metrological performance as tested by the accredited organization INERIS, the OLCT60 transmitter detectors intended for the measurement of explosive gases are classed as safety devices according with the European Directive and may, therefore, contribute to limiting the risks of explosion.

The information given in the following sections should be respected and taken into account by the manager of the site where the equipment is installed. As far as the aim of improving the health and safety of workers who are exposed to the risks of explosive atmospheres is concerned, refer to European Directive ATEX 1999/92/CE.

## Metrological performance for the detection of flammable gases

OLCT60 detectors are equipped with a VQ1 catalytic sensor in compliance with IEC / EN 60079-29-1. Suitability requirements for use as flammable gas, class 0-100% LEL Group II, reference gas 0-100% LEL Methane and Propane.

These detectors are classed as safety devices according to ATEX 94/9/CE and may, therefore, contribute to limiting the risks of explosion. For this to be so, they must be connected to Oldham type MX15, MX32, MX42A, MX43, MX48, MX52 or MX62 detection units, or otherwise connected to measurement units with 4-20 Ma inputs conforming to section 1.5 of Annex II of Atex Directive 94/9/CE and compatible with their characteristics (see transfer curve).

### Cable inlets:

These shall be of a type certified for use in explosive atmospheres. They shall be protected to (or better than) IP66 and shall be installed in accordance with standard ICE/EN 60079-14 (whatever edition is in force), and possibly in accordance with further

requirements related to the local or national regulations. The cables should be suitable for use at a temperature equal to or greater than 80°C.

## Threaded joints

The threaded joints on the OLCT60 may be lubricated to maintain explosion-proof protection. Only non-hardening lubricants or non-corrosive agents having no volatile solvents may be used. Warning: silicone based lubricants are strictly forbidden, since they contaminate the OLCT60 detector elements.

## Operating safety

The detector is certified by INERIS to be in conformity with the requirements of standard EN 50402 for *SIL capability 1* et *2* for the CH4 and HC versions. Applicable since 2005, these Standards are concerned with electrical apparatuses for the detection and measurement of oxygen or toxic or flammable gases or vapors, and define the requirements relating to the safety function of fixed gas detection systems. The detector has been developed in conformity with standard EN/CEI 61508. The safety function of the OLCT60 detector is the detection of flammable gases using catalytic technology and a 4-20 Ma current output proportional to the gas concentration expressed as a percentage of LEL, respectively from 0 to 100% LEL. In the event of a power failure, the output current will assume a fall-back value less than or equal to 1 Ma or greater than or equal to 23 Ma. The safety function is no longer valid after power has been switched on, during the time take by the measuring sensor stabilize, and during start-up tests, the output current shall be in maintenance mode (2 Ma).

## Reliability data

The analysis reported by INERIS with no. CGR 74448 of July 6$^{th}$ 2006 has allowed the assessment of the following datum: Annual failure rate of combustible gas detectors: $\boldsymbol{\lambda_{DU}}$ **annual = 4,42.10$^{-2}$** equipped with a catalytic sensor VQ1. The gas detector OLCT60 is compliant to EN50271. As mentioned under the field of application of the foregoing Standards, the detector may be also used for industrial applications requiring an integrity level 1 or 2 to CEI61508. The maintenance period should not exceed 6 and 3 months respectively for a SIL Capability Level 1 and 2.

Please note: the calculated failure rates are strictly valid over the actual life time of the most sensitive elements (limited time interval 3 – 5 years). Past this term, the foregoing rate is no longer significant due to aging of the measuring sensors.

# Chapter 10 | Fault and error codes

## Errors (*E xx*)

Errors are exclusively generated when a communication trouble occurs between the sensor and the internal board. Errors are identified in the following format *Exx* (whereas *xx* corresponds to the error code). No corrective action is possible for the operator. In this case, sensors must be returned to the manufacturer or his local agent.

| N° | Cause |
|---|---|
| 35 à 39 | Communication error with the sensor |
| 40-42 | Communication error with the infrared sensor block (OLCT-IR). |


**Figure 32: Example of communication errors**

## Faults (*dEF xx*)

A fault signal alerts about a material fault (voltage, sensor etc...)

Here below is the list of possible faults. Please note that the occurrence of more than one fault is not displayed by showing a sequence of the reference code numbers but rather by adding them up to each other.

If , for example, a zero fault (code 1) and a sensitivity fault (code 2) are detected, the display will show the fault code 3. In this case the analogic output signal will equal 1 mA.

| N° | Cause |
|---|---|
| 1 | Zero fault after calibration |
| 2 | Sensitivity fault after calibration |
| 4 | Sensor worn out after calibration |
| 8 | Memory problem. |
| 16 | Excessive negative signal. |
| 32 | Measuring beyond upper range. |
| 64 | Fault after an internal control |
| 256 | Line voltage too low. |
| 512 | RAM memory problem. |
| 1024 | Memory programmation problem. |
| ABS | No sensor block. |

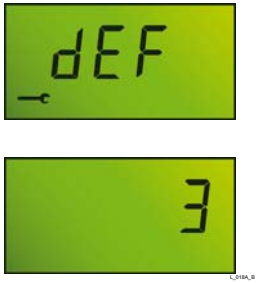


**Figure 33: Display example of a fault code 3.**

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## Z

# We guarantee

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To respond quickly and efficiently to your consultancy needs or order tracking throughout the world via our customer service department.

To respond as rapidly as possible to all questions of a technical nature.

## 2 Quality

TO assure you of the best quality of our products and service in conformity with the international Standards and directives in force.

## 3 Inspection & Reliability

To provide you with reliable equipment. The quality of our production is an essential condition for this reliability. This is guaranteed by virtue of very strict checks that are carried out when raw materials come in, both during the course of and at the end of manufacture (all equipment that is sent out is configured to your individual requirements).

## 4 Commissioning

If required, to commission your equipment by our Ism-ATEX qualified specialists. An extra safety guarantee.

## 5 Training

To provide targeted training programs.

## 6 Project department

Our team will investigate all your gas and flame detection projects via on-site investigations or from drawings. . We can even suggest pre-project studies, design, installation and maintenance of the safety system in ATEX or non ATEX zones in accordance with the applicable rules

## 7 Maintenance contract

To suggest revolving maintenance contracts that are tailored to your needs in order to guarantee you perfect safety:

- One or more annual visits, including consumables
- Renewable by tacit agreement,
- Including adjustment of fixed or portable gas detectors, and inspection of control systems.

## 8 On-site repair

To rapidly send our **After Sales Service specialists** to you. This is made possible by our facilities in France and abroad.

## 9 Factory repairs

To deal with any problem that cannot be resolved on-site by dispatching the equipment back to the factory. Teams of **specialist technicians** will get to work on repairing your equipment as quickly as possible, thereby minimizing your downtime.

For all After Sales Service in France, contact us by email at servicecenter@oldhamgas.com or by **telephone to 0800-OLDHAM (0800 653 426).**

OUR MISSION

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