TELEDYNE
OLDHAM SIMTRONICS
Everywhereyoulook™

# USER MANUAL

# OLCT 60

FIXED POINTGAS MONITOR

User Manuals in other languages are available on Website https://teledynegasandflamedetection.com



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.

TELEDYNE OLDHAM SIMTRONICS S.A.S.

Rue Orfila

Z.I. Est – C.S. 20417

F – 62027 ARRAS Cedex

Thank you for choosing this TELEDYNE OLDHAM SIMTRONICS S.A.S. instrument.

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

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

## Limitation of Liability

The Company TELEDYNE OLDHAM SIMTRONICS S.A.S., hereinafter referred to as "TELEDYNE OLDHAM SIMTRONICS" throughout this document, shall not be held responsible for any damage to the equipment or for any physical injury or death resulting in whole or in part from the inappropriate use or installation of the equipment, non-compliance with any and all instructions, warnings, standards and/or regulations in force.

No business, person or legal entity may assume responsibility on behalf of TELEDYNE OLDHAM SIMTRONICS, even though they may be involved in the sale of TELEDYNE OLDHAM SIMTRONICS products.

TELEDYNE OLDHAM SIMTRONICS shall not be responsible for any direct or indirect damage, or any direct or indirect consequence, resulting from the sale and use of any of its products **UNLESS SUCH PRODUCTS HAVE BEEN SELECTED BY TELEDYNE OLDHAM SIMTRONICS ACCORDING TO THE APPLICATION**.

## Ownership clauses

The drawings, specifications, and information herein contain confidential information that is the property of TELEDYNE OLDHAM SIMTRONICS.

This information shall not, either in whole or in part, by physical, electronic, or any other means whatsoever, be reproduced, copied, divulged, translated, or used as the basis for the manufacture or sale of TELEDYNE OLDHAM SIMTRONICS equipment, or for any other reason **without the prior written consent of TELEDYNE OLDHAM SIMTRONICS.**

## Warnings

This is not a contractual document. In the best interest of its customers and with the aim of improving performance, **TELEDYNE OLDHAM SIMTRONICS** reserves the right to alter the technical features of its equipment without prior notice.

**READ THESE INSTRUCTIONS CAREFULLY BEFORE THE FIRST USAGE:** these instructions should be read by all persons who have or will have responsibility for the use, maintenance, or repair of the instrument.

This instrument shall only be deemed to be in conformance with the published performance if used, maintained, and repaired in accordance with the instructions of TELEDYNE OLDHAM SIMTRONICS, by TELEDYNE OLDHAM SIMTRONICS personnel, or by personnel authorized by TELEDYNE OLDHAM SIMTRONICS.

# Important Information

The modification of the material and the use of parts of an unspecified origin shall entail the cancellation of any form of warranty.

The use of the unit has been projected for the applications specified in the technical characteristics. Exceeding the indicated values cannot in any case be authorized.

Catalytic sensors are susceptible to poisoning by traces of several substances. This leads to an inhibition which can be permanent or temporary depending on the contaminant, the concentration of the contaminant, the duration of exposure to the contaminant.

Poisoning may result from exposure to substances as:

- silicones (e.g. waterproofing, adhesives, release agents, special oils and greases, certain medical products, commercial cleaning agents)
- tetraethyl lead (e.g. leaded petrol, particularly aviation petrol 'Avgas')
- sulfur compounds (sulfur dioxide, hydrogen sulfide)
- halogenated compounds (R134a, HFO, etc.)
- organo-phosphorus compounds (e.g. herbicides, insecticides, and phosphate esters in fireproof hydraulic fluids

TELEDYNE OLDHAM SIMTRONICS recommends regular testing of fixed gas detection installations (read Preventive maintenance).

# Warranty

Under normal conditions of use and on return to the factory, parts and workmanship are guaranteed for 2 years, excluding consumables such as sensors, filters, etc.

# Disposal of the equipment

**European Union 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.

# Contents

# 1 Overview

OLCT 60 gas detectors are 4-20mA and 3-wire transmitters designed for measuring combustible and toxic gases as well as oxygen.

OLCT 60 is available in two versions:

- Flameproof certified enclosure along with flameproof certified sensor block. **This version is listed as OLCT 60d**.
- Flameproof certified enclosure along with intrinsically safe certified sensor block. This version is available for electrochemical sensors only. **This version is listed as OLCT 60id.**

Available versions are listed below.

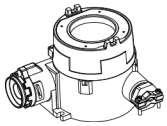
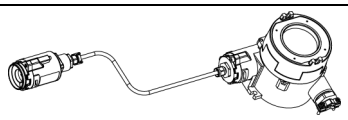
| | OLCT 60d | OLCT 60id |
|---|---|---|
| Catalytic sensor | ☑ | |
| Electrochemical sensor | ☑ | ☑ |
| Remote detector type GD10P | ☑ | |

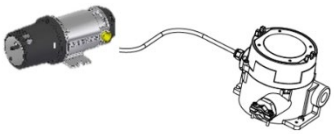
**Table 1: Comparison of OLCT 60 detectors**

Each version features two options:

- OLCT 60 version with on-board sensor. The sensor can either be flameproof or intrinsically safe certified depending on the version of the detector.
- OLCT 60D version with remote sensor. The sensor can either be flameproof or intrinsically safe certified depending on the version of the detector.

Available combinations are listed below.

| Name | Description | Illustration |
|---|---|---|
| OLCT 60 | Flameproof enclosure with on-board sensor (FLP or IS*) |  |
| OLCT 60D | Flameproof enclosure with remote sensor 15m (FLP or IS*) |  |

| Name | Description | Illustration |
|---|---|---|
| | Flameproof enclosure with remote transmitter type GD10P** |  |

(*) FLP stands for flameproof, IS stands for intrinsically safe. The IS version is distinguished - among other features - by the color of its housing which is blue. FLP versions are unpainted stainless steel.

## 1.1 Operating principle

The sensor converts the target gas into current. The current value is amplified, temperature compensated, linearized, and converted to a 4-20 mA signal proportional to the gas concentration and then conveyed through a connecting cable to a centralization system (gas controller or PLC).

Sensor type depends on the gas to be detected and the version of OLCT 60 as shown in Table 1: **Comparison of OLCT 60 detectors** on page 1.

## 1.2 Composition of the Detector

OLCT 60 detectors contain the following parts:

| Id. | Description |
|---|---|
| 1. | Label |
| 2. | Cover |
| 3. | Display board |
| 4. | Terminal board |
| 5. | On-board sensor |
| 6. | Enclosure |
| 7. | M25 cable gland (until August 2014) |
| 8. | Remote sensor |
| 9. | Cable for remote sensor |
| 10. | Adapter |
| 12. | Remote GD10P transmitter |

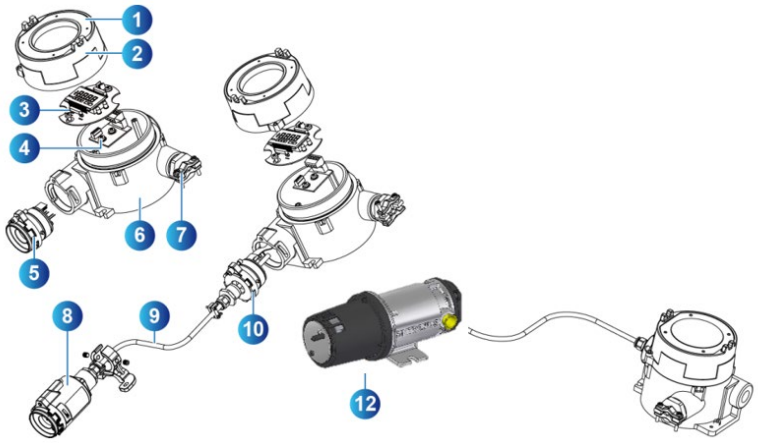
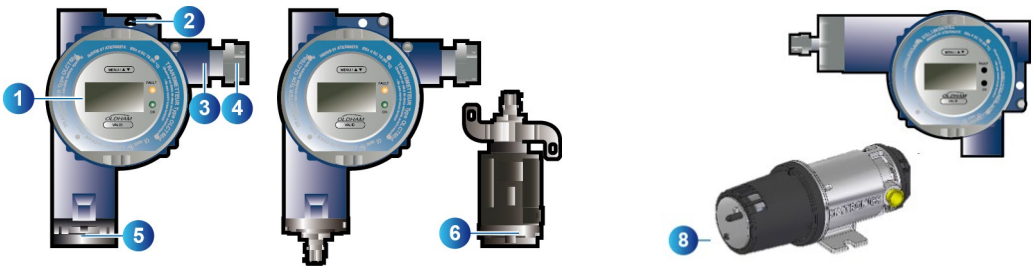



Figure 1: Main components of OLCT 60 detectors

## 1.3 External view

### 1.3.1 Overview

| Id. | Description |
|---|---|
| 1. | Digital display. See Figure 3 for more details. |
| 2. | Ground terminal |
| 3. | Cover fixation screw |
| 4. | Cable gland (until August 2014) |
| 5. | On-board sensor. |
| 6. | Remote sensor. |
| 8. | Remote GD10P transmitter. |




OLCT 60 OLCT 60D with remote sensor block OLCT 60 with GD10P remote

Figure 2: OLCT 60 overview

### 1.3.2 Difference between FLP and IS sensors

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

- Flameproof sensor: unpainted Stainless steel enclosure equipped with a flame arrestor,
- Intrinsically safe sensor: blue painted Stainless steel enclosure equipped a PTFE membrane.

### 1.3.3 Display and LEDs

| Id. | Description |
|---|---|
| 1. | Digital display indicates:<br>Gas concentration and gas type alternately with gas unit. If an error occurs, the respective error code is displayed and Fault LED is lit on. Please revert to section Readings on the display, page 6.<br>Maintenance menus. Please revert to section Menus, page 7. |
| 2. | Magnetic switch |
| 3. | Fault LED (orange) |
| 4. | Power LED (green) |
| 5. | Magnetic switch |
| 6. | Magnetic wand |


Figure 3: General Status Screen

## 1.4 Internal view

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

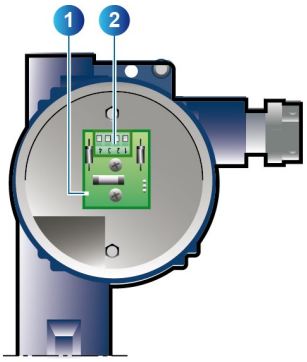



**Figure 4: Detector internal view (with display board removed)**

## 1.5 Labels and pictograms

The detector has two identification labels, as shown below:

### 1.5.1 Certification label

| Id. | Description |
|---|---|
| 1. | ATEX marking |
| 2. | Type of product |
| 3. | Manufacturer's name |
| 4. | Marking and certification temperature range in Hazardous area (is not the operating temperature range) |
| 5. | Warning |
| 6. | CE and ATEX marking |


**Figure 5: Certification label**

### 1.5.2 P/N label

This label is located on the side of the enclosure and contains the following information:

| Id. | Description |
|---|---|
| 1. | Part Number of the OLCT 60 without sensor |
| 2. | Disposal icon |
| 3. | Serial Number : The first two digits (in this case 10) correspond to the year of manufacture (in this case 2010) |

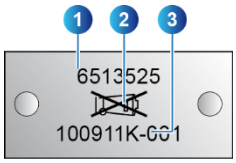



**Figure 6: Side label**

# 1.6 Visual indication

## 1.6.1 At startup

Display shows:

- Initialization screen. All LCD segments and LEDs turn on


- Firmware version


- Batch number


- Serial Number


- Gas concentration reading once initialization and stabilization are completed


**Figure 7: Warm-up screen**

## 1.6.2 In normal operation

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

| Indicator | Lit | Off |
|---|---|---|
| OK | OLCT 60 is powered | OLCT 60 is not powered |
| FAULT | Detector in fault or in maintenance mode<br>See Fault mode screen | Normal Operation |



**Figure 8: OLCT 60 in normal operating mode**

## 1.6.3 Fault mode screen

The display indicates DEF or the fault code (see page **Erreur ! Signet non défini.** for more warning code information). Simultaneously, the *FAULT* indicator lights on and the icon is displayed.


**Figure 9: OLCT 60 in fault mode**

### Maintenance Menus

They allow maintenance operations to be carried out (calibration, resetting of cell parameters, verification of the correct functioning of the display and the output current generator).

---

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 does not concern intrinsically safe versions that are used in an ATEX gas zone

---

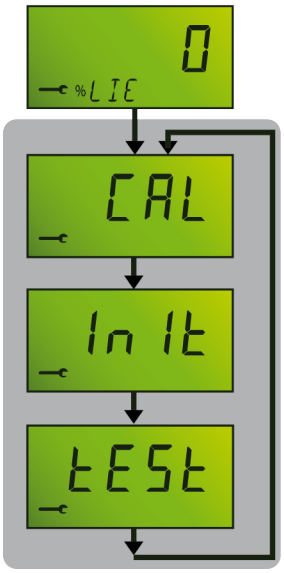
### Access

You can access the menus without opening the enclosure thanks to a magnet (rep. 1) that must be placed over VALID (rep. 2).


**Figure 10: place the magnet over 'VALID' to access the menus**

### Gas calibration menu

The OLCT 60 detector has three menus (CAL, INIT and TEST).




Normal operating mode
(page 18)

(page 26)

(page 350)

(page 35)

**Figure 11: Gas calibration menu**

- CAL: zero and span calibration. See page 26.
- Init: sensor replacement. See page 24.
- Test: Check Leds, LCD and current output See page 35

# 2 Installation

Please read the guidelines on the installation, use and maintenance of detectors for detection of flammable gases and oxygen (standard EN/IEC 60079-29-2) and toxic gases (standard EN 45544-4).

## 2.1 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.
- The equipment is authorized for use in Zones 1, 2, 21 and 22 and is certified for ambient temperatures from -20 °C to + 60 °C. **Note that this is not the operating temperature which, by the way, is sensor dependent.**
- Regarding the OLCT 60D-id version, the remote sensor can be used in zones 0, 1, 2, 20, 21 and 22. The transmitter itself is for use in zones 1, 2, 21 and 22 only.
- The detector must always be in contact with the ambient air. Thus:
  - Do not cover the sensor,
  - Do not paint the sensor,
  - Avoid dust deposits.

## 2.2 Necessary equipment

- Complete detector assembly
- Cable
- Tools
- Fixing hardware
- Multimeter (intrinsically safe certified when needed)

## 2.3 Location of the detector

Depending on the density of the gas to be detected or the application, the detector shall be positioned at ground level, or on the ceiling at the same height as the airflow, or near air extraction ducts. Heavy gases may be detected at the ground level, while light gases will be found at ceiling height. Gas densities are found on page 30.

# 2.4 Detector positioning

## 2.4.1 All versions excluding GD10P

The OLCT 60 will be installed with the sensor pointing downwards. Any tilt of more than 45° from the vertical will lead to an inaccurate measurement.

Fixing the enclosure will be performed by using 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 chapter *Accessories*).

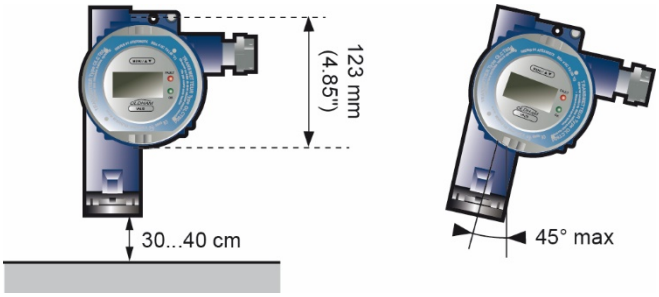



Figure 12: installation of an OLCT 60 with on-board sensor

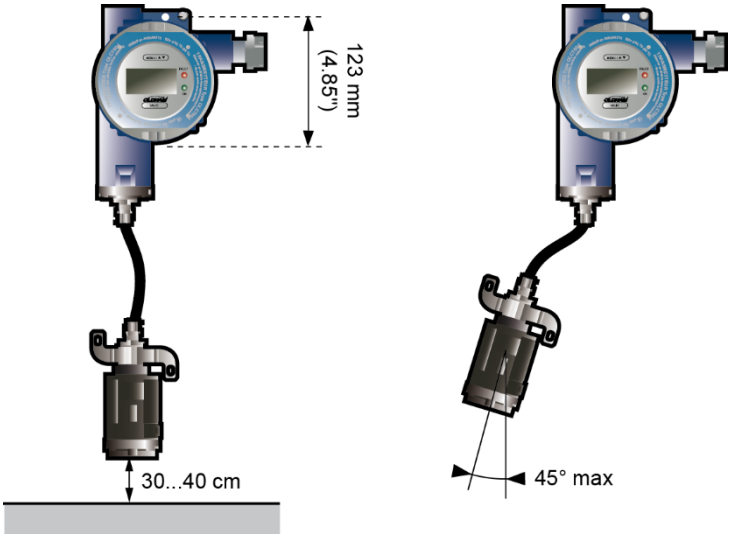



Figure 13: installation of an OLCT 60D with remote sensor

## 2.4.2 OLCT 60 with GD10P

The GD10P detector shall be installed horizontally with the red indicator pointing upwards.

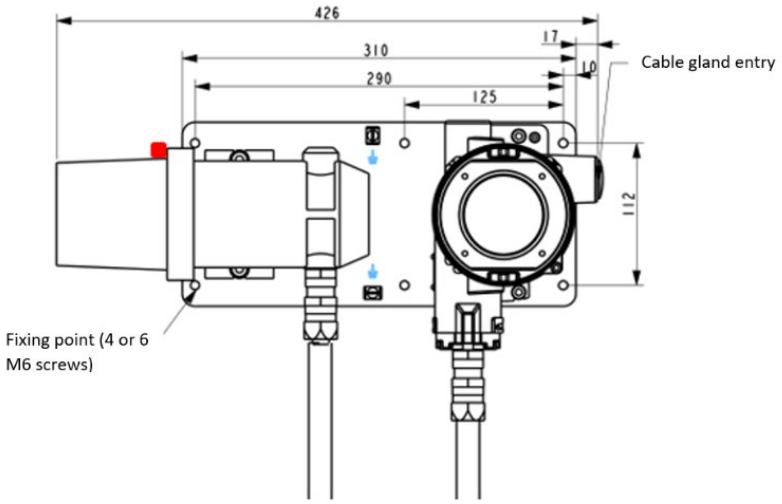



Figure 14: GD10P detector MUST be laid horizontally, indicator pointing upwards

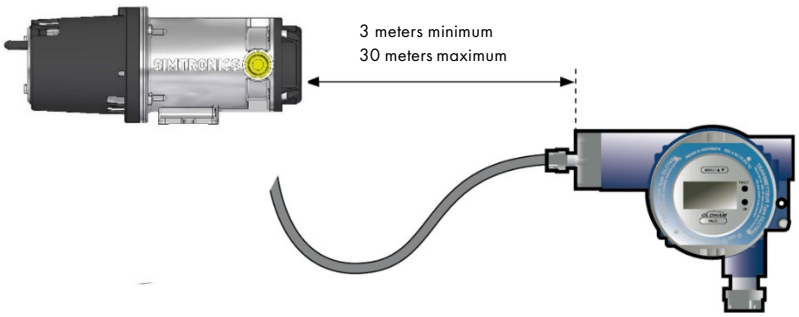



Figure 15: OLCT IR detector must be laid horizontally, indicator pointing upwards

## 2.5 Electrical Specifications

| Type of sensor | Input Voltage (Vdc) | Maximum current (mA) | Power consumption (W) |
|---|---|---|---|
| Catalytic | 16 to 32 | 140 | 2.5 |
| Infrared (sensor) | 16 to 32 | 120 | 2.0 |
| Infrared (GD10P) | 18 to 32 | 300 | 7.2 |
| Electrochemical | 16 to 32 | 80 | 1.3 |
| Semiconductor | 16 to 32 | 140 | 2.5 |

## 2.6 Connecting cable

The detector shall be connected to the controller with a 3-wire shielded cable. Core size depends on the specific requirements of the installation, the distance and type of detector (see table below).

| Type of detector | Type of sensor | Maximum length (km) depending on the core size | | | Maximum load resistance (Ω) |
|---|---|---|---|---|---|
| | | 0..5mm² (AWG 20) | 0.9 mm² (AWG 18) | 1.5 mm ² (AWG 15) | |
| Explosimeter | Catalytic | 0.55 | 1.0 | 1.7 | 250 |
| Explosimeter | Infrared (GD10P) | 0.40 | 0.80 | 1.4 | 250 |
| 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: Maximum distance cable (with 24 Vcc at controller terminals)**

The cable must be shielded 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:

Safe area: 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.

## 2.7 Cable connection

### 2.7.1 Turn off the line

On the controller:

1. Inhibit any alarms to prevent false alarms during operation.
2. Switch off the power supply to the detector.

## 2.7.2 Opening of the detector

Loosen the 4mm hex screw (rep.1) locking the cover before removing the detector cover.


Figure 16: Locking screw of the cover

## 2.7.3 Cable preparation

The cable will be supplied from the controller at the measurement point. The passage, support, and protection of the cable shall be done according to best practice.

## 2.7.4 Cable entry

It is essential to follow the instructions given by the manufacturer of the cable gland and to connect the shielding properly. Cable-gland or adaptor shall be M25 x 1.5 and flameproof certified.

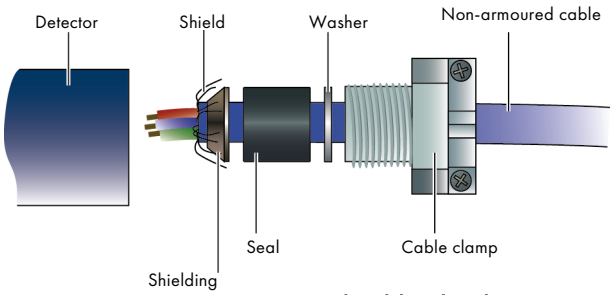



Figure 17: non-armoured cable gland type

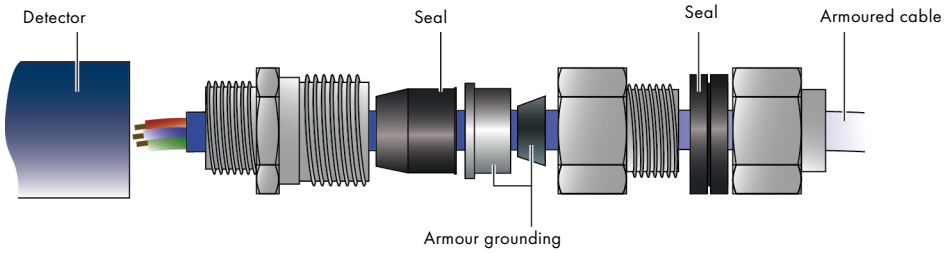



Figure 18: armoured cable gland type

## 2.7.5 Cable connection (OLCT 60)

Remove power before wiring the OLCT 60 to the controller. The site must be equipotential.

Connect the cable to the detector first and then connect the controller. Once the wiring is completed, connect the shield of the cable to the ground terminal of the controller.

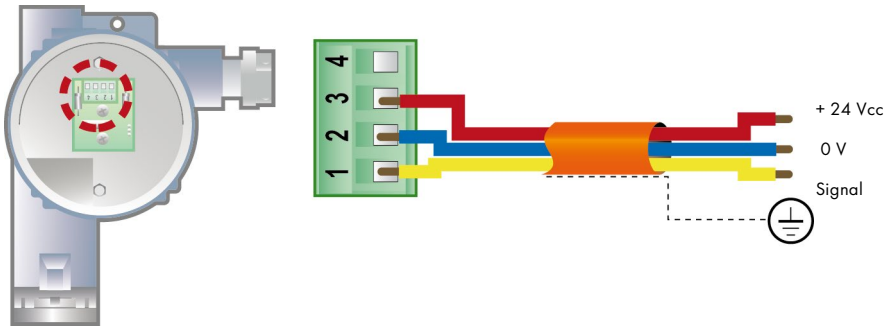


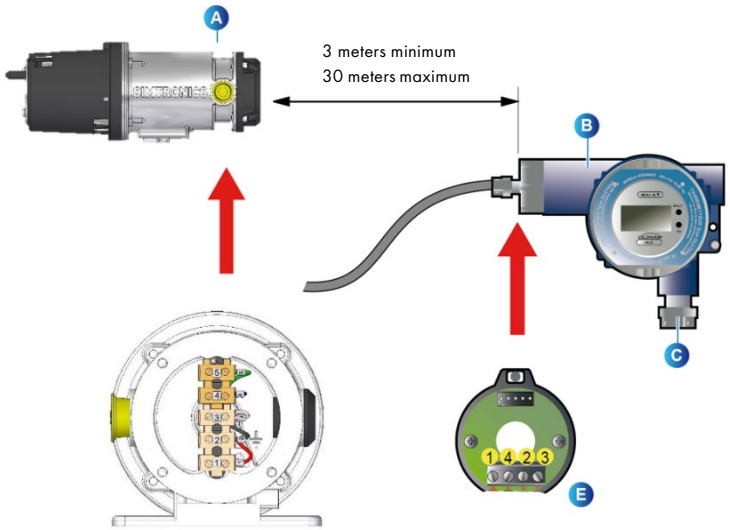

Figure 19: wiring the OLCT 60 (d or id version)

## 2.7.6 Cable connection (OLCT 60/DG10P remote)

Remove power before wiring the OLCT 60 to the controller. The site must be equipotential.

First carry out the connection between the GD10P (rep. A) and the detector (rep. B) as shown in Figure 20. The minimum distance is 3 meters minimum and the maximum is 30 meters (100 feet). The type of cable to use is 01-IT-09-EG-FA or EG-SF or similar, see page 12.

Then connect the OLCT 60 as described previously.



| GD10P | OLCT60 |
|---|---|
| 1 (+24Vdc) | 3 (+24Vdc) |
| 2 (0V) | 2 (0V) |
| 3 (mA) | 1 (mA) |
| 4 (not used) | 4 (not used) |
| 5 (not used) | N/A |

**Figure 20: wiring the OLCT 60D/GD10P.**
**Ensure the specificity of the numbering between GD10P and the OLCT 60D.**

## 2.7.7 Detector grounding

Connect the enclosure ground points to earth according to the regulations with a 4mm² (11 AWG) wire.

The OLCT 60 features an internal ground point as well. The internal grounding shall be preferred as the primary equipment ground.

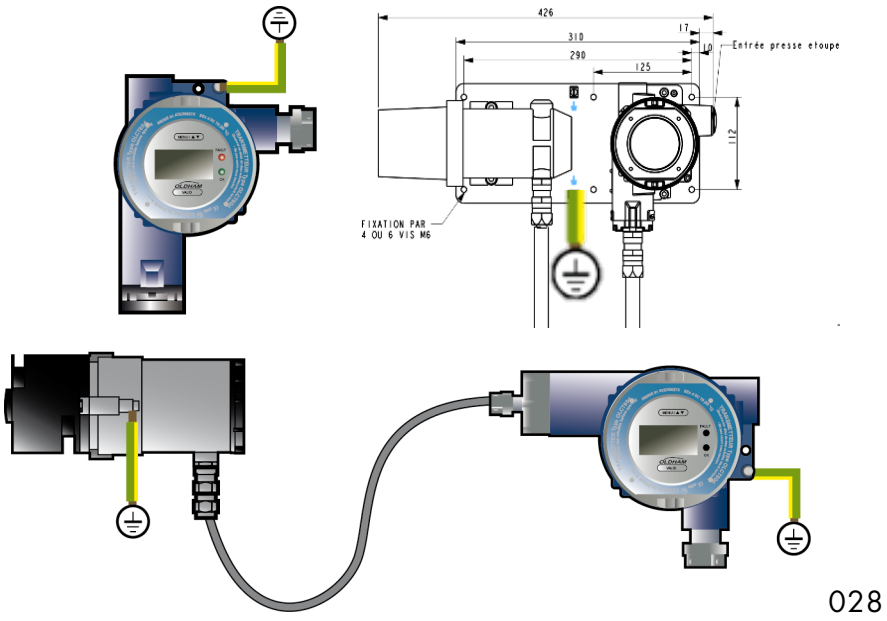



**Figure 21: OLCT 60 grounding**

## 2.7.8 Closing the cover

Before connecting the OLCT 60 to the controller, the cover shall be tightly closed. Firmly tighten the locking screw as well (see Figure 16, page 13).

## 2.8 Scope of use

Gas sensors have limitations that must be observed (see Special instructions for use in explosive environments and functional safety).

### 2.8.1 Presence of specific components

- Vapors from components containing silicone or sulfur can affect the catalytic sensors and thereby distort measurements. If sensors have been exposed to these types of compounds, a bump test shall be performed.
- 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 O2 overestimate).

### 2.8.2 Operation under low oxygen levels

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

## 2.9 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 Oldham, you should be certain 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.

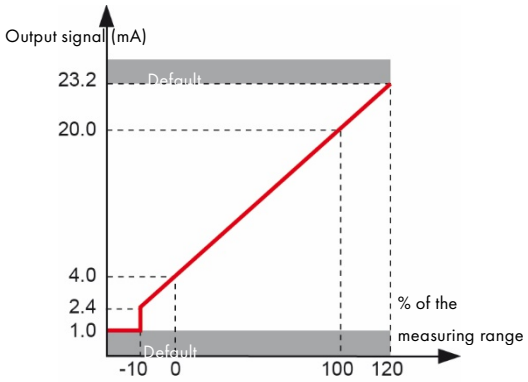



Figure 22: OLCT 60 transfer curve

# 3 Commissioning and operating modes

The tasks described in this chapter should only be performed by authorized and trained personnel as they are likely to jeopardize the reliability of detection.

This chapter describes:

- how to check the zero
- how to check the sensitivity
- the various operating modes

## 3.1 Purpose of control

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

However, for safety, it is advisable to check the zero and the sensitivity as shown below.

The detector cover shall remain completely closed since the adjustments are carried out through the window.

For flammable gas detector, we always recommend to calibrate the sensor with the targeted gas. When the user wishes to calibrate the detector with a different gas, refer to the table on page 30 for the use of recommended gas and corresponding coefficient.

## 3.2 Necessary equipment

- Zero grade air cylinder
- Appropriate span gas cylinder (gas concentration should be between 30 and 70% of the measurement range)
- Calibration cup (see Chapter *Accessories*)

# 3.3 Commissioning

## 3.3.1 Prior checks

Check the following points:

- Wiring completed
- Detector grounded
- Shielding grounded at controller side
- Integrity of the mechanical mounting (fixings, cable gland, and cover) ensured

## 3.3.2 Powering up detector

1. Inhibit any alarms to avoid false alarms during operation
2. Apply power to the OLCT 60

# 3.4 Stabilization time

Before initial calibration allow the detector to stabilize after applying power. Any adjustment before the time indicated will result in an incorrect measurement, which may in turn compromise the safety. The total waiting time is summarized below:

- Catalytic bead sensor: 2 hours
- Oxygen sensor: 1 hour (2 year sensor) to 1.5 hour (5 year sensor)
- Electrochemical sensor: 1 hour, excluding:
  - NO (Nitrogen Monoxide): 12 hours
  - HCl (Hydrogen Chloride): 24 hours
  - ETO (Ethylene Oxide): 36 hours
  - CVM (Vinyl chloride): 7 days
- Semiconductor sensor: 4 hours
- Infrared sensors and GD10P: 1 hour

# 3.5 Display of the gas measurement

## 3.5.1 Normal operating mode

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

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


**Figure 23: Normal operating mode**

### 3.5.2 Fault mode

In fault condition, the display indicates «dEF» followed by the fault code.

In the event of an internal electronic error, the display indicates «E» followed by the error code.

In both cases, the *FAULT* indicator is lit. Proceed with the corrective action in compliance with page **Erreur ! Signet non défini.**. See page **Erreur ! Signet non défini.** for more warning code information.


**Figure 24: Fault mode**

### 3.5.3 Over-Range condition

(catalytic version only)

For safety reasons, when measuring a concentration of a flammable gas above 100% LEL, the display indicates «SUP» and the *FAULT* indicator is lit. Meanwhile the analog output signal is set at 23.2 mA.

To exit this mode, swipe the magnet over MENU / ▲▼ once you have checked the absence of any explosive atmosphere with a portable combustible gas monitor for example.


**Figure 25: Over-Range indication**

## 3.6 Checking Zero

Proceed as follows:

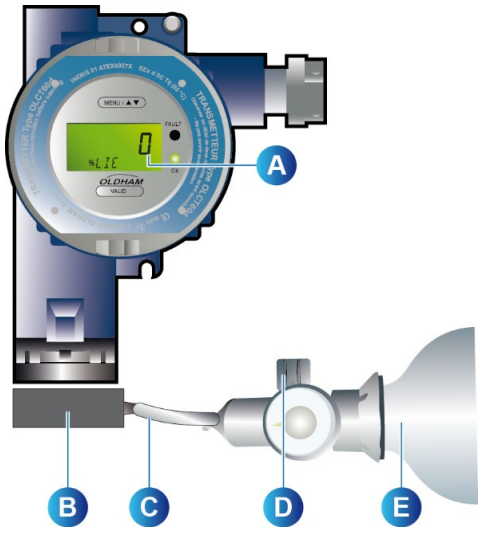



**Figure 26: Checking Zero**

1. Inhibit any alarms on the controller.
2. Place the calibration cup over the sensor (Figure 26, rep. B).
3. Connect the calibration cup to the zero gas cylinder (rep. E) by using a tubing in PTFE (Pos. C).

4. Apply the gas (flow regulator set to 0.5-1.0 liter per minute (LPM). For GD10P versions refer to GD10P manual.
5. Once the measure is stabilized (approx. 2 minutes), read the value on the display (rep. A).
6. If the expected value does not comply, proceed with the calibration (paragraph *Zeroing and sensitivity adjustment*, on page 26).
7. Continue with *Checking gas sensitivity* on the next page.

## 3.7 Checking gas sensitivity

For safety reasons, this procedure must be carried out after the control of the zero (page 18). Proceed as follows:

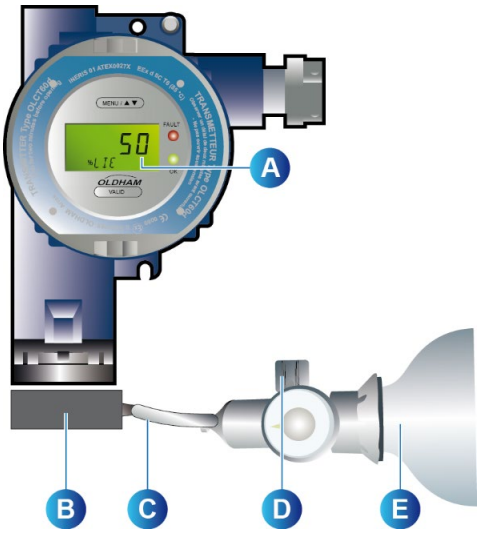



**Figure 27: Checking gas sensitivity**

1. Once the detector is zeroed, connect the calibration cup to the calibration gas cylinder (Pos. E) by using a tubing in PTFE (Pos. C) to prevent the adsorption of reactive gases (i.e.: HCl, SO2, Cl2, etc.) at the surface of the tube.
2. Open the valve on the gas cylinder (flow rate 0.5 to 1 LPM. In the case of GD10P versions refer to GD10P manual.
3. Once the measurement is stabilized (approx. 2 minutes), read the value on the display (rep. A).
4. If the expected value does not comply, proceed with the calibration (paragraph Zeroing and sensitivity adjustment, on page 26).
5. Close the valve (rep. D) of the gas cylinder and remove the calibration cup (rep. B). Wait for the measurement to return to zero and reset the alarms on the controller. The control of zero and gas sensitivity is now completed.

# 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 EN/IEC 60079-17 standard in force or with other national standards.*

## 4.1 Maintenance schedule

Gas detectors are safety devices. TELEDYNE OLDHAM SIMTRONICS recommends the regular testing of fixed gas detection installations. This type of test consists of injecting the calibration 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. If a detector should fail to react in contact with the gas, calibration is essential. The frequency of calibrations shall be appropriate according to the results of the tests (humidity, temperature, dust, etc.); however, it must not exceed one year.

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

## 4.2 Actions

### 4.2.1 OLCT 60

Periodic maintenance comprises the following actions:

- Removal of dust from the sensor and its optional protective cover with a dry cloth only. No water or solvents should be used. Severely dusty 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 any screws on the flameproof part need to be replaced, screws of equal quality or better than A4.70 should be used.
- Zero inspection with zero grade air; see page 19. In case of variance, comply with the actions described in this paragraph.
- Gas sensitivity check; see page 19. In case of variance, comply with the actions described in this paragraph.

### 4.2.2 OLCT 60/ GD10P

Refer to the specific GD10P manual.

# 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 EN/IEC 60079-17 standards in force or with other national standards.

## 5.1 Possible errors

The table below summarizes the various possible detector errors.

| Observed default | Possible cause | Action | (page ) |
|---|---|---|---|
| current output is at 0 mA | Connector cable | Check cable | 34 |
| | Power supply | Check voltage at detector terminal | - |
| | Electronic card | Change board | - |
| 0 mA < current output < 1mA | Sensor | Change sensor | 23 |
| | Line resistance too high | Check cable | - |
| | Power supply | Check voltage at detector terminal | - |
| | Improper calibration gas | Check the content of the calibration gas | - |
| current output is at 0.83 mA | GD10P optics are duty<br>GD10P in fault | | refer to the GD10P manual |
| Zero setting not possible | Sensor | Change sensor | 23 |
| | Electronic card | Change board | |
| Sensitivity adjustment not possible | Sensor | Change sensor | 23 |
| | Electronic card | Change board | |
| «SUP» display | Over-Range condition | Valid with the magnet | 19 |
| | | Check the span | 28 |

## 5.2 Replacing sensor block

The sensor block or detection module encloses the sensitive element 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 LEL detection module.

### 5.2.1 Frequency of replacement

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

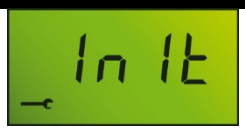
### 5.2.2 Exchanging of the sensor

| Step | Action |
|---|---|
| 1. | Prepare the following elements:<br>New sensor block<br>4 mm Allen wrench<br>Calibration set (gas cylinder, calibration cup, etc.). |
| 2. | Inhibit the alarms on the controller. |
| 3. | Turn the OLCT 60 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. | Power the OLCT 60. |
| 9. | Install the OLCT 60 as explained in detail in the Initialization of the sensor block paragraph on page **Erreur ! Signet non défini.**. |

## 5.3 Initialization of the sensor block

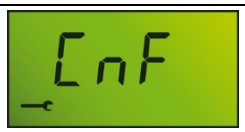
### 5.3.1 Selection of the initializing menu (*Init*)

| Step | Action | Illustration |
|---|---|---|
| 1a. | After the startup phase, the screen will show the gas measurement (it may be wrong at this point). Place the magnet over 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 over MENU / ▲▼. | |

| Step | Action | Illustration |
|---|---|---|
| 1e. | The initialization menu (Init) is displayed. |  |

## 5.3.2 Initialization of the sensor block

This procedure resets the electrical parameters of the sensor.

| Step | Action | Illustration |
|---|---|---|
| 2a. | The *Init* screen is displayed, place the magnet over VALID. |  |
| 2b. | The display indicates «CnF» (*Confirmation*). |  |
| 2c. | Place the magnet over VALID. | |
| 2d. | The display indicates «nOn» (*No*). |  |
| 2e. | Place the magnet over MENU / ▲▼ to change *No* to *Yes*. |  |
| 2f. | Place the magnet over 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. |  |

| Step | Action | Illustration |
|---|---|---|
| 2k. | Countdown starts before return in normal mode. |   |
| 2l. | When the countdown is ended, the display shows the gas measurement. The OLCT 60 is in normal mode. |   |
| 2m. | Subsequently check the gas operation as explained on pages 19 and 19. | |

## 5.4 Zeroing and sensitivity adjustment (calibration)

This paragraph will be followed to the extent that the zero control (page 19) and/or the sensitivity (page 19) show a variance from the expected values.

For safety reasons, it is important to proceed with the full calibration (zero and span settings).

In the event of a voluntary or an automatic abandon of the procedure, the previous values will be maintained.

OLCT 60 leaves the maintenance mode and returns to normal operation after 10 minutes of inactivity on the VALID or MENU / ▲▼.

The detector cover shall remain completely closed since the adjustments are carried out through the window.

For flammable gas detector, we always recommend to calibrate the sensor with the targeted gas. When the user wishes to calibrate the detector with a different gas, refer to the table on page 30 for the use of recommended gas and corresponding coefficient.

**FOR GD10P infrared versions**
It is imperative to clean the optics before proceeding zero as indicated in the GD10P manual.

### 5.4.1 Passage in calibration mode

| Step | Action | Illustration |
|---|---|---|
| 1a. | Place the magnet over VALID for 3 seconds. |   |

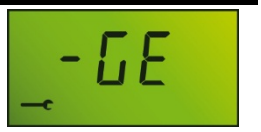
| Step | Action | Illustration |
|---|---|---|
| 1b. | Until the icon is displayed... |  |
| | ...present the magnet 3 consecutive times on the MENU / ▲▼ in the 3 seconds. |  |
| 1c. | The calibration menu (CAL) is displayed. | |

## 5.4.2 Zeroing

| Step | Action | Illustration |
|---|---|---|
| 2a. | The calibration menu (CAL) is displayed. |  |
| | Position the magnet over VALID. | |
| 2b. | The display now shows "-0-" indicating the beginning of the zero-setting phase. |  |
| 2c. | Position the magnet over VALID. | |
| 2d. | The display indicates the current value. |  |
| 2e. | Place the calibration cup and inject zero grade air at 0.5 to 1 LPM (for GD10P versions refer to GD10P manual).<br>Wait approximately 2 minutes for the stabilization of the measure.<br>The zero of a CO2 sensor block must be tested with a zero grade air cylinder or with nitrogen. Never consider ambient air as a zero value. | |
| 2f. | The display eventually indicates a value that is different than zero.<br>Place the magnet over VALID to confirm the zero adjustment. |  |
| 2g. | «GE» (Span Gas) is displayed to indicate that the system has switched over to the sensitivity adjustment phase. |  |

## 5.4.3 Adjustment of gas sensitivity

### Accessing the sensitivity adjustment menu

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

### Setting the Span Gas concentration

| Step | Action | Illustration |
|---|---|---|
| 4a | Place the magnet over VALID. | |
| 4b. | The displayed value corresponds to the span gas value by default (50 in the example).<br>The hundreds digit flashes. |  |
| 4c. | Adjusting the hundreds<br>Adjust the value of the hundreds by placing the magnet over MENU / ▲▼. Each time you place the magnet over, you increase the digit value. |  |
| 4d. | Confirm the value by placing the magnet over VALID. | |
| 4e. | Adjusting the tens<br>The tens digit flashes. Repeat the same procedure as for the hundreds. |  |
| 4f. | Adjusting the units<br>The unit digit flashes. Repeat the same procedure as for the hundreds. |  |
| 4g | Validate the digit of the units by placing the magnet over VALID<br>. | |
| 4h. | End of the procedure. | |

### Injecting calibration gas

| Step | Action | Illustration |
|---|---|---|
| 5a. | The display indicates «S» (Sensitivity). |  |
| 5b. | Place the calibration cup on the sensor and inject the span gas at flow rate between 0.5 and 1 LPM (for GD10P versions refer | |

| Step | Action | Illustration |
|---|---|---|
| | to GD10P manual). | |
| 5c. | Position the magnet over 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, place the magnet over VALID to exit the sensitivity adjustment function. Continue to step 6a. |  |

## 5.4.4 Validating your calibration

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

## 5.4.5 End of the zero-setting and calibration procedure

| Step | Action | Illustration |
|---|---|---|
| 7a | The OLCT 60 starts a countdown before returning in normal operation mode.<br>Please note: The countdown time is sensor dependent. |  |
| 7b. | Close the cock of the calibration gas cylinder and remove the calibration cup. | |
| 7c. | As soon as the countdown is over, the ambient gas concentration must be shown on the display. The detector is now in normal operation mode.<br>Restore the alarms on the controller. |  |
| 7d. | If the display shows «dEF» (Fault) followed by the fault number, it means that the detector is not operational.<br>Check the fault code number (page 59) and implement the recommended remedies. See page **Erreur ! Signet non défini.**. |  |

# 5.5 Applicable coefficients for explosive gas calibration

## 5.5.1 Catalytic sensor type VQ1

The applicable coefficients are shown in the following table.

| Gas | Chemical Formula | LEL (%) | LSE (%) | Flash point (°C) | Vapor density | Coefficient - Calibration gas CH4 (methane) | Coefficient - Calibration gas H2 (Hydrogen) | Coefficient - Calibration gas C4H10 (Butane) | Coefficient - Calibration gas C5H12 (Pentane) |
|---|---|---|---|---|---|---|---|---|---|
| Ethyl acetate | C4H8O2 | 2,10 | 11,50 | -4 | 3,0 | 1,65 | 1,35 | 0,90 | 0,80 |
| Acetone | C3H6O | 2,15 | 13,00 | -18 | 2,1 | 1,65 | 1,35 | 0,90 | 0,80 |
| Acetylene | C2H2 | 2,30 | 100 | -18 | 0,9 | 2,35 | 1,90 | 1,25 | 1,15 |
| Acrylic acid | C3H4O2 | 2,40 | 8,00 | 54 | 2,5 | 5,00 | 4,00 | 2,65 | 2,40 |
| Butyl acrylate | C7H12O2 | 1,20 | 8,00 | 37 | 4,4 | 3,50 | 2,80 | 1,85 | 1,70 |
| Ethyl acrylate | C5H8O2 | 1,70 | 13,00 | -2 | 3,5 | 3,05 | 2,45 | 1,65 | 1,50 |
| Acrylonitrile | C3H3N | 2,80 | 28,00 | -1 | 1,8 | 1,45 | 1,20 | 0,80 | 0,70 |
| Ammoniac | NH3 | 15,00 | 30,20 | < -100 | 0,6 | 0,90 | 0,75 | 0,50 | 0,45 |
| Benzene | C6H6 | 1,20 | 8,00 | -11 | 2,7 | 4,00 | 3,20 | 2,15 | 1,90 |
| 1.3-Butadiene | C4H6 | 1,40 | 16,30 | -85 | 1,9 | 2,55 | 2,05 | 1,35 | 1,25 |
| Butane | C4H10 | 1,50 | 8,50 | -60 | 2,0 | 1,90 | 1,55 | 1,00 | 0,90 |
| Butanol (Butyl Alcool) | C4H10O | 1,4 | 11,3 | 29 | 2,6 | 1,95 | 1,60 | 1,05 | 0,95 |
| 2 - Butanone (MEK) | C4H8O | 1,80 | 11,50 | -4 | 2,5 | 3,90 | 3,15 | 2,10 | 1,90 |
| Cyclohexane | C6H12 | 1,20 | 8,30 | -17 | 2,9 | 2,00 | 1,60 | 1,10 | 1,00 |
| Dimethylether | C2H6O | 3,00 | 27,00 | -41 | 1,6 | 1,80 | 1,45 | 0,95 | 0,90 |
| Dodecane | C12H26 | 0,60 | ~6,0 | 74 | 5,9 | 4,00 | 3,20 | 2,15 | 1,90 |
| Ethane | C2H6 | 3,00 | 15,50 | 135 | 1,0 | 1,50 | 1,20 | 0,80 | 0,75 |
| Ethanol | C2H6O | 3,30 | 19,00 | 13 | 1,6 | 2,15 | 1,75 | 1,15 | 1,05 |
| Ether (Diethylether) | (C2H5)2O | 1,70 | 36,00 | -45 | 2,6 | 1,90 | 1,55 | 1,00 | 0,90 |
| Ethylene | C2H4 | 2,70 | 34,00 | - 135 | 1,0 | 1,65 | 1,35 | 0,90 | 0,80 |
| LPG | Prop+But | 1,65 | ~9,0 | < -50 | 1,9 | 1,90 | 1,55 | 1,00 | 0,90 |
| Diesel | Melange | 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 | | | |
| 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 | 1,00 |
| Hydrogen | H2 | 4,00 | 75,60 | - | 0,069 | | 1,00 | | |
| Isobutane | C4H10 | 1,50 | 8,40 | -83 | 2,0 | 1,50 | 1,20 | 0,80 | 0,75 |

| Gas | Chemical Formula | LEL (%) | LSE (%) | Flash point (°C) | Vapor density | Coefficient - Calibration gas CH4 (methane) | Coefficient - Calibration gas H2 (Hydrogen) | Coefficient - Calibration gas C4H10 (Butane) | Coefficient - Calibration gas C5H12 (Pentane) |
|---|---|---|---|---|---|---|---|---|---|
| Isobutene | C4H8 | 1,60 | 10,00 | <-10 | 1,9 | 2,20 | 1,80 | 1,20 | 1,05 |
| Isopropanol | C3H8O | 2,15 | 13,50 | 11,7 | 2,1 | 1,60 | 1,30 | 0,85 | 0,80 |
| Kerosene (JP4) | C10 - C16 | 0,70 | 5,00 | > 50 | > 4 | 5,00 | 4,00 | 2,65 | 2,40 |
| Methyl Methacrylate | C5H8O2 | 2,10 | 12,50 | 2 | 3,5 | 2,25 | 1,80 | 1,20 | 1,10 |
| Methane | CH4 | 5,00 | 15,00 | -188 | 0,55 | 1,00 | | | |
| Methanol | CH3OH | 5,50 | 44,00 | 11 | 1,1 | 1,40 | 1,15 | 0,75 | 0,70 |
| Naphta | melange (Mixture) | 0,90 | 5,90 | > 44 | > 4 | 3,50 | 2,80 | 1,85 | 1,70 |
| Nonane | C9H20 | 0,70 | 5,60 | 31 | 4,4 | 4,40 | 3,55 | 2,35 | 2,10 |
| Octane | C8H18 | 1,00 | 6,00 | 12 | 3,9 | 2,70 | 2,20 | 1,45 | 1,30 |
| Ethylene Oxyde | C2H4O | 2,60 | 100 | -20 | 1,5 | 2,10 | 1,70 | 1,15 | 1,00 |
| Propylene oxide | C3H6O | 1,90 | 37,00 | 70 | 2,0 | 2,35 | 1,90 | 1,25 | 1,15 |
| Pentane | C5H12 | 1,40 | 8,00 | -49 | 2,5 | | | | 1,00 |
| Propane | C3H8 | 2,00 | 9,5 | -104 | 1,6 | 1,55 | 1,25 | 0,85 | 0,75 |
| Propylene | C3H6 | 2,00 | 11,70 | -107,8 | 1,5 | 1,65 | 1,35 | 0,90 | 0,80 |
| Styrene | C8H8 | 1,1 | 8,00 | 31 | 3,6 | 6,30 | 5,05 | 3,35 | 3,00 |
| Gasoline lead free | / | 1,10 | ~6,0 | 21 | 3 à 4 | 1,80 | 1,45 | 0,95 | 0,90 |
| Toluene | C7H8 | 1,20 | 7 | 5 | 3,1 | 4,00 | 3,20 | 2,15 | 1,90 |
| Turpentine Oil | - | 0,8 | 6,0 | 35 | 4,7 | 3,50 | 2,80 | 1,85 | 1,70 |
| Triethyl amine | C6H15N | 1,20 | 8 | -15 | 3,5 | 2,05 | 1,65 | 1,10 | 1,00 |
| White Spirit | melange (Mixture) | 1,10 | 6,50 | >30 | > 4 | 3,50 | 2,80 | 1,85 | 1,70 |
| Xylene | C8H10 | 1,00 | 7,60 | 25 | 3,7 | 4,00 | 3,20 | 2,15 | 1,90 |

: recommended gas for detector calibration

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

Example:

Calibration of an «acetone» detector with span gas at 1% butane concentration.

Value to be entered for the span gas concentration («GE», step 4b, page 28):

1% (injected butane) x 100 x 0.90 (butane/acetone coefficient) = 60 % LEL

1.5 % (LEL butane)

## 5.5.2 4F poison resistant catalytic bead sensor

The applicable coefficients are:

| Gas | Chemical Formula | LEL % | LSE % | Vapor density | CH4 Coef | C5H12 Coef | H2 Coef |
|---|---|---|---|---|---|---|---|
| Acetone | C3H6O | 2,15 | 13,0 | 2,1 | 2,24 | 1,03 | |
| Acetylene | C2H2 | 2,3 | 100 | 0,9 | 1,91 | | |
| Ammoniac | NH3 | 15,0 | 30,2 | 0,6 | 0,79 | 0,36 | |
| Benzene | C6H6 | 1,2 | 8,0 | 2,7 | 2,45 | 1,13 | |
| n-Butane | C4H10 | 1,5 | 8,5 | 2,0 | 2,16 | 0,99 | |
| Ethane | C2H6 | 3,0 | 15,5 | 1,0 | 1,47 | 0,78 | |
| Ethanol | C2H6O | 3,3 | 19,0 | 1,6 | 1,37 | 0,63 | |
| Ethylene | C2H4 | 2,7 | 34,0 | 1,0 | 1,41 | 0,65 | |
| n-Hexane | C6H14 | 1,2 | 7,4 | 2,48 | 2,85 | 1,14 | |
| Hydrogen | H2 | 4,0 | 75,6 | 0,07 | | | 1,0 |
| Isopropanol | C3H8O | 2,15 | 13,5 | 2,1 | 1,84 | 0,85 | |
| JP-4 | | | | | 3,28 | 1,51 | |
| JP-5 | | | | | 3,33 | 1,53 | |
| JP-8 | | | | | 3,48 | 1,6 | |
| Methane | CH4 | 5,0 | 15,0 | 0,55 | 1,0 | | |
| Methanol | CH3OH | 5,5 | 44,0 | 1,1 | 1,27 | 0,58 | |
| n-Pentane | C5H12 | 1,4 | 8,0 | 2,5 | 2,17 | 1,0 | |
| Propane | C3H8 | 2,0 | 9,5 | 1,6 | 1,9 | 0,87 | |
| Styrene | C8H8 | 1,1 | 8,0 | 3,6 | 2,13 | 0,98 | |
| Toluene | C7H8 | 1,2 | 7,0 | 3,1 | 2,26 | 1,04 | |
| Xylene | C8H10 | 1,0 | 7,6 | 3,7 | 2,8 | 1,29 | |

: recommended gas for detector calibration

**Table 4: Coefficients for the calibration of detectors equipped with a 4F poison resistant catalytic bead**

Please note (Table 3 and 4):

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

## 5.6 Checking the line current

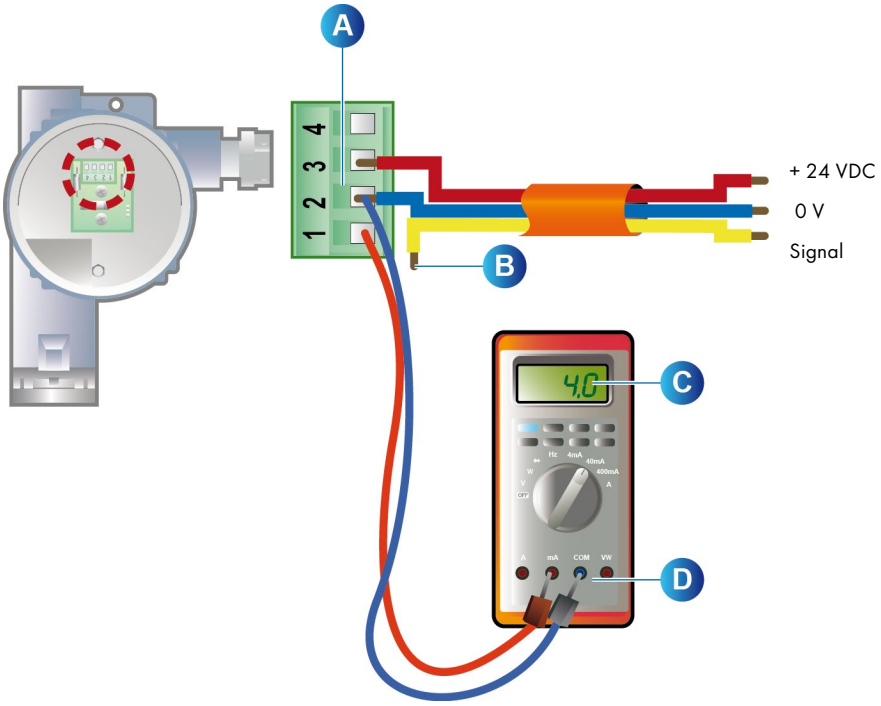



Figure 28: Checking the current generator of the detector

Proceed as follows:

1. Check the detector for proper power supply (+24V between terminal 2 and 3).
2. Switch the multimeter over to current measurement (mA range).
3. Make sure to inhibit the controller to avoid any false alarm. Disconnect the signal wire (terminal 1, Pos. B). Connect the «COM» terminal of the multimeter (Pos. D) to terminal 2 (0 V) of the detector (Pos. A).
4. Connect the «mA» terminal of the multimeter (Pos. D) to terminal 1 (signal) of the detector (Pos. A).
5. The current must be 4 mA (Pos. C) when zero grade air is applied on the sensor and 20 mA when applying span gas of concentration equal to the full scale.
6. Once testing is completed, connect back the signal wire to terminal 1 (Pos. B).

# 5.7 Menu "TEST"

The Test menu allows the user to check the operation of the LEDs, the LCD screen and the 4-20mA output.

### Accessing the Autotest (*tESt*) menu

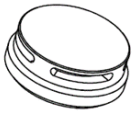
| Step | Action | Illustration |
|---|---|---|
| 1a. | After the startup phase, the screen will show the gas measurement (it may be wrong at this point). Place the magnet over VALID for 3 seconds. |  |
| 1b. | Until the — icon is displayed... |  |
| | ...present the magnet 3 consecutive times on the MENU / ▲▼ in the 3 seconds. |  |
| 1c. | The calibration menu (CAL) is displayed. |  |
| 1d. | Place the magnet over MENU / ▲▼. | |
| 1e. | The initialization menu (Init) is displayed. |  |
| 1d. | Place the magnet over MENU / ▲▼. | |
| 1e. | The initialization menu (tESt) is displayed, Place the magnet over VALID |  |
| 1f.. | The version number of the software is displayed. |  |
| 1g. | Place the magnet over MENU / ▲▼. | |
| 1h. | Display of the green and orange indicators.<br>To run the test, Place the magnet over VALID. |  |

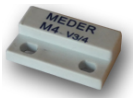
| Step | Action | Illustration |
|---|---|---|
| 1i. | The "FAULT" and OK LEDs flash one after the other. |   |
| 1j. | To stop the test or go to next test, Place the magnet over MENU / ▲▼. | |
| 1k. | LCD test display.<br>To run the test, Place the magnet over VALID. |   |
| 1l. | The display will flashing. |   |
| 1m. | To stop the test or go to next test, Place the magnet over MENU / ▲▼. | |
| 1n. | Display of the 4-20mA output test.<br>To run the test, Place the magnet over VALID. |   |
| 1o. | Define the output current value available from the OUT terminal ( from 1 to 23 mA). |   |
| 1p. | Setting the tens digit<br>Set the tens value by placing the magnet over MENU / ▲▼. The tens digit flashes. Each magnet action increments the tens digit. Validate the tens digit by positioning the magnet over VALID. |   |
| 1q. | Setting the unit digit<br>Set the unit value by placing the magnet over MENU / ▲▼. The unit digit flashes. Each magnet action increments the unit digit. Validate the unit digit by positioning the magnet over VALID. |   |
| 1r. | Setting the tenths digit<br>Set the tenths value by placing the magnet over MENU / ▲▼. The tenths digit flashes. Each magnet action increments the tenths digit. Validate the tenths digit by positioning the magnet over VALID. |   |
| 1s. | *OLCT 60* generate the define output current. |   |

| Step | Action | Illustration |
|---|---|---|
| 1t. | To stop the test or go to next test, Place the magnet over VALID. | |
| 1u. | Back to the 4-20mA test menu.<br>To stop the test or, Place the magnet over MENU / ▲▼ . |  |
| 1v. | Place the magnet over MENU / ▲▼ to come back to LED test menu or over VALID to exit |  |

# 6 Accessories

*The following accessories do not apply for OLCT 60 versions with GD10P. For the latter please refer to the GD10P manual.*

| Accessories | Utilization | Illustration | Illustration |
|---|---|---|---|
| Tool Kit | Opening of the OLCT 60 and sensor replacement |  | 6147870 |
| Calibration cup | Shall be used for sensor calibration. |  | 6331141<br>⚠Plastic material. Risk of electrostatic charges. Wipe with a damp cloth |
| By-pass adaptor | Allows bypass measuring.<br>Effects on measurement: no effect if calibration is done in the same conditions (pipe, flow).<br>Effects on response time: none. |  | 6327910<br>⚠Plastic material. Risk of electrostatic charges. Wipe with a damp cloth |
| Splash-guard | Protects the sensor against splashing liquids.<br>Effects on measurement: none.<br>Effects on response time: the response time at natural diffusion may increase for certain gases. Please consult us. |  | 6329004<br>⚠Plastic material. Risk of electrostatic charges. Wipe with a damp cloth |
| Stainless steel Splash-guard kit | Protects the detector against splashes<br>Effect on measurement: no effect.<br>Effect on response time: response time for natural diffusion can increase for certain gases. Contact us for details. |  | 6129010 |

| Accessories | Utilization | Illustration | Illustration |
|---|---|---|---|
| Remote calibration cup | Allows gas detection and the use of a tubing for calibration gas injection. For combustible gases only. Flow rate 1 LPM minimum.<br>Effects on the measurement: none.<br>Effects on response time: negligible. |  | 6327911<br>⚠Plastic material. Risk of electrostatic charges. Wipe with a damp cloth |
| PTFE protection filter | Protects the sensor against splashing liquids and dust contamination.<br>Effects on the measurement: no effect, but cannot be used to detect O3, HCL, HF, CL2.<br>Effects on response time: increased response time<br>(please consult us for high-density gas > 3 and low concentrations < 10 ppm). |  | 6335975<br>⚠Plastic material. Risk of electrostatic charges. Wipe with a damp cloth |
| Ceiling gas collector | Allows the sensor to detect gas more quickly.<br>Effects on the measurement: none.<br>Effects on response time: may increase by 10% |  | 6323623 |
| Magnet | Used for menu selection through the detector glass window. |  | 6155651 |
| Cable entry adaptor | M25 / M20 adaptor<br>M25 / ¾ NPT adaptor | | 6143552<br>6143584 |

# 7 Spare parts

*Spare parts list for different detectors*

Spare parts must be original TELEDYNE OLDHAM SIMTRONICS parts. Use of non-original spare parts may impair safety of the instrument.

## 7.1 Explosionproof sensor block

| Illustration | Description |
|---|---|
| 6 313 685 | OLCT 60 0-100% LEL with VQ1 catalytic bead |
| 6 313 872 | OLCT 60 0-100% LEL Butadiene/Acetylene (VQ1 catalytic bead) |
| 6 313 974 | OLCT 60 0-100% LEL with 4F poison resistant sensor |
| 6 313 687 | OLCT 60 0-100% vol. CH4 sensor block |
| 6 313 986 | Sensor block OLCT 60, 0-100% vol. SF6 |
| 6 314 203 | Sensor block OLCT 60, 0-100% vol. H2 |
| 6 314 100 | Infrared sensor block 0-5% vol. CO2 for OLCT 60 |
| 6 314 101 | Infrared sensor block 0-10% vol. CO2 for OLCT 60 |
| 6 314 146 | Infrared sensor block 0-100% vol. CO2 for OLCT 60 |
| 6 314 225 | Infrared sensor block 0-100% LEL R1234yf for OLCT 60 |
| 6 314 226 | Infrared sensor block 0-2000 ppm R1234yf for OLCT 60 |
| 6 314 227 | Infrared sensor block 0-2000 ppm R134A for OLCT 60 |
| 6 314 228 | Infrared sensor block 0-2000 ppm R407F for OLCT 60 |
| 6 314 229 | Infrared sensor block 0-2000 ppm SF6 for OLCT 60 |
| 6 313 710 | Sensor block OLCT 60 O2 0–30% vol. (life expectancy 2 years) |
| 6 315 C5A | Sensor block OLCT 60 O2 0–30% vol. (life expectancy 5 years) |
| 6 313 707 | Sensor block OLCT 60 NH3 0-100 ppm |
| 6 313 708 | Sensor block OLCT 60 NH3 0-1000 ppm |
| 6 313 894 | Sensor block OLCT 60 NH3 0-5000 ppm |
| 6 313 690 | Sensor block OLCT 60 CO 0-100 ppm |
| 6 313 691 | Sensor block OLCT 60 CO 0-300 ppm |
| 6 313 692 | Sensor block OLCT 60 CO 0-1000 ppm |

| Illustration | Description |
|---|---|
| 6 313 693 | H2-compensated sensor block OLCT 60 CO 0-1000 ppm |
| 6 313 695 | Sensor block OLCT 60 H2S 0-30 ppm |
| 6 313 965 | Sensor block OLCT 60 H2S 0-30 ppm, no HC-interference |
| 6 313 696 | Sensor block OLCT 60 H2S 0-100 ppm |
| 6 313 697 | Sensor block OLCT 60 H2S 0-1000 ppm |
| 6 313 698 | Sensor block OLCT 60 NH3 0-100 ppm |
| 6 313 699 | Sensor block OLCT 60 NH3 0-300 ppm |
| 6 313 700 | Sensor block OLCT 60 NH3 0-1000 ppm |
| 6 313 706 | Sensor block OLCT 60 H2  0-2000 ppm |
| 6 313 772 | Sensor block ADF OLCT 60 methylene – methylene chloride |
| 6 313 773 | Sensor block ADF OLCT 60 R12 |
| 6 313 774 | Sensor block ADF OLCT 60 R134A |
| 6 313 775 | Sensor block ADF OLCT 60 MOS |

## 7.2 Intrinsically safe sensors

| Illustration | Description |
|---|---|
| 6 313 748 | Sensor block OLCT 60 SI 02 0–30% vol. |
| 6 313 728 | Sensor block OLCT 60 SI NH3 0-100 ppm |
| 6 313 729 | Sensor block OLCT 60 SI NH3 0-1000 ppm |
| 6 313 895 | Sensor block OLCT 60 SI NH3 0-5000 ppm |
| 6 313 694 | H2-compensated sensor block OLCT 60 SI CO 0-1000 ppm |
| 6 313 711 | Sensor block OLCT 60 SI CO 0-100 ppm |
| 6 313 712 | Sensor block OLCT 60 SI CO 0-300 ppm |
| 6 313 713 | Sensor block OLCT 60 SI CO 0-1000 ppm |
| 6 313 716 | Sensor block OLCT 60 SI H2S 0-30 ppm |
| 6 313 717 | Sensor block OLCT 60 SI H2S 0-100 ppm |
| 6 313 718 | Sensor block OLCT 60 SI H2S 0-1000 ppm |
| 6 313 719 | Sensor block OLCT 60 SI NO 0-100 ppm |
| 6 313 720 | Sensor block OLCT 60 SI NO 0-300 ppm |
| 6 313 721 | Sensor block OLCT 60 SI NO 0-1000 ppm |
| 6 313 722 | Sensor block OLCT 60 SI NO2 0-10 ppm |
| 6 313 723 | Sensor block OLCT 60 SI NO2 0-30 ppm |

| Illustration | Description |
|---|---|
| 6 313 727 | Sensor block OLCT 60 SI H2 0-2000 ppm |
| 6 313 730 | Sensor block OLCT 60 SI HCl 0-30 ppm |
| 6 313 731 | Sensor block OLCT 60 SI HCl 0-100 ppm |
| 6 313 724 | Sensor block OLCT 60 SI SO2 0-10 ppm |
| 6 313 725 | Sensor block OLCT 60 SI SO2 0-30 ppm |
| 6 313 726 | Sensor block OLCT 60 SI SO2 0-100 ppm |
| 6 313 734 | Sensor block OLCT 60 SI Cl2 0-10 ppm |
| 6 313 746 | Sensor block OLCT 60 SI ETO 0-50 ppm |
| 6 313 732 | Sensor block OLCT 60 SI HCN 0-10 ppm |
| 6 313 733 | Sensor block OLCT 60 SI HCN 0-30 ppm |
| 6 313 736 | Sensor block OLCT 60 SI COCl2 0-1 ppm |
| 6 313 740 | Sensor block OLCT 60 SI ClO2 0-3 ppm |
| 6 313 735 | Sensor block OLCT 60 SI O3 0-1 ppm |
| 6 313 737 | Sensor block OLCT 60 SI PH3 0-1 ppm |
| 6 313 739 | Sensor block OLCT 60 SI HF 0-10 ppm |
| 6 313 738 | Sensor block OLCT 60 SI ASH3 0-1 ppm |
| 6 313 747 | Sensor block OLCT 60 SI SiH4 0-50 ppm |
| 6 313 926 | Sensor block OLCT 60 SI CVM 0-200 ppm (before December 2018, 1st) |
| 6 313 747 | Sensor block OLCT 60 SI CVM 0-200 ppm (since December 2018, 1st) |

# 8 Declaration of EU Conformity

TELEDYNE OLDHAM SIMTRONICS
Everywhereyoulook™

**DECLARATION UE DE CONFORMITÉ**

***EU CONFORMITY DECLARATION***

Réf : UE_OLCT60_rev E.1.doc

Nous,
*We,*

**Teledyne Oldham Simtronics S.A.S.**, ZI Est, 62000 Arras France

Déclarons, sous notre seule responsabilité, que le matériel suivant :
*Declare, under our sole responsibility that the following equipment* :

**Détecteur de gaz *(Gas Detector)* OLCT 60**

Est conçu et fabriqué en conformité avec les Directives et normes applicables suivantes :
*Is designed and manufactured in compliance with the following applicable Directives and standards:*

**I) Directive Européenne ATEX 2014/34/UE** du 26/02/14: **Atmosphères Explosives**
*European Directive ATEX 2014/34/UE dated from 26/02/14: Explosive Atmospheres*

| | |
|---|---|
| Normes harmonisées appliquées :<br>*Harmonised applied Standards* | **EN 60079-0: 2018**<br>**EN 60079-11: 2012**<br>**EN 60079-1: 2014**<br>**EN 60079-31: 2014** |
| Attestation CE de Type du matériel :<br>*EC type examination certificate* | **INERIS 01 ATEX 0027X** |
| Catégorie *(category)* / Marquage *(marking)* : | |
| **OLCT 60-d** (avec cellule intégrée)<br>*(with on-board sensor)* | Ex **II 2 GD**<br>**Ex db IIC T6 Gb / Ex tb IIIC T85°C Db**<br>(-20°C<Ta<+60°C) |
| **OLCT 60D-d** (avec cellule déportée)<br>*(with remote sensor)* | |
| Sur le transmetteur<br>*(on the transmitter)* | Ex **II 2 GD**<br>**Ex db IIC T6 Gb / Ex tb IIIC T85°C Db**<br>(-20°C<Ta<+60°C) |
| Sur la cellule déportée<br>*(on the remote sensor)* | Ex **II 2 GD**<br>**Ex db IIC T6 Gb / Ex tb IIIC T85°C Db**<br>(-20°C<Ta<+70°C) |

Page 1 | 2

TELEDYNE OLDHAM SIMTRONICS
Everywhereyoulook™

# DECLARATION UE DE CONFORMITÉ

# *EU CONFORMITY DECLARATION*

Réf : UE_OLCT60_rev E.1.doc

| | |
|---|---|
| **OLCT 60 id** (avec cellule intégrée)<br>*(with on board sensor)* | Ⓔx **II 2 GD**<br>**Ex db [ia Ga] ia IIC T4 Gb / Ex tb [ia Da] ia IIIC T135°C Db**<br>(-20°C<Ta<+60°C) |
| **OLCT 60 D id** (avec cellule déportée)<br>*(with remote sensor)* | |
| sur le transmetteur<br>*(on the transmitter)* | Ⓔx **II 2 (1) GD**<br>**Ex db [ia Ga] IIC T4 Gb / Ex tb [ia Da] IIIC T135°C Db**<br>(-20°C<Ta<+60°C) |
| sur la cellule déportée<br>*(on the remote sensor)* | Ⓔx **II 1 GD**<br>**Ex ia IIC T4 Ga / Ex ia IIIC T135°C Da**<br>(-20°C<Ta<+70°C) |
| Notification Assurance Qualité de Production :<br>*Notification of the Production QA* | **INERIS 00 ATEX Q403** |
| Délivré par l'Organisme notifié numéro 0080 :<br>*Issued by the Notified Body n°0080* | **INERIS,** Parc Alata<br>60550 Verneuil en Halatte France |

**II) Directive Européenne CEM 2014/30/UE du 26/02/14: Compatibilité Electromagnétique**
*European Directive EMC 2014/30/UE dated from 26/02/14: Electromagnetic Compatibility*

| | |
|---|---|
| Normes harmonisées appliquées :<br>*Harmonised applied Standard* | **EN 50270:15 for type 2** |

Ce matériel ne doit être utilisé qu'à ce pour quoi il a été conçu et doit être installé en conformité avec les règles applicables et suivant les recommandations du fabricant.
*This equipment shall be used for the purpose for which it has been designed and be installed in accordance with relevant standards and with manufacturer's recommendations.*

A Arras, le 20/05/2020 / *Arras, May 5th, 2020*

AM. Dassonville
Certification Responsible

Dass

**Teledyne Oldham Simtronics S.A.S.**
Z.I. EST - C.S. 20417
62027 ARRAS Cedex – FRANCE
Tel. : +33(0)3 21 60 80 80
www.teledyneGFD.com

# 9 Technical Specifications

## 9.1 Dimensional characteristics

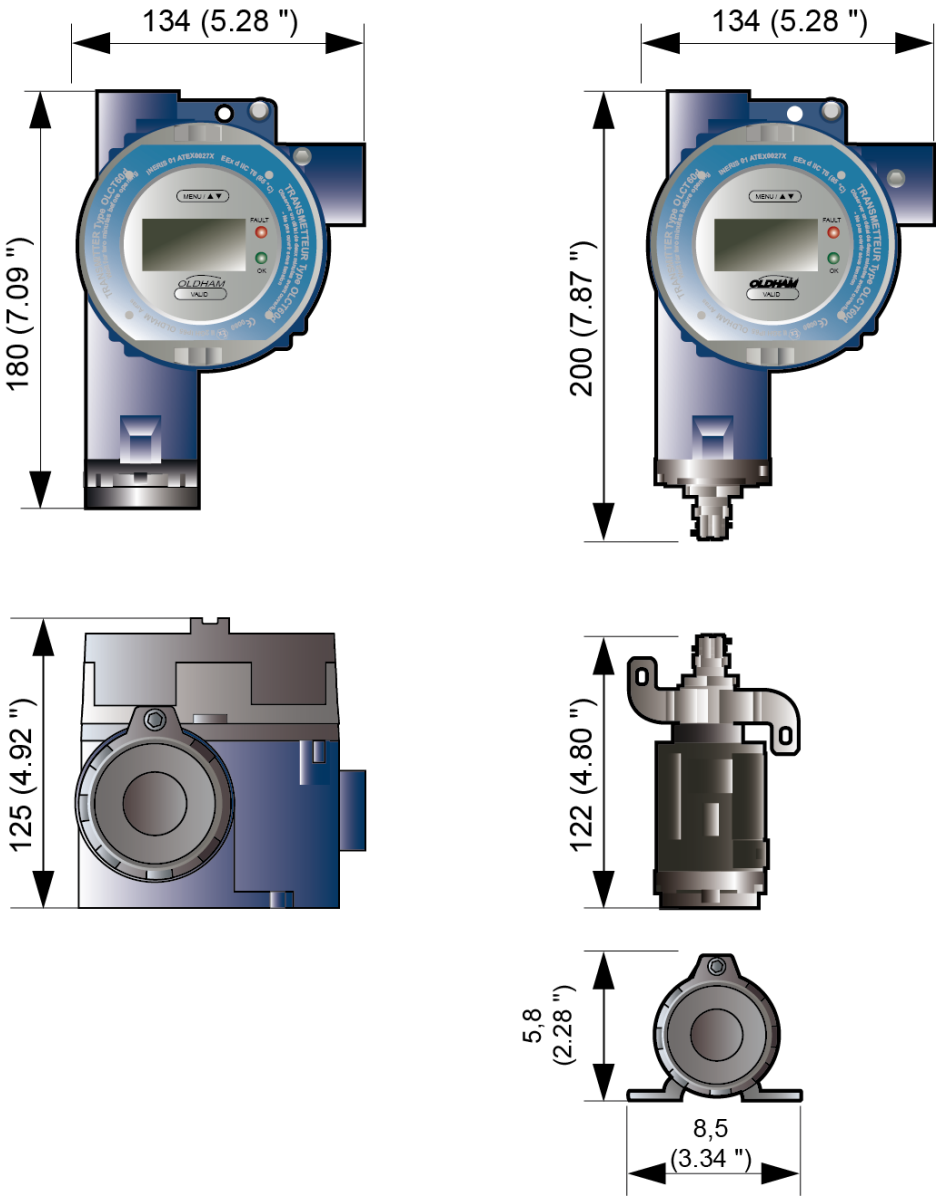



Figure 29: Dimensional characteristics of OLCT 60 detectors with on-board and remote sensor

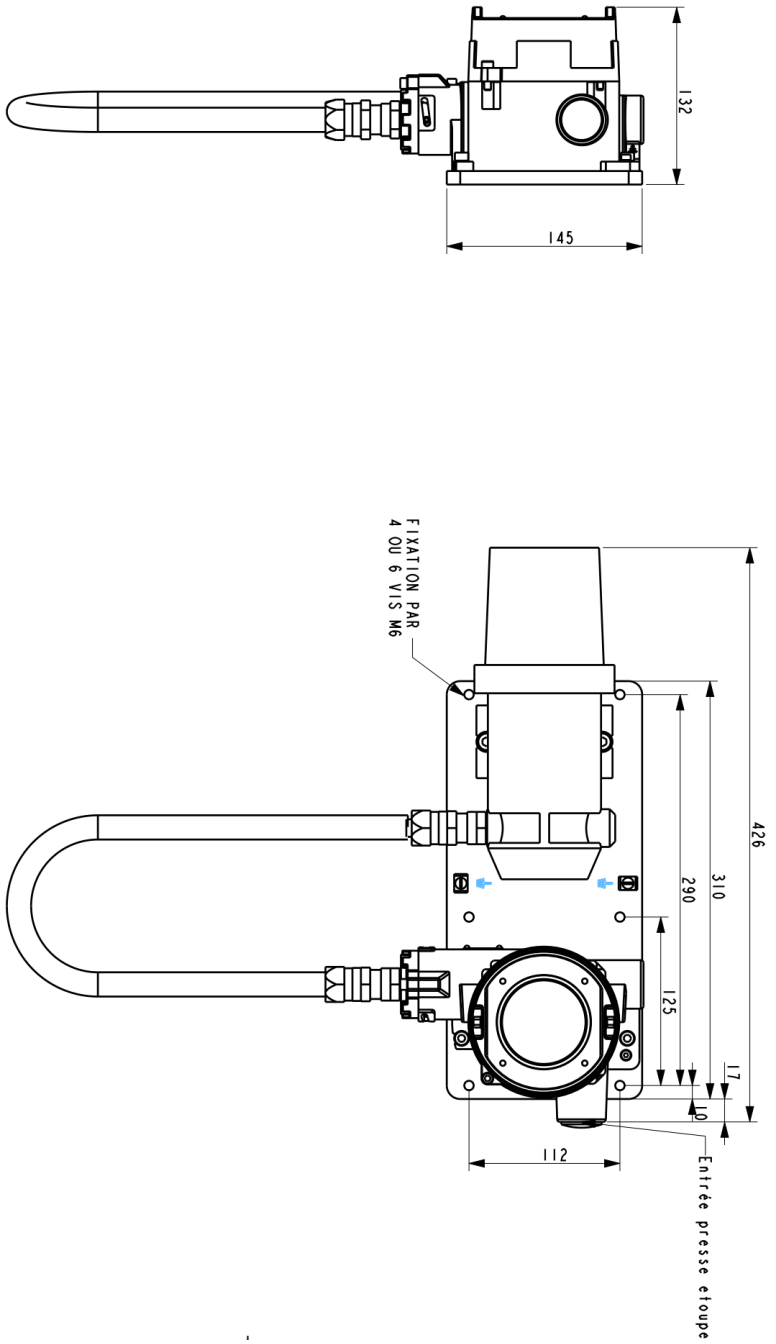



Figure 30: Dimensional characteristics of OLCT 60 equiped with GD10P mounting on plate

## 9.2 Complete detector

| | |
|---|---|
| Power supply to the detector terminals | • 16 to 30 Vdc<br>18 to 30 Vdc (versions with GD10P) |
| Average consumption @24Vdc based on the sensor block type (active display) | • Catalytic: 100 mA<br>• Electrochemical: 55 mA<br>• Infrared sensor: 120 mA<br>• Infrared GD10P: 225 mA |
| Output current (signal) | • Current source encoded from 0 to 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>• Over-range: > 23 mA<br>• Non-ambiguity reading: 20 mA (over-range for combustible gas detectors) |
| Display | • 4 digit backlit LCD display<br>• Menu display<br>• Green LED (OK): normal operation mode<br>• Orange LED (FAULT): fault or maintenance |
| Type of cable | • 3-wire shielded cable |
| Cable entry | • M25 cable gland (supplied with the detector before August 2014)<br>• M25 / M20 adaptor in option (P/N 6143552)<br>• M25 / ¾ NPT adaptor in option (P/N 6143584) |
| Electromagnetic compatibility | • EN 50270 compliant |
| Ingress Protection | • IP66 |
| Weight | • 1.6 kg without sensor block<br>• 2.1 kg with sensor block<br>• 5 kg with GD10P |
| Material | • Painted aluminum with epoxy polyester coating |
| Operating temperature | • Electronics: detectors suitable in ATEX hazardous area -20°C à +60°C<br>• Sensors: sensor dependent |
| Storage temperature | • Electronics: -25 °C à +60 °C<br>• Sensors: sensor dependent |

# 9.3 Measuring sensors

| Gas | | Measuring range (ppm) | ADF sensor | IS sensor | Temperature range (°C) | % HR | Accuracy (ppm) @20°C | Average LifeExpectancy (months) | Resp. Time T50/T90 (s) | Storage time and conditions |
|---|---|---|---|---|---|---|---|---|---|---|
| Combustible gas | Infrared GD10P | 0-100% LEL | ■ | | -20 to +60 | 0 – 99 | +/- 3% (from 0 to 50% LEL)<br>+/- 5% (from 50 to 100% LEL) | >60 | 1/2 (CH4)<br>3/6 (CH4) | (a) |
| | Catalytic | 0-100% LEL | ■ | | -20 to +60 | 0 - 95 | +/-1 % LEL(from 0 to 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 (range 0-100) | 40 | 15/40 | (a) |
| CO2 | Carbon Dioxide | 0-5% vol. | ■ | | -20 to +55 | 0 – 95 | +/- 3% | 48 | 11/30 | (a) |
| COCl2 | Phosgene | 1.00 | | ■ | -20 to +40 | 15 – 90 | +/- 0,05 | 12 | 60/180 | (c) |
| 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>■ | -20 to +50 | 15 – 90 | +/- 1.5 (range 0-30) | 36 | 15/30 | (a) |
| HCl | Hydrogen Chloride | 30.0<br>100 | | ■ | -20 to +40 | 15 - 95 | +/- 0.4 (range 0-30) | 24 | 30/150 | (a) |
| HCN | Hydrogen Cyanide | 10.0<br>30.0 | | ■ | -25 to +40 | 15 - 95 | +/- 0.3 (range 0-10) | 18 | 30/120 | (c) |
| HF | Hydrogen Fluoride | 10.0 | | ■ | -10 to +30 | 20 – 80 | +/- 5% | 12 | 40/90 | (c) |
| NH3 | Ammonia | 100<br>1000<br>5000 | ■<br>■<br>■ | ■<br>■<br>■ | -20 to +40 | 15 – 90 | +/- 5<br>+/- 20<br>+/- 150 or 10% | 24 | 50/90<br>50/90<br>50/120 | (a) |
| NO | Nitrogen Monoxide | 100<br>300<br>1000 | ■<br>■<br>■ | ■<br>■<br>■ | -20 to +50 | 15 – 90 | +/- 2 (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 (>2years) | 0-30% vol. | ■ | ■ | -20 to +50 | 15 – 90 | 0.4% Vol. (from 15 to 22% O2) | 28 | 6/15 | (a) |
| O2 | Oxygen (>5years) | 0-30% vol. | ■ | | -40 to +50 | 15 – 90 | +/-1.5% | 60 | 15/25 | (a) |

| Gas | | Measuring range (ppm) | ADF sensor | IS sensor | Temperature range (°C) | % HR | Accuracy (ppm) @20°C | Average LifeExpectancy (months) | Resp. Time T50/T90 (s) | Storage time and conditions |
|---|---|---|---|---|---|---|---|---|---|---|
| O3 | Ozone | 1.00 | | ■ | 0 to +40 | 10 – 90 | +/- 0.03 (from 0 to 0,2 ppm)<br>+/- 0.05 (from 0.2 to 1 ppm) | 18 | 40/120 | (c) |
| 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) |
| 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) |
| CMV (→30/11/2018) | Vinyl chloride | 200 | | ■ | 0 to +40 | 15 – 90 | +/- 5% (from 20 to 70% FS) | 24 | 10/50 | (a) |
| CMV (01/12/2019→) | | 200 | | ■ | -20 to +40 | 15 – 90 | +/- 5% (from 20 to 70% FS) | 24 | 10/50 | (a) |
| CH3Cl | Chloro-methane | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| CH3Cl | Dichloro-methane | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R12 | | 1 % vol. | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R22 | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R123 | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| FX56 | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R134 a | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R134 a | | 2000 | ■ (IR) | | -20 to +50 | 0 – 95 | +/- 40 (from 0 to 50% FS)<br>+/- 100 (from 50 to 100% FS) | 60 | 40/170 | (e) |
| Freon R11 | | 1 % vol. | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% FS) | 40 | 25/90 | (d) |
| Freon R23 | | 1 % vol. | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R143 a | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R404 a | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R507 | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R410 a | | 1000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R32 | | 1000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |

| Gas | | Measuring range (ppm) | ADF sensor | IS sensor | Temperature range (°C) | % HR | Accuracy (ppm) @20°C | Average LifeExpectancy (months) | Resp. Time T50/T90 (s) | Storage time and conditions |
|---|---|---|---|---|---|---|---|---|---|---|
| Freon R407 c | | 1000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R407 f | | 2000 | ■ (IR) | | -20 to +50 | 0 – 95 | +/- 40 (from 0 to 50% FS)<br>+/- 100 (from 50 to 100% FS) | 60 | 40/105 | (e) |
| Freon R408 a | | 1000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R1234yf | | 2000 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/90 | (d) |
| Freon R1234yf | | 2000 | ■ (IR) | | -20 to +50 | 0 – 95 | +/- 40 (from 0 to 50% FS)<br>+/- 100 (from 50 to 100% FS) | 60 | 25/120 | (e) |
| Freon R1234yf | | 0-100% LEL | ■ (IR) | | -20 to +50 | 0 – 95 | +/- 2% (from 0 to 50% LEL)<br>+/- 5% (from 50 to 100% LEL) | 60 | 30/115 | (e) |
| SF6 | | 2000 | ■ (IR) | | -20 to +50 | 0 – 95 | +/- 40 (from 0 to 50% FS)<br>+/- 100 (from 50 to 100% FS) | 60 | 50/160 | (e) |
| Ethanol | | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/60 | (d) |
| Toluene | | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/60 | (d) |
| Isopropanol | | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/60 | (d) |
| 2-Butanone (MEK) | | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/60 | (d) |
| Xylene | | 500 | ■ | | -20 to +55 | 20 – 95 | +/- 15% (from 20 to 70% PE) | 40 | 25/60 | (d) |

+4°C to +20°C.
20 % to 60 % HR
1 bar ± 10 %
maximum 6 months

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

(c) +4°C to +20°C.
20 % to 60 % HR
1 bar ± 10 %
maximum 3 months

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

e) - 40°C to +85°C
0 to 80% HR
1 bar ± 10 %
maximum 6 months

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

## 10.1 General comments

The OLCT 60 sensors conform to the requirements of European Directive ATEX 2014/34/UE relating to explosive Dust and Gas atmospheres. On account of their metrological performance (currently under re-evaluation of the certification with the notified body INERIS following the modifications of the standard), the OLCT 60 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.

## 10.2 Warnings

Do not open when energized. After de-energizing, delay 2 minutes before opening. Read instructions notice (cable glands).

## 10.3 Requirements for use in dust explosive atmospheres

For the equipment installed in dust explosive atmosphere, user shall ensure a sufficient cleaning to prevent dust accumulation on the device. The maximum permissible thickness of a dust layer must be less than 5 mm.

## 10.4 Cable entries:

Cable glands and other wiring accessories (plugs, adaptors, etc.) shall be “db” certified for use in gas explosive atmospheres and “tb” for use in dust explosive atmospheres. They must be at least IP66 and of M20x1.5 6g or M25x1.5 6g types in accordance with ISO965-1 and ISO965-3 standards. Minimum depth of engagement must be 5 threads and installation must be

done in accordance with current version of EN 60079-14 and eventually with any local or national additional requirements that may apply in the country of installation.

The cables should be suitable for use at a temperature equal to or greater than 80°C.

## 10.5 Threaded joints

Threaded joints have different values than those specified in EN60079-1 standard. Oldham does not allow the repair of the threaded joints and shall not be held responsible for any damage to the equipment or for any physical injury or death resulting from any product modification.

The threaded joints on the OLCT 60 may be lubricated to ensure protection against explosions. Only non-hardening lubricants or non-corrosive agents without volatile solvents may be used. Warning: silicone-based lubricants are strictly prohibited since they contaminate some of the gas sensing elements used in the OLCT 60.

## 10.6 Electrostatic Risk

Plastic accessories (see page 39) can present a risk of static discharge. Do not rub with a dry cloth. Clean with water and wipe only with a damp cloth.

## 10.7 Limitations of use

Gas detection cells have certain limitations that shall be known and understood by the user.

## 10.8 Overange and exposition to specific components

- A bump test and/or a calibration is recommended each time the detector has been exposed to high gas concentration and moreover if the detector went to overange condition.
- Vapour 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% O2 overestimate).

## 10.9 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.

## 10.10 Installation and calibration

- The detector will be installed with the sensor cell pointing downwards.
- The detector should be calibrated with the gas to be measured. With respect to combustible gases only, and in the event it is impossible to calibrate with the targeted gas, see tables on pages 31 and further for recommended calibration gas and cross gas interference.

## 10.11 Functional Safety

The safety function of the OLCT 60 detector is the detection of flammable gases using catalytic technology or the detection of oxygen using an electrochemical cell and a 4-20 mA current output proportional to the gas concentration expressed as a percentage of LEL (from 0 to 100% LEL) or expressed as a percentage of volume of oxygen (from 0 to 30% vol. O2). In the event of a failure, the output current will assume a fallback value less than or equal to 1 mA or greater than or equal to 23 mA. The safety function is no longer valid on warm up and during the time it takes for the sensor to stabilize. During this period, the output current shall be frozen at 2 mA (maintenance mode).

## 10.12 Reliability data

The analysis reported by INERIS, report no. CGR 74448 of July 6th 2006, has allowed the assessment of the annual failure rate of OLCT 60 combustible gas detectors equipped with a VQ1 catalytic sensor: $\lambda_{DU}$ annual = $4.7.10^{-2}$.

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

# 10.13 Marking

## OLCT60d type(with on-board sensor, 'd' type)

TELEDYNE OLDHAM SIMTRONICS SAS

ZI EST

62027, ARRAS France

OLCT60 d

CE0080

INERIS 01ATEX0027X

Ex II 2 G D

Ex db IIC T6 Gb

Ex tb IIIC T85°C Db

T.Amb : -20°C à 60°C

**WARNING:** Do not open when energized. After de-energizing, delay 2 minutes before opening. Read user manual (cable glands)

## OLCT60D d detector (with remote sensor, 'd' type)

On the detector:

TELEDYNE OLDHAM SIMTRONICS SAS

ZI EST

62027, ARRAS France

OLCT60D d

CE0080

INERIS 01ATEX0027X

Ex II 2 G D

Ex db IIC T6 Gb

Ex tb IIIC T85°C Db

T. Amb : -20°C à 60°C

**WARNING:** Do not open when energized. After de-energizing, delay 2 minutes before opening. Read user manual (cable glands)

On the remote sensor:

OLCT60D d

CE0080

INERIS 01ATEX0027X

 II 2 G D

Ex db IIC T6 Gb

Ex tb IIIC T85°C Db

T. Amb : -20°C à 70°C

WARNING: **Do not open when energized.**

## OLCT60 id detrector(with local sensor, 'i' type)

TELEDYNE OLDHAM SIMTRONICS SAS

ZI EST

62027, ARRAS France

OLCT60 id

CE0080

INERIS 01ATEX0027X

 II 2 G D

Ex db [ia Ga] ia IIC T4 Gb

Ex tb [ia Da] ia IIIC T135°C Db

T. Amb : -20°C à 60°C

WARNING: Do not open when energized. After de-energizing, delay 2 minutes before opening. Read user manual (cable glands)

## Détecteur type OLCT60 D id detector(with remote sensor, 'i' type)

On the detector:

TELEDYNE OLDHAM SIMTRONICS SAS

ZI EST

62027, ARRAS France

OLCT60D id

CE0080

INERIS 01ATEX0027X

 II 2 (1) G D

Ex db [ia Ga] IIC T4 Gb

Ex tb [ia Da] IIIC T135°C Db

T. Amb : -20°C à 60°C

WARNING: Do not open when energized. After de-energizing, delay 2 minutes before opening. Read user manual (cable glands)

## On the remote sensor:

OLCT60D id

CE0080

INERIS 01ATEX0027X

 II 1 G D

Ex ia IIC T4 Ga

Ex ia IIIC T135°C Da

T. Amb : -20°C à 70°C

# 11 Fault and error codes

## 11.1 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.

| Number | Cause |
|---|---|
| 35 to 39 | Communication error with the sensor |
| 40 to 42 | Communication error with the infrared sensor block (OLCT IR). |


**Figure 31: Example of communication errors**

## 11.2 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 32: Display example of a fault code 3**

TELEDYNE
OLDHAM SIMTRONICS
Everywhereyoulook™


**AMERICAS**
14880 Skinner Rd
CYPRESS
TX 77429,
USA
Tel.: +1-713-559-9200

**EMEA**
Rue Orfila
Z.I. Est – CS 20417
62027 ARRAS Cedex,
FRANCE
Tel.: +33 (0)3 21 60 80 80

**ASIA PACIFIC**
Room 04, 9th Floor, 275
Ruiping Road, Xuhui District
SHANGHAI
CHINA
Tel.: +86-134-8229-5057

www.teledynegasandflamedetection.com





NPO60GB Revision F.2 / March 2021