

Detectors

OLC20

OLDHAM
Gas Monitoring Solutions



Installation and use

Transmitters

OLCT20 – OLCT 40



INDUSTRIAL
SCIENTIFIC



Made in
France



Ref.: NPO20GB
20-10-2009

GAS DETECTION

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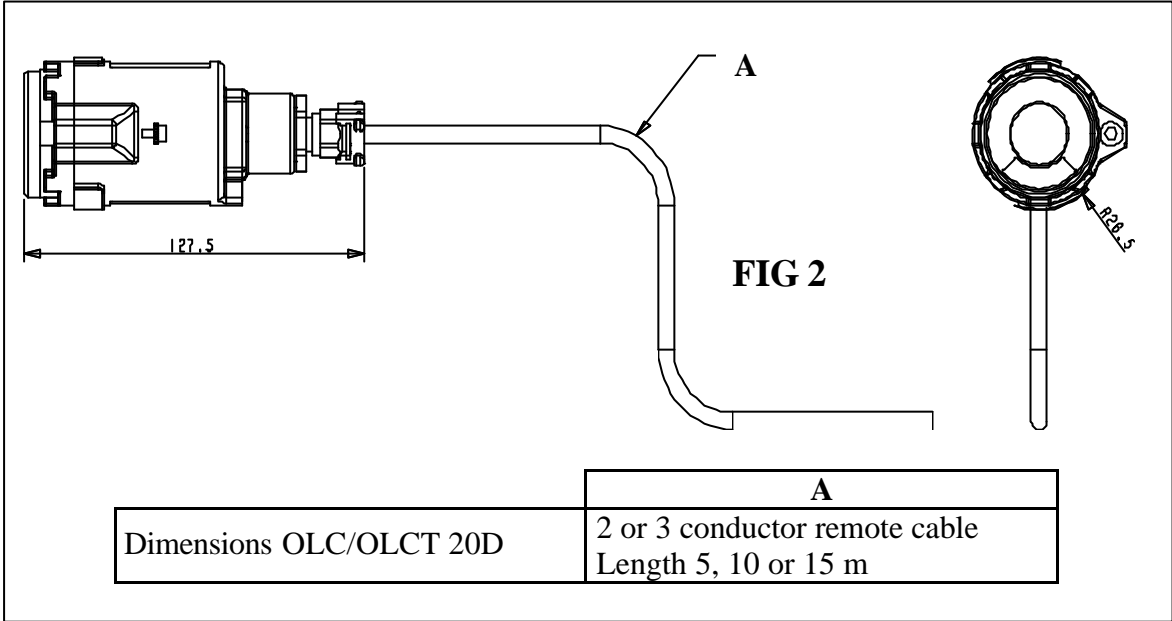
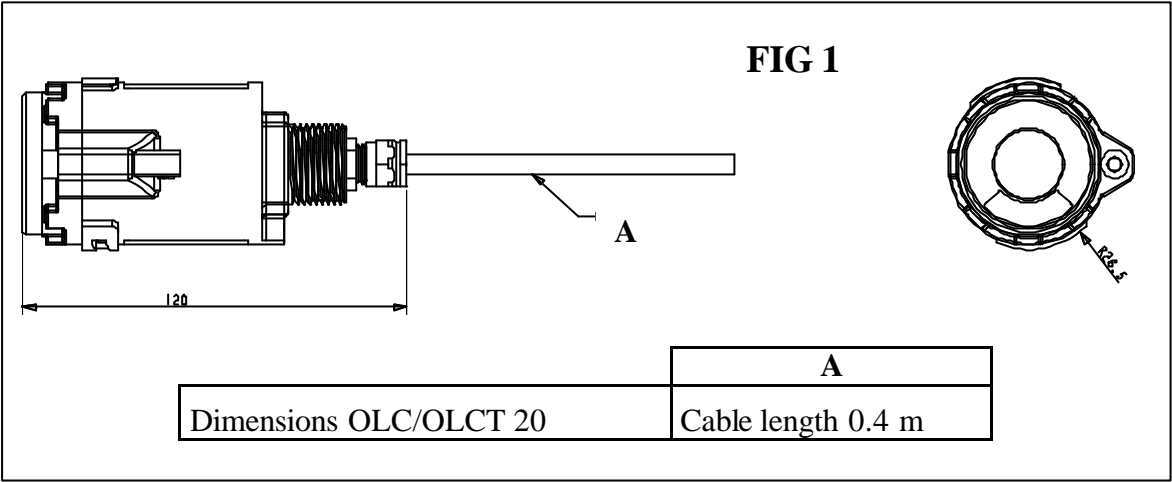
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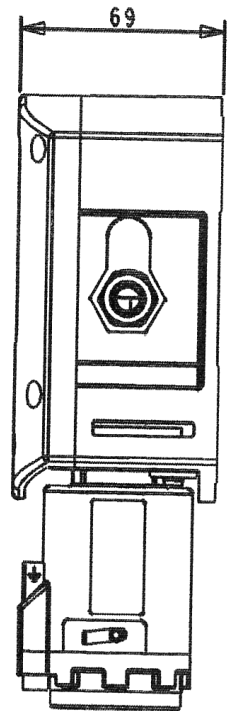
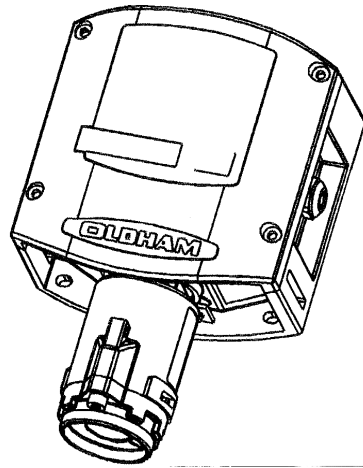
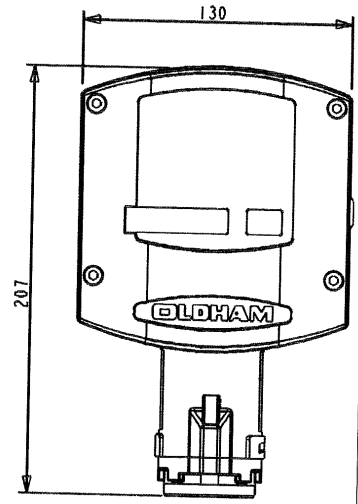
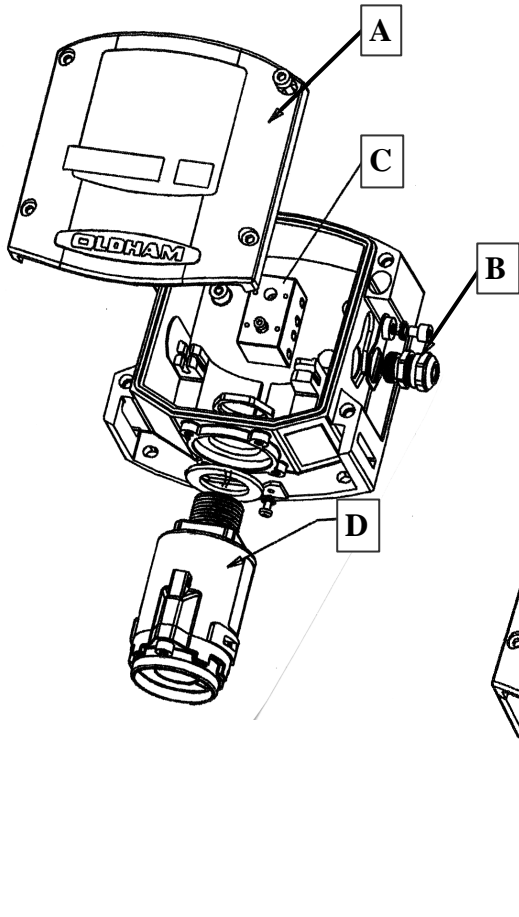
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2 years guarantee in normal conditions of use on parts and technical labour, return in our workshops, excluding consumables (sensors, filters, etc.)

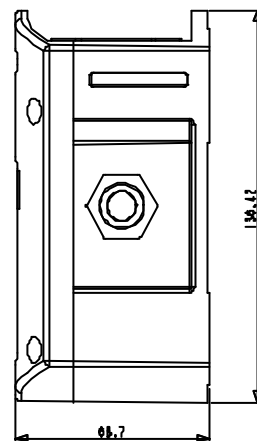
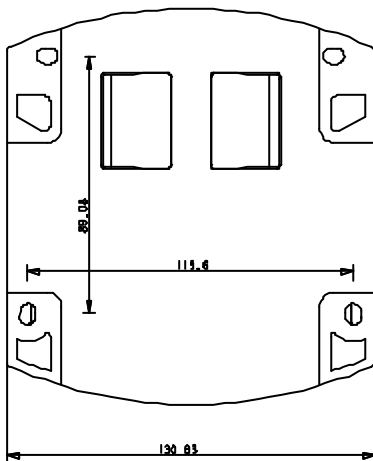


**FIG 4
OLCT40**



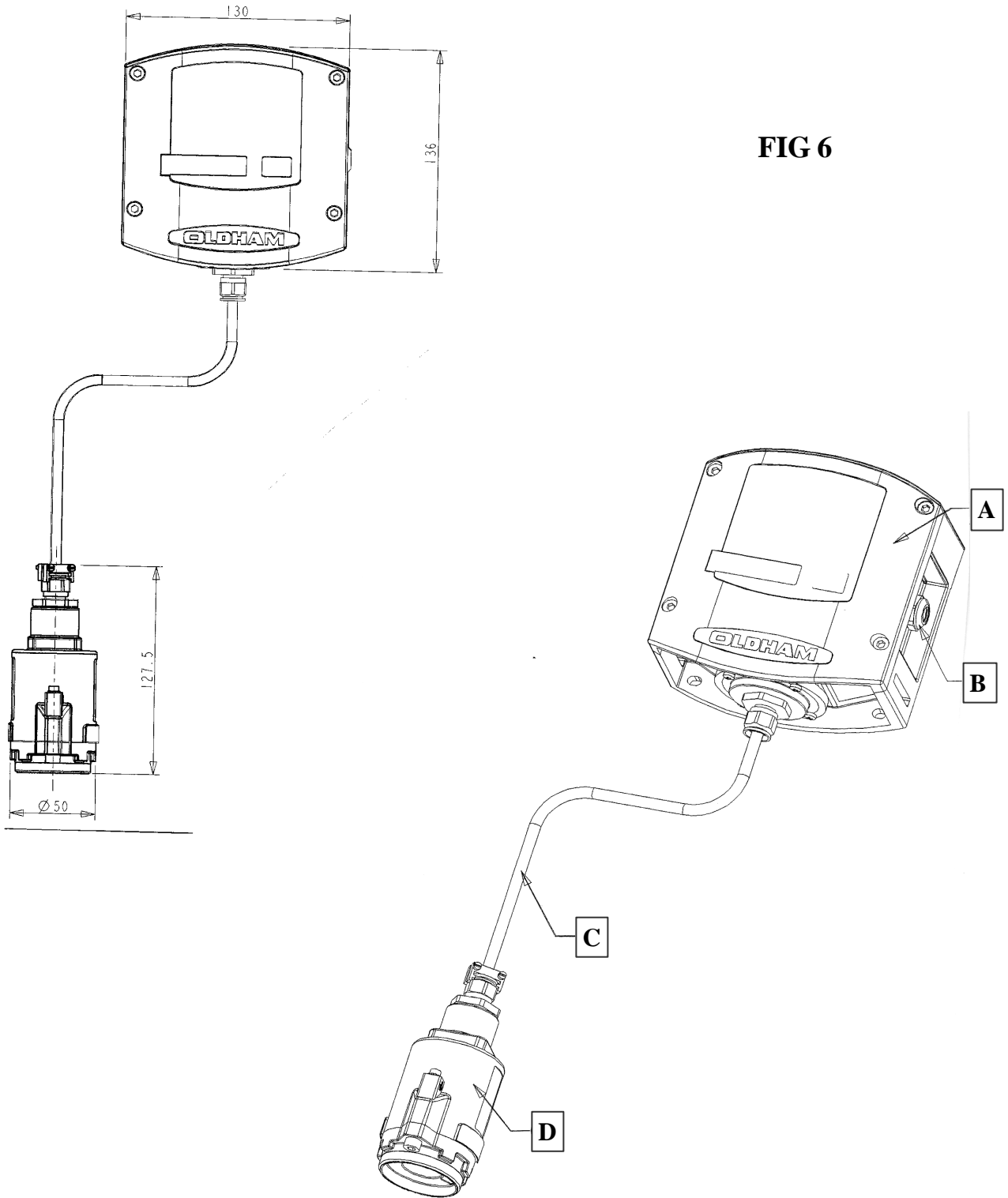
A	B	C	D
Casing EEx e	Cable gland PG9 for \varnothing 6mm to \varnothing 12 mm cable	Junction box approved EEx e	Detector OLCT 20

FIG 5

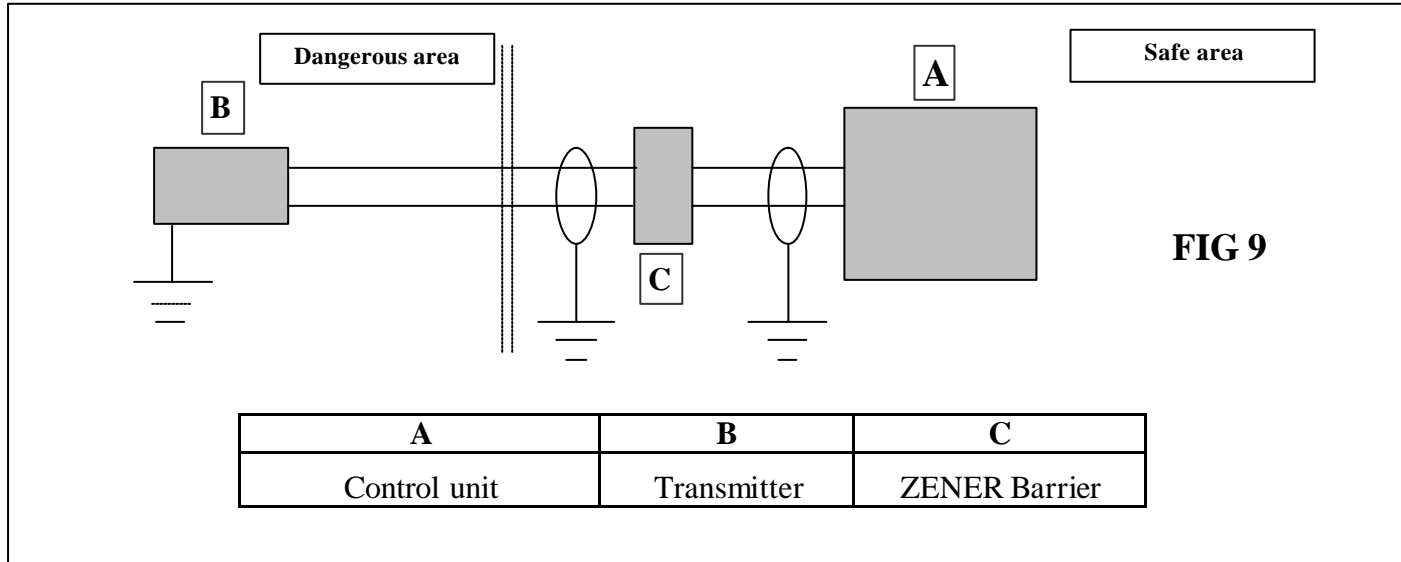
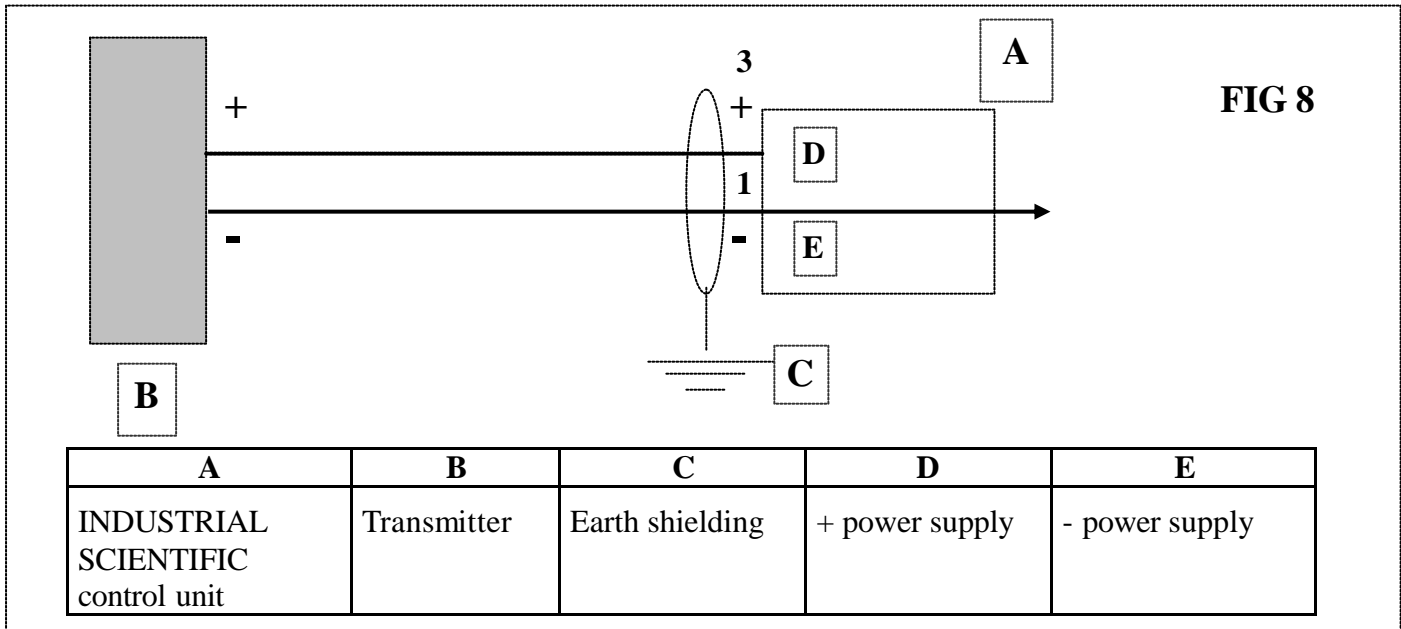
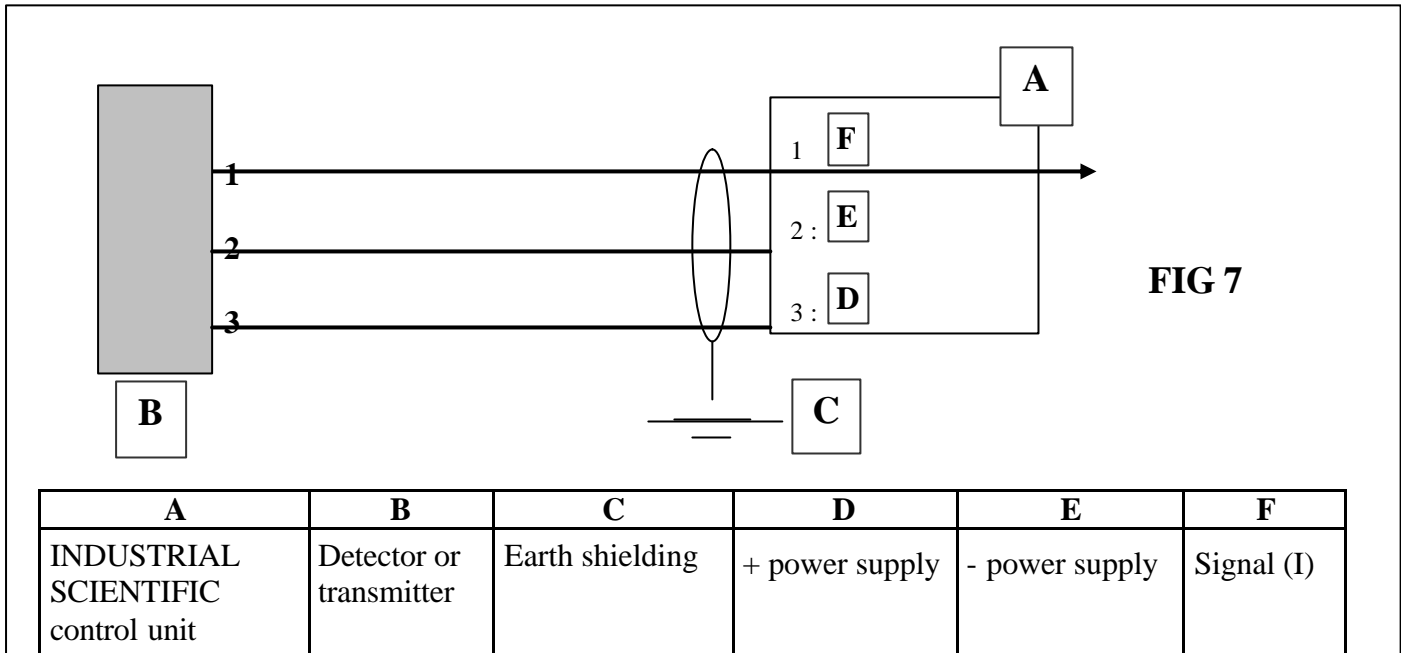


Dimensions and fixing OLCT 40

FIG 6



A	B	C	D
Casing EEx e	Cable gland PG9 for Ø 6mm to Ø 11 mm cable	Shielded cable Length 10 m	Remote detector



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I. Description of the OLC / OLCT20 family



OLC20



OLC20D

1. General

The gas detectors in the **OLC20** series are catalytic cell type detectors intended for the detection of combustible gases. They are only available in explosion proof protection mode, the approved type is OLC20D. A special OLC20 HT (High Temperature) version provides detection in ambient temperatures up to 200°C.

The **OLCT20** type gas detectors are 420 mA transmitters (3-wire or 2-wire T signifies Transmitter) and are intended for the measurement of combustible and toxic gases and oxygen. They are available in explosion proof protection mode (The approved type is OLCT20D) or in intrinsic safety protection mode (the approved type is OLCT 20i)

Series **OLC20** and **OLCT20** consist of two types of detectors or transmitters:

➤ version **OLC20** or **OLCT20**

- designed to be screwed onto a housing using the equipment's $\frac{3}{4}$ NPT or M25 screw fitting (standard),
- connected to the measurement data logger inside the housing equipped with a cable with a standard length of 40 cm.

➤ version **OLC20D** or **OLCT20D** (D signifies remote version)

- mounted in place by means of a bracket supplied as an accessory,
- supplied with 5, 10 or 15 metre length of shielded cable and which can be connected to the measurement data logger either directly or via a branch box if the cable length is greater.

2. Main characteristics of the various versions

	OLC20	OLC20D	OLCT20		OLCT20D	
	<i>EXPLO</i>	<i>EXPLO</i>	<i>EXPLO</i>	<i>TOX/O2</i>	<i>EXPLO</i>	<i>TOX/O2</i>
Explosion-proof safety housing	X	X	X	X	X	X
Intrinsic safety housing				X		X
Outlet via packing gland ¹	X	X	X	X	X	X
3-wire cable / Wheatstone bridge	X	X				
3-wire cable / 4-20 mA output			X		X	
2-wire cable / 4-20 mA output				X		X
Catalytic cell	X	X	X		X	
Electrochemical cell				X		X
Interchangeable unit	X	X				
Interchangeable and precalibrated unit			X	X	X	X
Wall mounting bracket		X			X	X

¹ On request, the OLCT20 transmitter type in intrinsic safety version can be delivered with a sealed cable.

II. Description of the OLCT40 / OLCT40D family

1. General

The gas detectors in the **OLCT 40** series are **4-20 mA TRANSMITTERS** (3-wire or 2-wire) which are intended for the measurement of combustible and toxic gases and oxygen.

The **OLCT 40** series comprises two types of TRANSMITTERS:

- Version **OLCT 40**: housing/cell unit assembly



In this case, the transmitter is connected directly to the measurement data logger.
See **Figure 04** at the beginning of this manual.

- Version **OLC 40 D** (D signifies remote cell unit)



In this case, the measurement data logger is connected to the main housing.
See **Figure 06** at the beginning of this manual.

2. Main characteristics of the various versions

	OLCT40		OLCT40D	
	<i>EXPLO</i>	<i>TOX/O2</i>	<i>EXPLO</i>	<i>TOX/O2</i>
Explosion-proof safety cell unit	X	X	X	X
Intrinsic safety cell unit		X		X
Outlet via packing gland	X	X	X	X
3-wire cable / 4-20 mA output	X		X	
2-wire cable / 4-20 mA output		X		X
Catalytic cell	X		X	
Electrochemical cell		X		X
Interchangeable and precalibrated unit	X	X	X	X
Wall mounting bracket of the cell unit			X	X

III. Mechanical installation of the various versions

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

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

1. OLC20 and OLCT20

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

Note: The threaded outlet from the body can be used to attach the OLC20 detector or the OLCT20 transmitter to its mounting (box, case, etc.).

2. OLC20D and OLCT20D (remote version)

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

3. OLCT 40

See the beginning of this manual:

- **Figure 04** for dimensions,
- **Figure 05** for attachment of the main housing.

4. OLCT 40D (remote version)

See the beginning of this manual:

- **Figure 06** for dimensions,
- **Figure 03** for attachment of the remote cell.

IV. Wiring of the various versions

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

1. 3-Wire versions

- - See **Figure 07** (at the beginning of this manual)

2. 2-wire versions

- - See **Figure 08** (at the beginning of this manual)

3. 2-wire Intrinsic Safety versions

- See **figure 09** (at the beginning of the manual)

V Maintenance

Caution: The operations and adjustments described in this chapter must be performed by authorized personnel only as they can affect the appliance's reliability in detection.
IMPORTANT: It is prohibited to open the transmitter when energized.

1. Detectors OLC20 and OLC20D

These types of detectors are equipped with a removable cell unit.

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

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


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

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

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

1.1. CALIBRATION

Procedure to be followed once the required site authorisations have been granted

On the data logger	On the DETECTOR
<p>Set the measuring channel to the calibration position (alarm relays inhibited)</p>	 <p>Position the gas input pipe and carry out the calibration in accordance with the procedure defined during the training course provided by INDUSTRIAL SCIENTIFIC or by a person approved by INDUSTRIAL SCIENTIFIC .</p>
<p>Make the zero and sensitivity adjustments.</p>	
<p>Return the measuring channel to the "normal" position and make sure that it is working properly, after.</p>	

Important note regarding version OLC 20 High Temperature Detector

- The OLC20 HT sensor is powered by a DC supply from the INDUSTRIAL SCIENTIFIC measuring device. This current depends on the sensor operating temperature. The higher the temperature, the lower the supply voltage. The device current rating is factory-set to suit the operating temperature.
- The sensor is zeroed on the device when the sensor is at its stabilised operating temperature. If the operating temperature falls or rises as a result of the process, the zero signal will vary accordingly. For example, a 100°C variation causes a sensor zero drift of +- 15% LEL CH4.
- Sensor sensitivity is factory-set. On site, sensor sensitivity can be calibrated on the device when the sensor is at its stabilised operating temperature.

1.2. Replacing a cell unit on OLC 20 or OLC 20 D

When?

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

How?

See the following page

- Switch off the relevant measuring channel.
- Remove the cell unit to be replaced.
- Replace it with a new unit.
- Switch the channel back on and check that it operates correctly.

2. Transmitters OLCT20/20D and OLCT40/40D

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

However, as they constitute safety equipment, it is recommended that these types of TRANSMITTERS should be calibrated at least twice a year (in normal operating conditions).

2.1 CALIBRATION

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




- After removing the cell block from the transmitter, calibration is performed using a calibrating bench provided for that purpose.

Note:

To operate this bench, see the operating procedure supplied with it.

Calibrating procedure

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

On the data logger	On the TRANSMITTER⁽¹⁾
<p>Switch off the measuring channel</p>	<div style="text-align: right; margin-bottom: 10px;">  <p>Loosen the locking screw</p> </div> <div style="text-align: right; margin-bottom: 10px;">  <p>1 : Rotate the unit through ¼ turn 2 : Extract it</p> </div> <div style="text-align: right;">  <p>- Disconnect the connector linking the cell unit to the transmitter body.</p> </div> <p>Reinstall the same newly calibrated unit or a replacement unit and reinstall the whole assembly.</p>
<p>Switch the measuring channel back on and make sure that it is working properly, after stabilizing the measurement.</p>	

¹ Reminder: Transmitters **OLCT20(D)** and **OLCT40(D)** use the same cell unit.

2.2 . CALIBRATION SPECIFICATIONS

CAUTION:

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

CELL UNIT **OLCT20/40 (D)**
(explo/tox/O₂)



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

2.3 Replacing a cell unit on OLCT 20/20D or OLCT 40/40 D

When?

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

How?

- Switch off the relevant measuring channel.
- Remove the cell unit to be replaced.
- Replace it with a new, precalibrated unit.
- Switch the channel back on and check that it operates correctly.

3. Scrapping of olct 20 40

Concerning the conservation, of the protection and the improvement of the quality of the environment, as well as for the protection of the health of the persons and the careful and rational use of natural resources, OLCT 20 40 has to be the object of a selective collection for the electronic equipments and cannot be scrapped with the normal domestic waste. The user thus has the obligation to separate the OLCT 20 40 of the other waste so as to guarantee that it is recycled in a sure way at the environmental level. For more details of the existing sites of collection, contact the local administration or the distributor of this product.



VI. List of spare parts

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

1 Explosion-proof cell units OLCT 20/20 D and OLCT40/40D

EXPLOSION-PROOF CELL UNITS (ADF)	REFERENCES
CELL UNIT OLCT20 ADF EXPLO C1000	6313685
CELL UNIT OLCT20 ADF EXPLO AP	6313686
CELL UNIT OLCT20 ADF KATHARO C1000	6313687
CELL UNIT OLCT20 ADF NH3 5000ppm	6313688
CELL UNIT OLCT20 ADF CO – 100 PPM	6313690
CELL UNIT OLCT20 ADF CO – 300 PPM	6313691
CELL UNIT OLCT20 ADF CO – 1000 PPM	6313692
CELL UNIT OLCT20 ADF H2S – 30 PPM	6313695
CELL UNIT OLCT20 ADF H2S – 100 PPM	6313696
CELL UNIT OLCT20 ADF H2S – 1000 PPM	6313697
CELL UNIT OLCT20 ADF NO – 100 PPM	6313698
CELL UNIT OLCT20 ADF NO – 300 PPM	6313699
CELL UNIT OLCT20 ADF NO – 1000 PPM	6313700
CELL UNIT OLCT20 ADF H2 – 2000 PPM	6313706
CELL UNIT OLCT20 ADF NH3 – 100 PPM	6313707
CELL UNIT OLCT20 ADF NH3 – 1000PPM	6313708
CELL UNIT OLCT20 ADF O2 0–30% vol	6313710



2 Intrinsic safety cell units OLCT 20/20 D and OLCT40/40D

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



3. Explosion-proof cell units OLC20 and OLC20D (remote cell)



Explosion-proof cell unit C1000	6313757
Explosion-proof cell unit AP (antipoison)	6313758
Katharometric cell unit	6313759
High-temperature explo. cell unit	6314571

VII. List of accessories for detectors OLC20/20D and transmitters OLCT20/20D, OLCT40/40D

TOOL KIT	6147869		
GAS INPUT DEVICE	6331141		
GAS CIRCULATION HEAD For explosive gases, CO, H ₂ s, O ₂	6327910		
SPLASH GUARD DEVICE	6329004		
PROTECTIVE FILTER, PTFE	6335975		
ACTIVE CARBON FILTER	6335976		
REMOTE GAS INJECTION HEAD (for explosive gases only)	6327911		

VIII. TECHNICAL CHARACTERISTICS OF OLC20 and OLC20D



OLC20



OLC20D

1. Electric power supply

Power supply:	voltage on detector terminals = 2.8 V max
Power consumption:	3-wire version = 400 mA max
Mesurement signal:	Wheastone bridge
Line length (shielded cable):	3-wire version = 1 km as 3x 1.5 mm ² (32 ohms in loop mode)

2. MISCELLANEOUS

Protection index : IP66
WEIGHT: 800 g
Dimensions :60 X 120 mm

IX. Technical characteristics of OLCT20/20D and OLCT40/40D



1. Electric power supply

A) Explosion-proof version

Power supply:	voltage on detector terminals = 15 V to 30 V
Power consumption:	3-wire version = 100 mA 2-wire version = 25 mA
Load resistance:	maximum resistance = 250 ohms
Line length (shielded cable):	3-wire version = 1 km as 3x 1.5 mm ² (32 ohms in loop mode) 2-wire version = 4 km as 3x 1.5 mm ² (32 ohms in loop mode)

B) Intrinsic safety version

Characteristics of ZENER barrier:	28 V - 300 ohms
Supply voltage for barrier:	19 V to 26 V
Voltage on detector terminals:	10 V to 26 V
Power consumption:	25 mA max
Load resistance:	47 ohms
Line length (shielded cable):	1 km as 3x 1.5 mm ² (32 ohms in loop mode)

2. Output signal

Source mode current = 4-20 mA
Max. current: 25 mA
Fault current: <1 mA

3. MISCELLANEOUS

	OLCT20/20D	OLCT40/40D
Protection index	IP66	IP66
Weight	800grs	1K200
Dimensions	60X120 mm	70X 130 mm

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

The OLC/OLCT 20 & 40 detection devices comply with the requirements of European Directive ATEX 94/9/EC on potentially explosive atmospheres.

As a result of its metrological performance, as tested by the research and testing organisation INERIS, the OLC/OLCT 20 & 40 devices, designed to measure explosive gasses and oxygen, are classified as a safety devices and may therefore contribute to limiting the risk of explosion.

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

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

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

1.1. Explosion-proof detectors (d): OLC/OLCT 20 d and enlarged safety (e) and explosion-proof (d) : OLC/OLCT40 d

- These detectors are intended for use in surface industries II, Category 2, zones 1 and 2 (Gas) and zones 21 and 22 (Dust) in ambient temperature from -20°C to +60°C.
- Cables will be mechanically protected.
- The transmitter casing will be earthed using the external or internal terminal, which should be corrosion-protected. Users should clean detectors regularly in order to prevent any external accumulation of dust.
- Mechanically, detectors will be installed such that the detection cell points downwards. Any variance of over 45° from the vertical will result in measurement errors.
- Where connections are located in a classified zone, they will be enclosed in approved envelopes.

1.2. Explosion-proof detector (d) version HT High Temperature

- The OLC20 d HT cell block is intended for use in surface industries II, Category 2, zones 1 and 2 (Gas) in ambient temperature ranges that vary according to the temperature classes applying to the zone concerned:
 - Temperature class T4: Ambient temperatures from -20°C to +110°C
 - Temperature class T3: Ambient temperatures from -20°C to +180°C
 - Temperature class T2: Ambient temperatures from -20°C to +200°C
- The cable will be mechanically protected.
- The transmitter casing will be earthed using the external terminal, which should be corrosion-protected.
- Where connections are located in a classified zone, they will be enclosed in approved envelopes.

1.3. Intrinsic safety detectors (i) OLCT20 i and OLCT40 i

- These detectors are intended for use in surface industries II, Category 1, zones 0, 1 and 2 (Gas) and zones 20, 21 and 22 (Dust). They are also intended for coal mines II, Category M1. The ambient operating temperature range is -25°C to $+70^{\circ}\text{C}$.
- Users should clean detectors regularly in order to prevent any external accumulation of dust.
- The person responsible for IS installation (the “System Designer”) must draw up a system document demonstrating that every aspect of the Power Cable Detector system complies with intrinsic safety. Please refer to EN 50039 for group II when drafting this document.
- They must be powered by an intrinsic safety source: 28V - 300 ohms
- Where connections are located in a classified zone, they will be enclosed in approved envelopes.
- The safety parameters applying to the OLCT20i and OLCT40i detectors are :

Ui (V)	Ii (mA)	Pi (mW)	Ci (nF)	Li (H)
28	94	658	40	15 μ H

2. Metrological specifications for explosive gas and oxygen measurement detectors

The OLC/OLCT 20 & 40 transmitter sensors intended to measure explosive gasses and oxygen are classified as safety devices and may therefore contribute to limiting the risk of explosion. N.B.: the OLC20 d High Temperature detector does not fall within this category.

Detectors comply with the following European standards:

Explosive gas detectors :

- OLC20 explosive gas detectors comply with European standards EN 50054 and EN 50057 for Methane (calibration gas), Propane and Hydrogen (gasses following response curves) where they are used with INDUSTRIAL SCIENTIFIC detection devices SV4B, MX32, MX42A, MX48 and MX52.
- OLCT20 and OLCT40 explosive gas detectors comply with European standards EN 50054 and EN 50057 for Methane (calibration gas), Propane and Hydrogen (gasses following response curves), where they are used with INDUSTRIAL SCIENTIFIC detection devices SV4B, MX32, MX42A, MX48 and MX52, or where they are connected to measurement devices with 4-20 mA inputs in accordance with paragraph 1.5 of Appendix II of the ATEX 94/9/EC Directive and are compatible with their characteristics (cf. transfer curve).

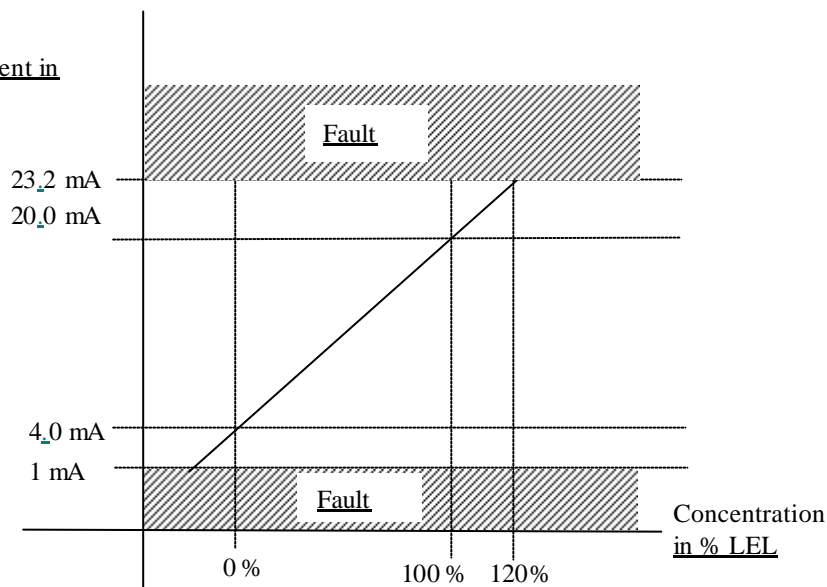
Oxygen detectors :

- OLCT20 and OLCT40 oxygen detectors comply with European Standard EN 50104 where they are used with INDUSTRIAL SCIENTIFIC detection devices MX32, MX42A, MX48 and MX52, or where they are connected to measurement devices with 4-20 mA inputs in accordance with paragraph 1.5 of Appendix II of the ATEX 94/9/EC Directive and are compatible with their characteristics (cf. transfer curve).

2.1. Technical Specifications and Special Instructions for explosive gas detectors

2.1.1. Transfer curves for OLCT 50 / OLCT50-A detectors

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



Please note: Detectors can generate ambiguous measurements at high gas concentrations, i.e. the current output for a > 20% concentration of gas by volume is the same as for a concentration of < 5% by volume (bell curve). It is therefore essential that the measuring device memorises the fact that the value has exceeded the scale and that resetting is manual rather than automatic, and follows the safety regulations specific to the site.

2.1.2. Metrological details

Type	C1000 filaments - +VQ1
Maximum concentration	100% LEL
Principle	Catalytic
Estimated service life	> 36 months
Storage	Away from air -10°C < T < 35°C 10% < RH < 60%. Maximum 6 months

Continuous temperature range		-20°C to +55°C			
Humidity range		0% RH to 95% RH			
Pressure range		1 bar ± 10%			
Linearity variance (methane scale)		Between 0% and 70% LEL: ≤ 1% LEL Between 70% and 100% LEL: ≤ 7% LEL			
Measurement reproducibility		± 2% of the value measured, or ± 1 LEL (or ± 0.05% CH ₄)			
Long-term drift in normal operating conditions	Zero point: Sensitivity: Methane Propane/Butane	< 5% methane LEL per year Typical drift values < 20% of the value measured per year < 10% of the value measured per year			
Effect of humidity (10% to 90% RH) at 40°C		± 5% of relative sensitivity			
Maximum recommended interval between calibrations (normal operating conditions)		6 months			
Calibration concentration		30– 80% LEL			
Response time (may vary ± 10% between sensors)	gas and concentration injected	Methane (50% LEL)	Hydrogen (50% LEL)	Pentane (52% LEL)	Styrene (45% LEL)
	t25	4 sec	3 sec	8 sec	12 sec
	t50	8 sec	6 sec	12 sec	40 sec
	t90	15 sec	10 sec	27 sec	60 sec

2.1.3. Special precautions for explosive gas detectors

- Cells are sensitive to certain poisons, which can reduce their sensitivity: emission of silicone-containing vapours at concentrations > 10 ppm and chlorinated or sulphurous products at concentrations > 100 ppm.
- A lack of oxygen (< 15% O₂) or over-oxygenation (> 23% O₂) may cause under-measurement (in the former case) or over-measurement (in the latter case).
- Cells must be located head downwards at installation or during maintenance work.

2.1.4. Response to other explosive gasses

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

Table 1: CALIBRATION COEFFICIENTS

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

Gas recommended for sensor calibration

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

Value to be displayed:

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

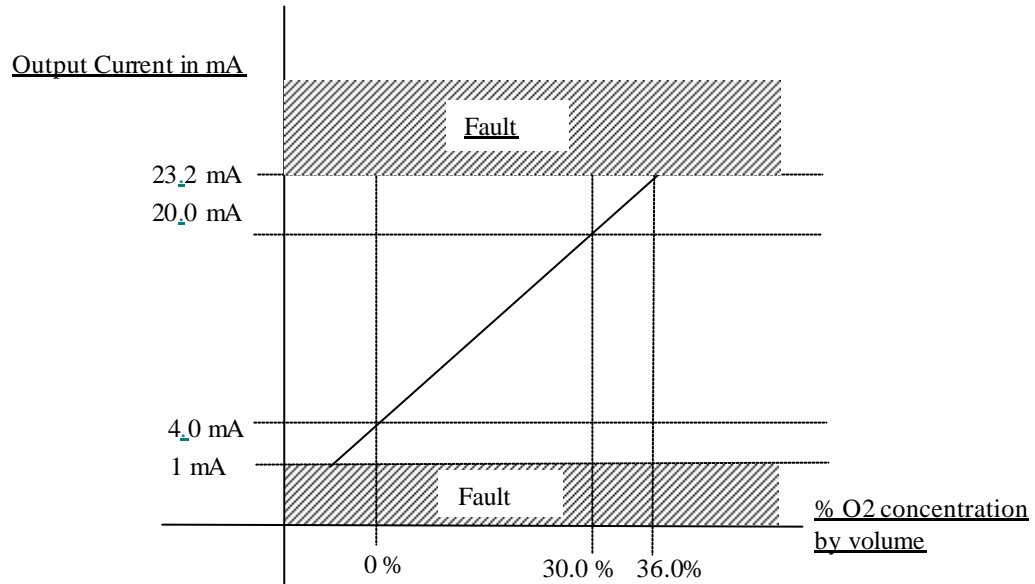
N.B.:

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

2.2. Technical Specifications and Special Instructions for Oxygen detectors

2.2.1. Transfer curves for OLCT 20 / OLCT 40 detectors

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



2.2.2. Metrological details

Maximum concentration	30% O ₂
Type and number	CT5020 CELL
Principle	2-electrode electrochemical (Measurement of oxygen concentration by volume)
Estimated service life	30 months
Storage	4°C < T < 12°C 10% < RH < 60%
Temperature range	-20°C to +45°C
Humidity range	20% RH to 95% RH
Pressure range	1 bar ± 10%
Accuracy at 20°C	15 to 21% O ₂ ± 0.5% vol O ₂ 1 to 14% O ₂ ± 0.6% vol O ₂
Repeatability	< 2% of signal
T90 response time	< 15 seconds
Effect of temperature (0 to 40°C)	< 0.5% vol O ₂
Effect of humidity (10% to 90% RH)	The measurement is lower as a result of the air being diluted by water vapour
Sensitivity drift over time	< 2% per month
Zero stabilisation time following power-up	30 to 60 minutes

2.2.3. Characteristics and Special precautions for oxygen detectors

- When the sensor is powered up or the measurement cell is replaced, it takes between 30 and 60 minutes for the measurement to stabilise at 20.9% v/v in pure ambient air.
- The use of an oxygen-rich atmosphere (> 25%) can compromise safety.

3. MARKINGS

3.1. Explosion-proof safety version : OLC20d and OLCT20 d

OLDHAM Arras

 0080

OLC20d or OLCT20d

 II 2GD

IP66

EEx d IIC T6 (85°C)

INERIS 01ATEX0004X

Do not open when powered.


Serial number, year of manufacture

3.2. Explosion-proof safety version: OLC20d High temperature HT

OLDHAM Arras

 0080

OLC20d

 II 2G

EEx d IIC T4 AmbT -20°C + 110°C

EEx d IIC T3 AmbT -20°C + 180°C

EEx d IIC T2 AmbT -20°C + 200°C

INERIS 01ATEX0004X

Do not open when powered.


Serial number, year of manufacture

3.3. Intrinsic safety version: OLCT20 i

OLDHAM Arras

 0080

OLCT20i

 II 1 GD

IP66

EEx ia IIC T4 (T135°C)

INERIS 01ATEX0004X

Do not open when powered

Serial number, year of manufacture

3.4. Explosion-proof and enlarged safety version : OLC 40 d/OLCT40d

OLDHAM Arras

CE 0080

OLC40d or OLCT40d



II 2GD

IP66

EEx e d IIC T6 (85°C)

INERIS 01ATEX0006X

WARNING : ELECTROSTATIC CHARGES

RUB OR WIPE ONLY WITH A WET RAG

Serial number, year of manufacture

3.5. Intrinsic safety version: OLCT40 i

For Group I

OLDHAM

CE 0080

OLCT40i



I M1

IP66

EEx ia I

INERIS 01ATEX0006X

DO NOT OPEN WHEN POWERED

For Group II

OLDHAM

CE 0080

OLCT40i



II 1GD

IP66

EEx ia IIC T4 (135°C)

INERIS 01ATEX0006X

DO NOT OPEN WHEN POWERED

Warning : Electrostatic charges : rub or wipe only with a wet rag

MANUFACTURER DECLARATION OF CONFORMITY

**INDUSTRIAL
SCIENTIFIC**



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 European Directives:

Gas Detectors OLC20 d / OLC20 d HT / OLCT20 d / OLCT20 i

I) European Directive ATEX 94/9/CE of 23/03/94: Explosive Atmospheres

N° of EC type examination certificate:

INERIS 01ATEX0004X

N° of the Production Quality Assurance Notification of the Arras factory:

INERIS 00ATEXQ403

Issued by the Notified Body n°0080:

INERIS, 60550 Verneuil, France.

Rules of construction:

EN50014, EN50018, EN50020, EN50284, EN50281-1-1, EN50303

- OLC20d - OLCT20d :



II 2 GD / EEx d IIC T6 (85°C) IP66

- OLC20d HT:



II 2 G / EEx d IIC T2 (Tamb :-20 +200°C), T3(-20 +180°C), T4 (-20 +110°C)

- OLCT20i :



II 1 GD / EEx ia IIC T4 (135 °C) I M1 / EEx ia I IP66

Note: the equipment is not impacted by the substantial modifications of the applicable harmonized standards series EN 60079-0, -1, -11

Performance Standards:

EN 50054, EN 50057 (Reference gas methane – standard sensors C1000)

- OLC20 combustible gases, when connected to control units SV4B, MX32, MX42A, MX48, MX52

- OLCT20 combustible gases, when connected to control units MX32, MX42A, MX48, MX52, MX62 or others control units compliant to à ATEX 94/9/CE, Annexe II, Ch1.5

Performance Standard:

EN 50104 (oxygen gas)

- OLCT20 oxygen gas, when connected to control units MX32, MX42A, MX48, MX52, MX62 or others control units compliant to à ATEX 94/9/CE, Annexe II, Ch1.5

Functional Safety Standard:

EN 50402

- OLC20 and OLCT20, combustible gases and oxygen, present an architecture in conformity with the standard according to following levels:

- Level SIL Capability 1, with a period of maintenance no more than 6 months.
- Level SIL Capability 2, with a period of maintenance no more than 3 months.

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

European Standards:

EN 50270

Functional Safety: Reliability Data

The reliability analysis, based on INERIS report n° CGR 74448 of 06 July 2006 has determined:

Annual failure rate of detector OLC/OLCT20 for combustible gas: $\lambda_{da} \text{ annual} = 4.42 \cdot 10^{-2}$

Note: The calculated failure rate are only valid on the real lifetime of the sensitive elements (limited time, about 3 to 5 years). Beyond that, due to ageing of the measuring cells, the rate is not significant any more. The Standard EN50402 assumes for the simple modules like sensors OLC/OLCT20, an effective Safety Failure Fraction (SFF) between 60% and 90%.

Arras, 20 oct/09

ATEX Authorized Representative

Lionel Witrant

Engineering Director



Industrial Scientific Oldham

Z.I. EST - B.P. 20417
62027 ARRAS Cedex - FRANCE
Tel +33 3 21 60 80 80
Fax +33 3 21 60 80 00

MANUFACTURER DECLARATION OF CONFORMITY

**INDUSTRIAL
SCIENTIFIC**



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 European Directives:

Gas Detectors OLC/OLCT40.

I) European Directive ATEX 94/9/CE of 23/03/94: Explosive Atmospheres

N° of EC type examination certificate:

INERIS 01ATEX0006X

N° of the Production Quality Assurance Notification of the Arras factory:



INERIS 00ATEXQ403

Issued by the Notified Body n°0080:

INERIS, 60550 VERNEUIL, France.

Rules of construction:

EN50014, 50018, 50019, 50020, 50284, 50281-1-1, 50303

- OLC40d –OLCT40d :  II 2 GD / EEx e d IIC T6 (T85°C) IP66
- OLCT40i:  II 1 GD / EEx ia IIC T4 (135 °C) 1 M1 / EEx ia I IP66

Note: the equipment is not impacted by the substantial modifications of the applicable harmonized standards series EN 60079-0, -1, -7 and -11

Performance Standards:

EN 50054, EN 50057 (reference gas methane – standard sensor C1000)

- OLC40 / OLCT40 combustible gases, when connected to control units MX32, MX42A, MX48, MX52, MX62 or others control units compliant to à ATEX 94/9/CE, Annexe II, Ch1.5

Performance Standard:

EN 50104 (oxygen gas)

- OLCT40 oxygen gas, when connected to control units MX32, MX42A, MX48, MX52, MX62 or others control units compliant to à ATEX 94/9/CE, Annexe II, Ch1.5

Functional Safety Standard:

EN 50402

- OLC40 / OLCT40, combustible gases and oxygen, present an architecture in conformity with the standard according to following levels:

- Level SIL Capability 1, with a period of maintenance no more than 6 months.
- Level SIL Capability 2, with a period of maintenance no more than 3 months.

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

European Standards :

EN 50270

Functional Safety: Reliability Data

The reliability analysis, based on INERIS report n° CGR 74448 of 06 July 2006 has determined:

Annual failure rate of detectors OLC/OLCT40 for combustible gas: $\lambda_{da} \text{ annual} = 4.42 \cdot 10^{-2}$

Note: The calculated failure rate is only valid on the real lifetime of the sensitive elements (limited time, about 3 to 5 years). Beyond that, due to ageing of the measuring cells, the rate is not significant any more. The Standard EN50402 assumes for the simple modules like sensors OLC/OLCT40, an effective Safety Failure Fraction (SFF) between 60% and 90%.

Arras, 20 October 09

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Lionel Witrant



Industrial Scientific Oldham

Z.I. EST - B.P. 20417
62027 ARRAS Cedex - FRANCE
Tel +33 3 21 60 80 80
Fax +33 3 21 60 80 00


Engineering Director

XI. APPENDICES

Appendix 1

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

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

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

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

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

Factors to be considered in determining optimal detector positioning:

⇒ potential sources of gas and vapour emissions

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

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

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

⇒ air movements

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

⇒ effect of temperature

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

⇒ positioning to allow easy maintenance, if possible

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

Nous nous engageons

We undertake

1 Les Plus

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

2 Qualité

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

3 Fiabilité & Contrôles

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

4 Mise en service

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

5 Formation

A dispenser des formations ciblées.

6 Contrat d'entretien

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

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

7 Dépannage sur site

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

8 Dépannage en usine

A traiter tout problème qui ne pourrait être résolu sur site par le renvoi du matériel en usine. Des équipes de **techniciens spécialisés** seront mobilisées pour réparer votre matériel, dans les plus brefs délais, limitant ainsi au maximum la période d'immobilisation.
Pour toute intervention du Service Après Vente en France, un numéro Indigo a été mis en place : le 0 825 842 843

1 Strong points

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

2 Quality

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

3 Reliability and inspections

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

4 Start-up

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

5 Training

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

6 Maintenance contract

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

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

7 Field servicing

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

8 Factory repairs

We give the undertaking that any problem that cannot be solved in the field will be dealt with by the return of the equipment concerned to our factory. Teams of specialized technicians are on hand to ensure the immediate repair of your equipment in the shortest possible time, so keeping downtimes for your equipment to a minimum. For any specific technical question, please contact our technical support service : 00 33 3 21 60 80 80

NOTRE MISSION

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

OUR MISSION :

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

**INDUSTRIAL
SCIENTIFIC**

EUROPEAN PLANT AND OFFICES
Z.I. Est - rue Orfila B.P. 20417 - 62027 ARRAS Cedex FRANCE
Tél.: 33 3 21 60 80 80 - Fax: 33 3 21 60 80 00

Web site : <http://www.indsci.com>

AMERICAS

Tel. : +1 412 788 4353
Fax : +1 412 788 8353
info@indsci.com

ASIA PACIFIC

Tel. : +86 10 8497 3970
Fax : +86 10 8497 3971
sales@isc-cn.com

EUROPE

Tel. : +33 3 21 60 80 80
Fax : +33 3 21 60 80 00
info@eu.indsci.com

AUSTRALIA/INZ

Tel. : +61 2 8870 3400

GERMANY

Tel. : +49 231 9241-0

NETHERLANDS

Tel. : +31 76 5427 609

SINGAPORE

Tel. : +65 6561 7377

CZECH REPUBLIC

Tel. : +420 234 622 222/3

MIDDLE EAST

Tel. : +971 50 455 8518

SWITZERLAND

Tel. : +41 26 652 51 18

UNITED KINGDOM

Tel. : +44 1280 706114