Digital Transmitter OLCT10N

OLDHAM
An Industrial Scientific Company

P/N : NPO10NGB

Rev A

INDUSTRIAL SCIENTIFIC

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

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

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Contents

Thank you for choosing this OLDHAM instrument.

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

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

The extent of our responsibility

- INDUSTRIAL SCIENTIFIC OLDHAM 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, installation, or storage of the equipment, which is the result of not complying with the instructions and warnings, and/or with the standards and regulations in force.

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- **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 INDUSTRIAL SCIENTIFIC OLDHAM by INDUSTRIAL SCIENTIFIC OLDHAM personnel or by personnel authorized by INDUSTRIAL SCIENTIFIC OLDHAM.

Guarantee

- Under normal conditions of use and on return to the factory, parts and workmanship are guaranteed for 3 years, excluding such consumables as sensors, filters, etc.

Destruction of the equipment

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

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

Chapter 1 | Presentation

Purpose

The OLCT10N is a digital detector designed to detect a particular gas depending on the type of sensor used.

Composition of the detector

An OLCT10N detector comprises the following elements:

Rep.	Description
1.	Enclosure
2.	Cable gland
3.	PCB
4.	Sensor
5.	Terminal
6.	Gas input
7.	Led
8.	Cover

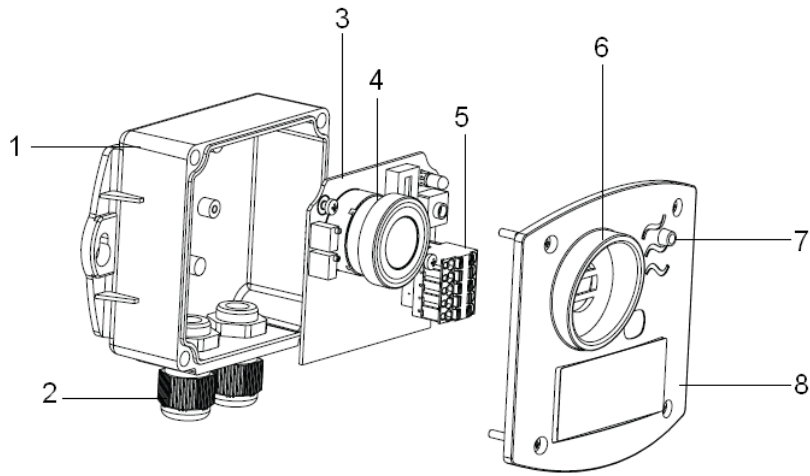

Figure 1 : component parts of an OLCT10N.

Type of detector available

Gas	Range
Oxygen (O2)	0-30% vol
Carbone monoxide (CO)	0-300 ppm
	0-1000 ppm
Hydrogen sulfide (H2S)	0-30 ppm
	0-100 ppm
Nitrogen monoxide (NO)	0-100 ppm
	0-300 ppm
Nitrogen dioxide (NO2)	0-10 ppm
	0-30 ppm
Ammonia (NH3)	0-100 ppm
	0-1000 ppm

Chapter 2 | Installation

Regulations and conditions of use

The sensor in the transmitter should always be in contact with the ambient air.

Therefore:

- Do not cover the detector.
- Do not paint the detector.
- Avoid dust.

Location of the detector

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

Detector positioning

The detectors shall preferably be positioned in an accessible place to facilitate the operations of inspection and maintenance as well as the absolute safety of the operators. The detectors must not be obstructed by anything that will prevent them from measuring the ambient environment to be checked.

The detector shall be installed with the cable gland pointing downwards.

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

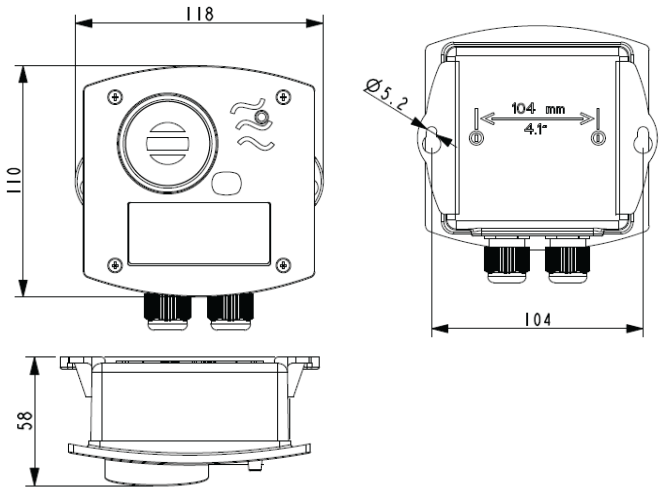

Figure 2 : OLCT10N dimensions

Connection

RS485 transmission

There are two cable entries on the OLCT10N, one entry is for the input signal and one is for the output signal – this is used for digitally connecting multiple transmitters on a single line to the MX43 Controller.

The digital modules are linked by 2 twisted cable pairs of 4 x 0.22 m² minimum, type MPI-22A, nominal resistance of 120 Ohms. This cable carries the RS485 (A and B) signal on one pair and the power supply of the modules (0–24 VDC) connected to the line on the other pair. The + 24 VDC, 0V, A, B terminals are respectively connected to +24VDC, 0V, A, B terminals of the other modules on the line and then to the connector of the corresponding line on the central unit. The cable shielding must be connected to the grounding rod of the MX43.

At the end of the busbar, the 120-Ohm end of line resistor (EOL RESISTOR/RESISTANCE F.D.L) must be activated (switch n°8 must be set to ON, cf fig 5).

No portion of the bare end of the terminal wires should be visible. For protection against any electromagnetic disturbances, the data as well as screen wires (or braids) must be cut as short as possible.

Before connecting the detector to the control unit, please inhibit any installation alarms to avoid unexpected triggering during operation.

The connection of the cable between the detector and central unit should be made with the power off. The site should be at equal potential

Connecting is made according to the following schematic:

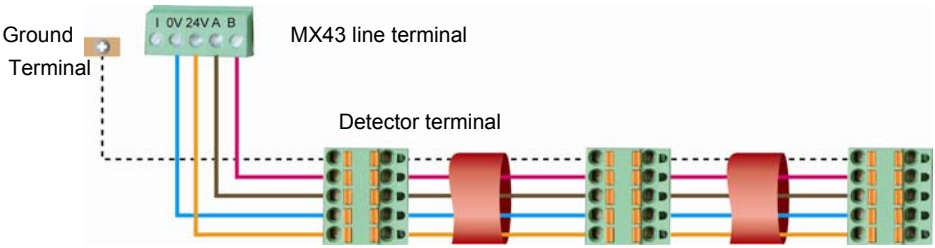

Figure 3 : principle of connecting modules on a MX43 line.

Configuration of communication

Detector address

All the digital modules on a line must be identified by a unique address.

Switches 1 to 5 of the configuration block of each module make it possible to establish an address number (1 to 32) in binary mode.

In the illustration to the right, the address 9 (10010) has been defined.

The *Addressing Table* below lists the possible combinations.

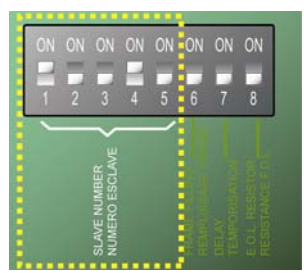

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Figure 4 : Switches of address configuration.

Address	Switches (ON = 1 ; OFF = 0)				
	1	2	3	4	5
1	1	0	0	0	0
2	0	1	0	0	0
3	1	1	0	0	0
4	0	0	1	0	0
5	1	0	1	0	0
6	0	1	1	0	0
7	1	1	1	0	0
8	0	0	0	1	0
9	1	0	0	1	0
10	0	1	0	1	0
11	1	1	0	1	0
12	0	0	1	1	0
13	1	0	1	1	0
14	0	1	1	1	0
15	1	1	1	1	0
16	0	0	0	0	1

Address	Switches (ON = 1 ; OFF = 0)				
	1	2	3	4	5
17	1	0	0	0	1
18	0	1	0	0	1
19	1	1	0	0	1
20	0	0	1	0	1
21	1	0	1	0	1
22	0	1	1	0	1
23	1	1	1	0	1
24	0	0	0	1	1
25	1	0	0	1	1
26	0	1	0	1	1
27	1	1	0	1	1
28	0	0	1	1	1
29	1	0	1	1	1
30	0	1	1	1	1
31	1	1	1	1	1
32	0	0	0	0	0

Table 1 : Addressing table (address depends on switch positions).

Remarks:

- During module replacement, all the configuration switches of a new module must be positioned in the same configuration as those of the the previous module.
- The switch 6 (FRAME FILLING) must be set to OFF (unused option).
- The switch 7 (DELAY) must be set to ON.

End of line resistance

For the last detector of each, set switch n° 8 (EOL RESISTOR/RESISTANCE F.D.L) to ON.

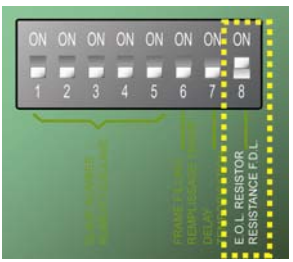

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Figure 5: End of line resistor switch in position "ON".

Scope of use

The sensors have certain limitations; it is essential to fully recognize these limitations

Presence of specific components

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.

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.

Chapter 3 | Maintenance

Maintenance primarily comprises sensor calibration and 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.

Frequency of maintenance

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

The frequency of gas tests depends on the industrial application where the detector is in use. Frequent inspections should be made in the months following the commissioning of the installation, and should then become more widely spaced provided that no significant deviation is observed. The interval between tests should not exceed 3 months. If a detector should fail to react **when** 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 **site** manager should put safety procedures in place on-site. INDUSTRIAL SCIENTIFIC cannot be held responsible for their enforcement.

The OLCT10N can be calibrated either :

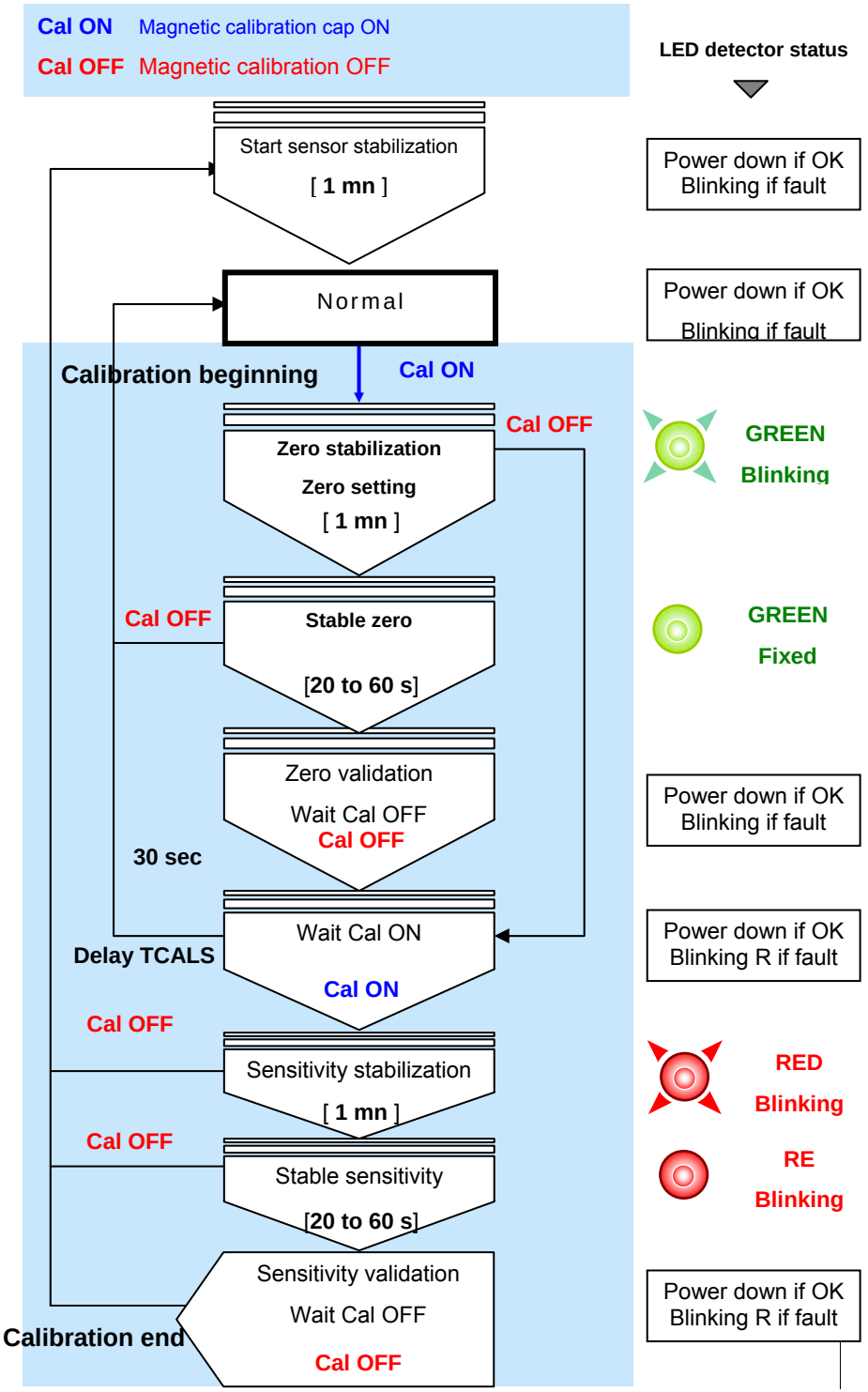
- **Manually**
- **Or automatically**

The manual calibration have to be made only after each sensor or detector replacement. A manual calibration has to be followed by an automatic calibration.

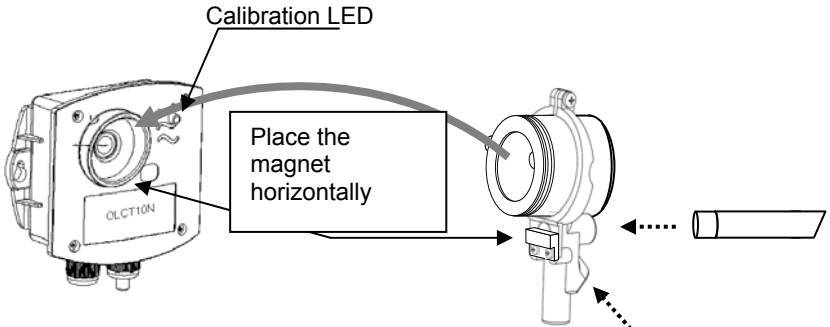
Please find below the different calibration gas concentrations.

Gas	Range	Calibration gas cocnentration
Oxygen (O2)	0-30% vol	20.9 %
Carbone monoxide (CO)	0-300 ppm	100 ppm
	0-1000 ppm	300 ppm
Hydrogen sulfide (H2S)	0-30 ppm	25 ppm
	0-100 ppm	25 ppm
Nitrogen monoxide	0-100 ppm	50 ppm
	0-300 ppm	50 ppm
Nitrogen dioxide	0-10 ppm	10 ppm
	0-30 ppm	10 ppm
Ammonia	0-100 ppm	100 ppm
	0-1000 ppm	1000 ppm

Automatic calibration

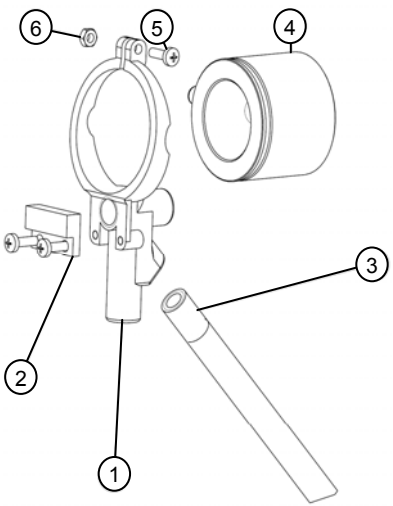

Cal ON Magnetic calibration cap ON
Cal OFF Magnetic calibration OFF
LED detector status
Start sensor stabilization
[1 mn]
Power down if OK
Blinking if fault
Normal
Power down if OK
Blinking if fault
Calibration beginning
Cal ON
Cal OFF
Zero stabilization
Zero setting
[1 mn]
GREEN
Blinking
Cal OFF
Stable zero
[20 to 60 s]
GREEN
Fixed
Zero validation
Wait Cal OFF
Cal OFF
30 sec
Power down if OK
Blinking if fault
Wait Cal ON
Cal ON
Delay TCALS
Power down if OK
Blinking R if fault
Cal OFF
Sensitivity stabilization
[1 mn]
RED
Blinking
Cal OFF
Stable sensitivity
[20 to 60 s]
RE
Blinking
Sensitivity validation
Wait Cal OFF
Cal OFF
Calibration end
Power down if OK
Blinking R if fault

Automatic calibration

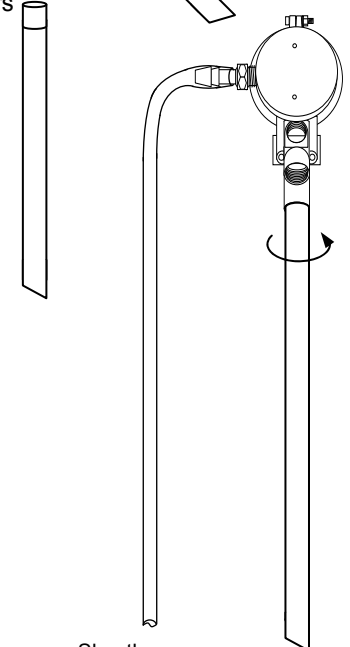


The magnetic calibration allows for one-man and non-intrusive calibration.

Manual calibration with zero and span potentiometers is possible by opening the OLCT10N

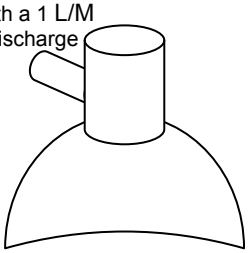


Ref	P/N	QTY	Description
1	**6128 972**	1	Support
2	**6155771**	1	Magnet
3	**6325161**	1	Handle
4	**6331141**	1	Calibration cap
5	**6902406**	3	Screw PCL TZ
6	**6903305**	1	Swivel H M3



Slug the gas

With a 1 L/M discharge



Sensor replacement

Sensors should be replaced as a part of regular preventative maintenance or following a failed calibration test.

After a sensor replacement, both manual and automatic calibrations have to be conducted

To change the sensor:

1. Remove the detector cover
2. Push and hold down the sensor replacement button (1) for 5 seconds until the solid green LED (2) is on.
3. Release the button.
4. Replace the sensor and conduct both manual and automatic calibrations (This is a mandatory step).

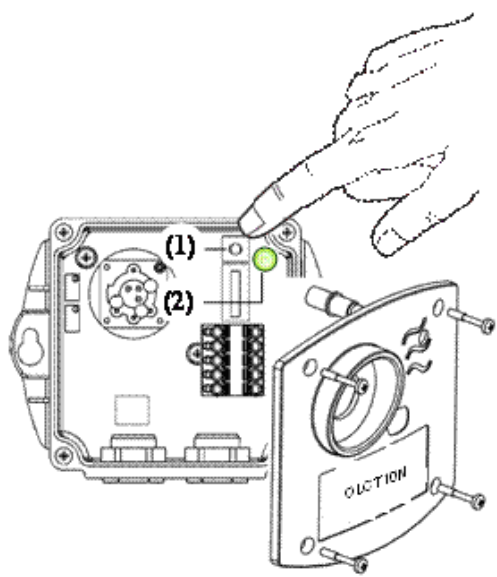


Figure 6: Sensor replacement

Manual calibration

The calibration kit provided by ISC must be used (Ref. 6116291 female connector / wires / voltmeter connection files).

1. Remove the detector cover

2. Connect the cable (strand) to the circuit's male connector

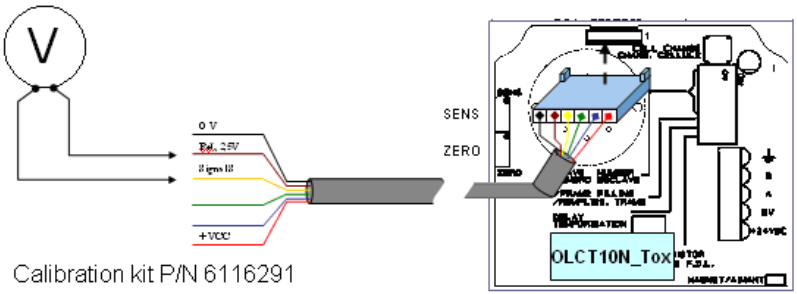
Zero the sensor

1. Ensure that the sensor is in clean air. If not, inject air into the sensor at a flow rate of 1 L/M, then wait for voltmeter levels to stabilize (use the gas injection device: bottle of synthetic air, calibration pipe, tube).
2. Adjust the zero with the potentiometer's ZERO until the voltmeter reads 0 mV.

Sensitivity

1. Now inject the known gas (1 L/M) into the sensor. Wait for the voltmeter signal to stabilize.
2. Adjust the sensitivity if necessary with the potentiometer "**SENS**" until the signal value (in mV) corresponds to the amount of reference gas used. **Use the following formula to calculate the correct value for the signal.**
3. Stop injecting gas (remove the calibration pipe from the sensor).
4. Wait for the voltmeter to "return to zero."

$$U_{(mV)} = \frac{1600 \times \text{Reference gas value}}{\text{Measuring scale}}$$



Calibration kit P/N 6116291

MAINTENANCE WIRES:

+VCC (**red**) = + power supply

Signal S (yellow) = signal from 0 mV to 1600 mV for zero and sensitivity settings

Ref 2,5V (brown) = zero reference for signal reading from 0 mV to 1600 mV

GND (black) = electronic circuit ground

Note: Blue and green wires will not be used.

Chapter 4 | Part numbers and accessories

Part Number	Description
OLCT10N-200	OLCT10N Digital detector, range 0-30% vol O2
OLCT10N-204	OLCT10N Digital detector, range 0-300 ppm CO
OLCT10N-205	OLCT10N Digital detector, range 0-1000 ppm CO
OLCT10N-213	OLCT10N Digital detector, range 0-30 ppm H2S
OLCT10N-214	OLCT10N Digital detector, range 0-100 ppm H2S
OLCT10N-216	OLCT10N Digital detector, range 0-100 ppm NO
OLCT10N-217	OLCT10N Digital detector, range 0-300 ppm NO
OLCT10N-219	OLCT10N Digital detector, range 0-10 ppm NO2
OLCT10N-220	OLCT10N Digital detector, range 0-30 ppm NO2
OLCT10N-231	OLCT10N Digital detector, range 0-100 ppm NH3
OLCT10N-232	OLCT10N Digital detector, range 0-1000 ppm NH3

Part Number	Description
6331163	OLCT10N Digital detector Kit including stainless steel bar and a magnetic calibration cap

Chapter 5 | Spare Parts

Spare parts list for the different detectors.

	Description
6313970	OLCT10N Digital detector CO Sensor
6313990	OLCT10N Digital detector H2S Sensor
6113331	OLCT10N Digital detector NO Sensor
6113332	OLCT10N Digital detector NO2 Sensor
6314118	OLCT10N Digital detector NH3 Sensor range 0-100 ppm
6314119	OLCT10N Digital detector NH3 Sensor range 0- 1000 ppm
6313982	OLCT10N Digital detector O2 Sensor

Chapter 6 | Declaration of EC conformity

OLDHAM
Gas Monitoring Solutions
INDUSTRIAL SCIENTIFIC

DECLARATION DE CONFORMITE CONSTRUCTEUR
Manufacturer Declaration of Conformitv

CE

La **Société Industrial Scientific OLDHAM**, ZI Est, 62000 Arras France, atteste que le matériel neuf :
*(The **Company Industrial Scientific OLDHAM**, ZI Est 62000 Arras France, declares that new material)*

Détecteurs de gaz OLCT10N - Gas detector OLCT10N

Est conforme aux exigences des Directives Européennes suivantes :
(Complies with the requirements of the following European Directives)

I) Directive Européenne CEM 2004/108/CE du 15/12/04 : Compatibilité Electromagnétique
The European Directive EMC 2004/108/EC of 15/12/2004: Electromagnetic compatibility

Normes harmonisées appliquées : EN 50270 (Type1)
(Harmonized European Standards)

CE-OLCT10N-1-revA

Arras, le 03/01/2011

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PDG
President

Chapter 7 | Specifications

Detector

Dimensions	118*110*60 mm
Ingress protection	IP65
Enclosure	ABS
Inlet and outlet cable	2 cable gland M16, diameter 4 to 8 mm
Type of cable	Type MPI-22A
Power supply	12-30V
Consumption	Electrochemical sensor : 2.5mA in normal operating @ 24V Catalytic sensor : 50 mA in normal operating@ 24V
Status indication during calibration	LED red/green
Calibration	Automatic, no need to open the sensor due to a gas introduction device equipped with a magnetic switch, or with a potentiometer inside of the case. Calibration gas is set in the detector
Sensor replacement	Sensor replacement switch on the interior of the CPS 10 case. Detection of sensor
Humidity	15-90% RH
Storage conditions	4 – 20 °C 20 – 60 % RH 1 bar ± 10 % 6 months maximum
Certification	CEM EN 50270 (type 1)

Sensor specifications

Gas		Measurement range (ppm)	Temp. range°C	Accurcay	Life Expectancy (months)	T_{50} / T_{90} (sec)
CO	Carbon monoxide	300 1000	-20 to +50	+/- 5	36	15/40
H_2S	Hydrogen sulfide	30 100	-40 to +50	+/- 5	36	15/30
NH_3	Ammonia	100 1000	-20 to +40	+/- 5	24 24	25/70 20/60
NO	Nitric Oxide	100 300	-20 to 50	+/- 5	36 36	10/30
NO_2	Nitrogen dioxide	10 30	-20 to 50	+/- 5	24	30/60
O_2	Oxygen	0-30% vol	-20 to +50	0.4 % vol (from 15 to 22 % O_2)	28	6/15

Line length (use with MX43)

Below is a table which gives the maximum distances in meter (in feet) of wiring OLCT10N transmitters to the MX43 based on cable size when connected on a single line of without the need of an external power supply.

Number of toxic OLCT10N transmitters	Cable core size		
	0.9 mm² (AWG 18)	0.5 mm² (AWG 20)	0.22 mm² (AWG 24)
10			1000 (3200)
20		1000 (3200)	900 (2950)
25		1000 (3200)	500 (1600)
32	1000 (3200)	800 (2625)	300 (980)

Guaranty

1 Plus Points

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

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

2 Quality

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

3 Inspection and Reliability

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

4 Commissioning

If required, to commission your equipment by our Ism-ATEX qualified specialists.

5 Training

To provide detailed training programs.

6 Project department

Our team will investigate all gas and flame detection projects via on-site investigations or from drawings. We can suggest pre-project studies, design, installation and maintenance of safety systems in ATEX or non-ATEX zones with full respect of all standards in force.

7 Maintenance contract

To suggest rolling maintenance contracts tailored to your needs in order to guarantee you maximum safety:

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

8 On-site repair

To rapidly send our Service Technicians to you. This is possible on account of our hubs in France and abroad.

9 Factory repair

To deal with any problem that cannot be resolved on-site by dispatching the equipment back to the factory. Teams of technicians will work on repairing your equipment as quickly as possible, thereby reducing the time spent out of commission to a minimum**.** Cost efficient replacement solutions are available if equipment is deemed not repairable.

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OUR MISSION

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

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The Fixed Gas Detection People

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