TELEDYNE
OLDHAM SIMTRONICS
Everywhereyoulook™

USER MANUAL

OLC/OLCT 10

ANALOG GAS DETECTOR

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.

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Thank you for choosing this TELEDYNE OLDHAM SIMTRONICS 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

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, 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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Warning

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 authorised 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 Chapter 4).

Guarantee

Under normal conditions of use and on return to the factory, parts and workmanship are guaranteed for 2 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.

Table of Contents

1 Presentation of different versions

The **OLC 10, OLC 10 TWIN** and **OLCT 10CAT** combustible gas detectors are detectors fitted with catalytic sensors and intended for use in boiler rooms and parking lots.

The **OLCT 10TOX** gas detectors are 4-20mA transmitters equipped with electrochemical sensors and especially designed to detect toxic gases in commercial and light industrial applications (parking lots, boiler room, etc).

The OLCT 10 SC gas detectors are 4-20mA transmitters equipped with semi-conductor sensors and especially designed to detect toxic or combustible gases.

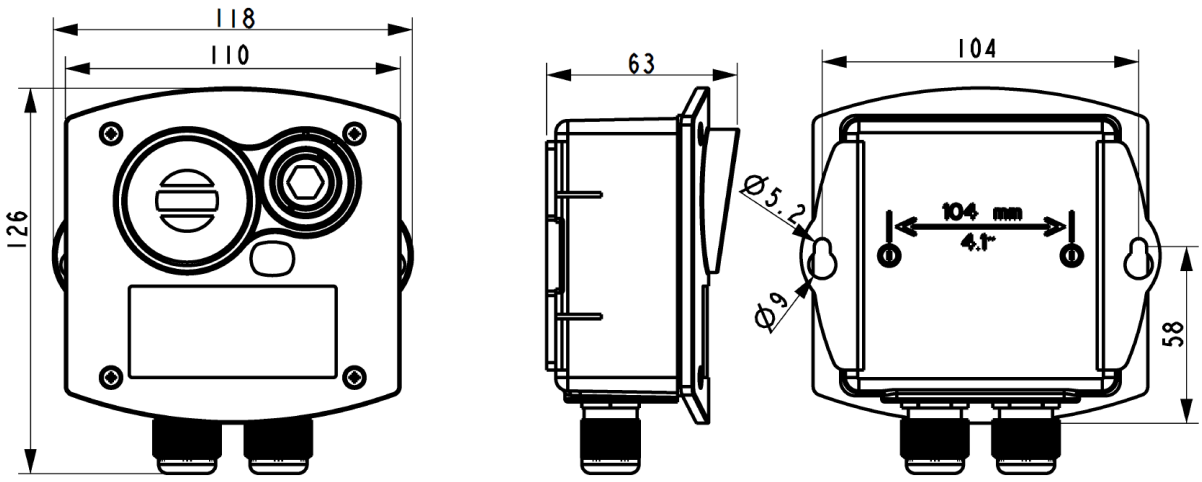
1.1 Different versions available

- OLC 10: combustible gas
- OLC 10 TWIN: combustible gas
- OLCT 10 CAT: combustible gas (transmitter version, 4-20 mA output)
- OLCT 10 TOX: toxic gas (transmitter version, 4-20 mA output)
- OLCT 10 SC: toxic or combustible gas (transmitter version, 4-20 mA output)

Only OLC 10 and OLC 10 TWIN models are certified for use in ATEX zones

2 Mechanical installation of different versions, dimension and mounting

The OLC/OLCT 10 gas detectors-transmitters are mounted vertically with the cable entries positioned downwards.



Drill two holes **104 mm** apart on the base to mount the units.

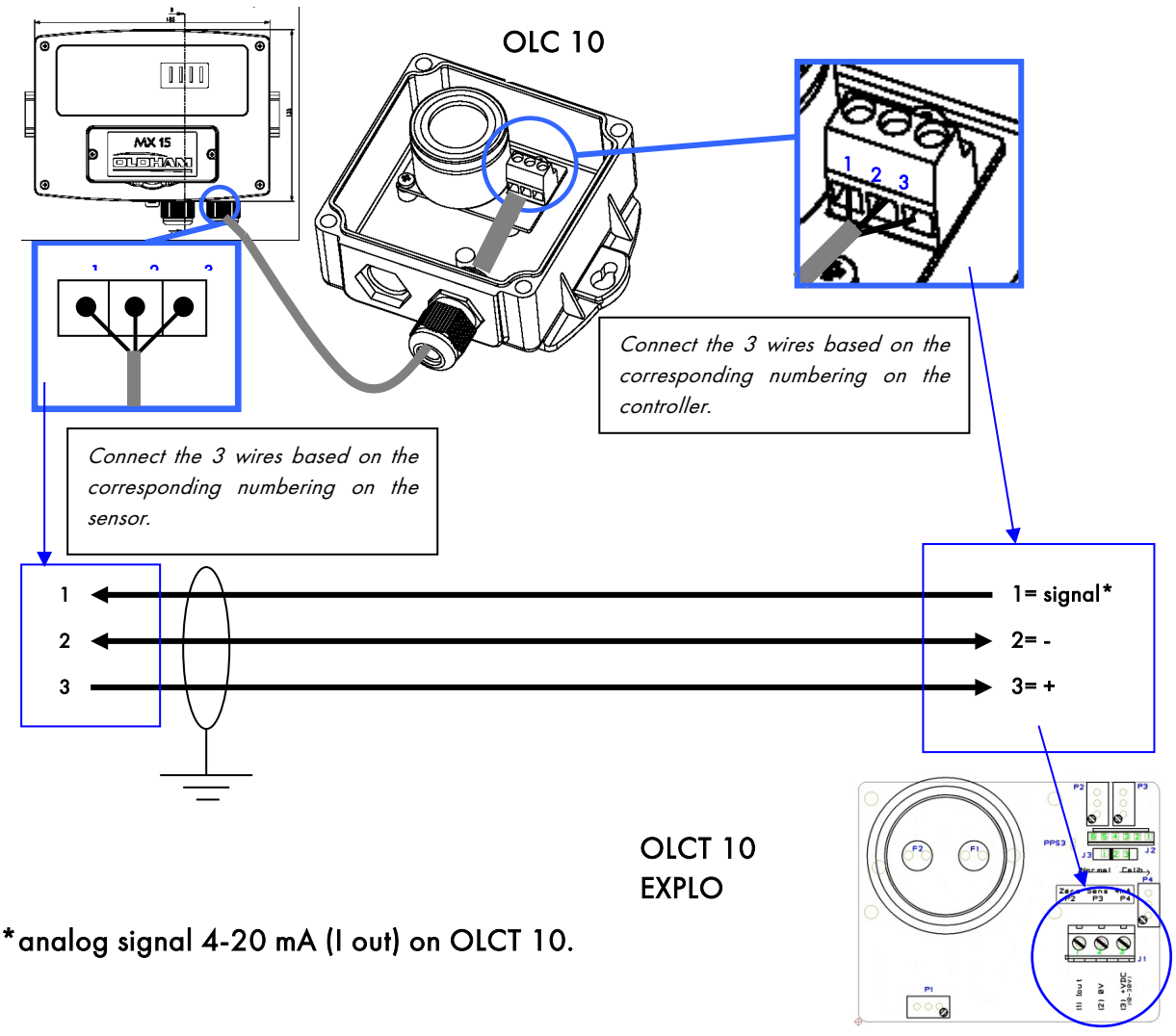
3 Electrical Installation of different versions

3.1 Connection of OLC 10, OLCT 10 CAT or OLCT 10 SC to a controller:

The controller configuration will be different based upon the use of an OLC 10 or OLCT 10

Cable to be used: 3 conductors, 3x1 mm² LiYCY type

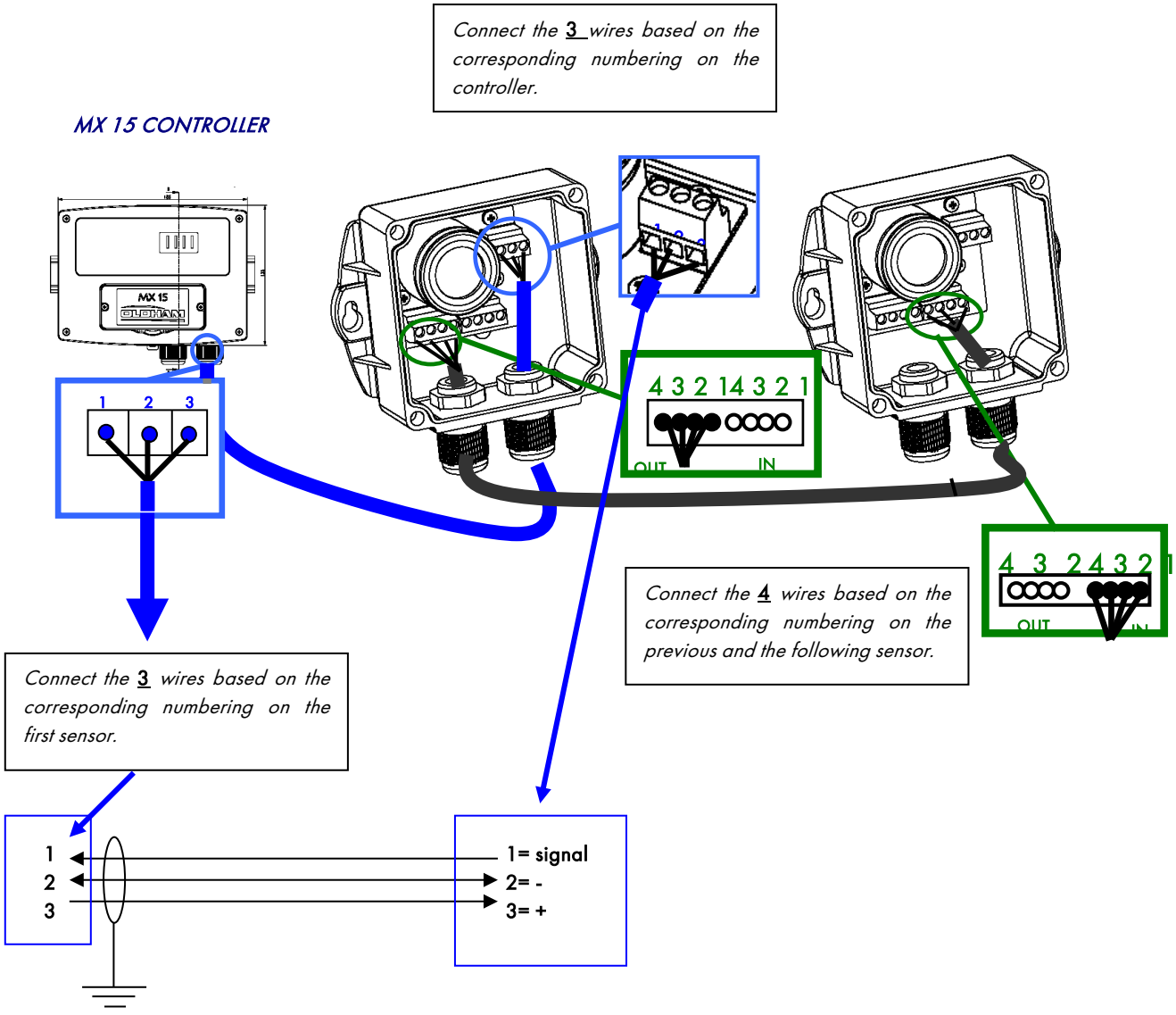
e.g., CONTROLLER MX 15



*analog signal 4-20 mA (I out) on OLCT 10.

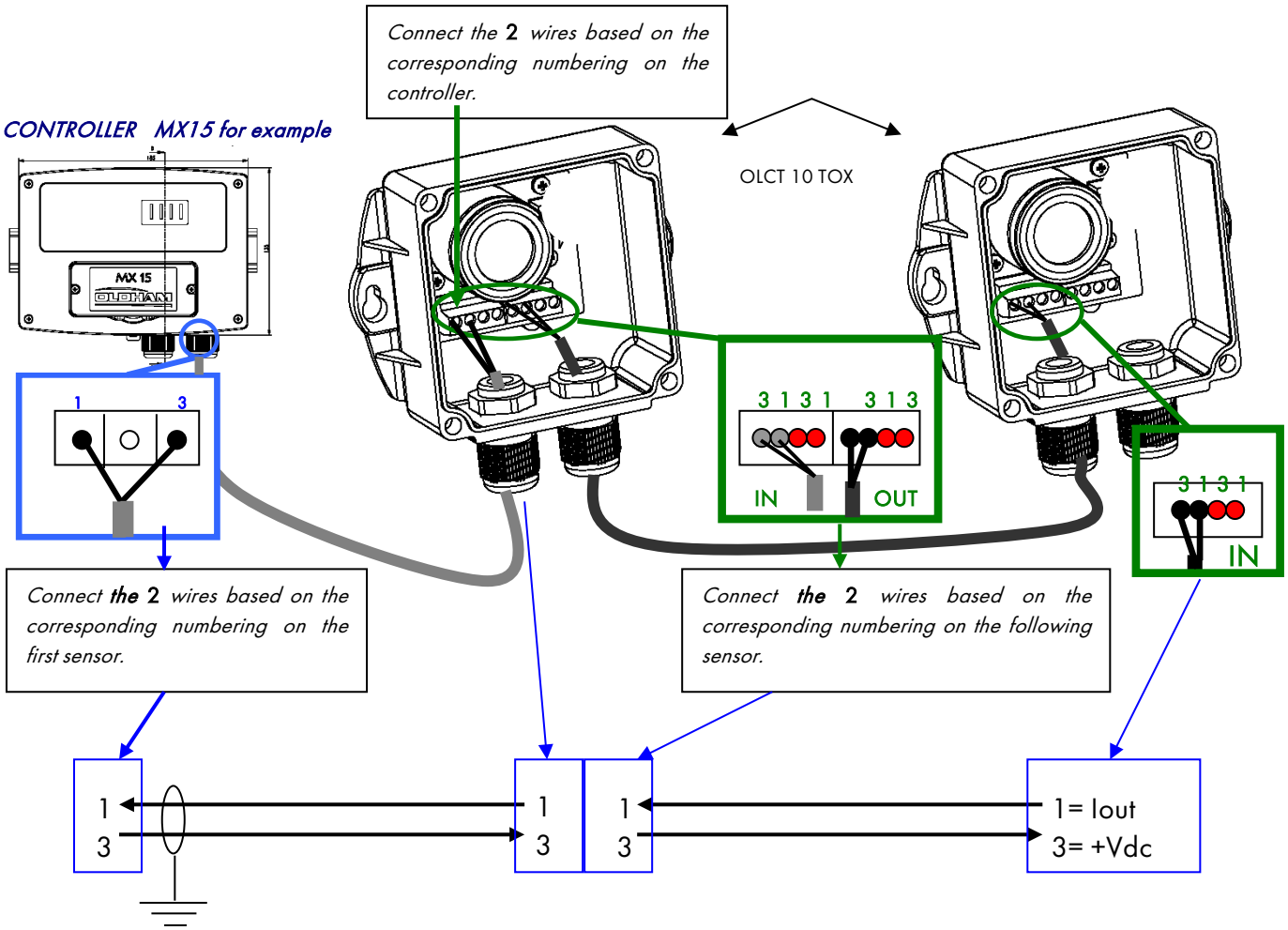
3.2 Connection of two OLC 10 TWIN to a controller

Cable to be used: 3 and 4 core cable, 3x1 mm² and 4x1 mm² LiYCY type



3.3 Connection of two OLCT 10 TOX (maximum 5) to a controller for detection of the same toxic gas

Cable to be used: One pair (0.75 mm²) screened cable



Notes : The free terminals ● allow the connection of another network of OLCT 10 TOX.

COMMENTS:

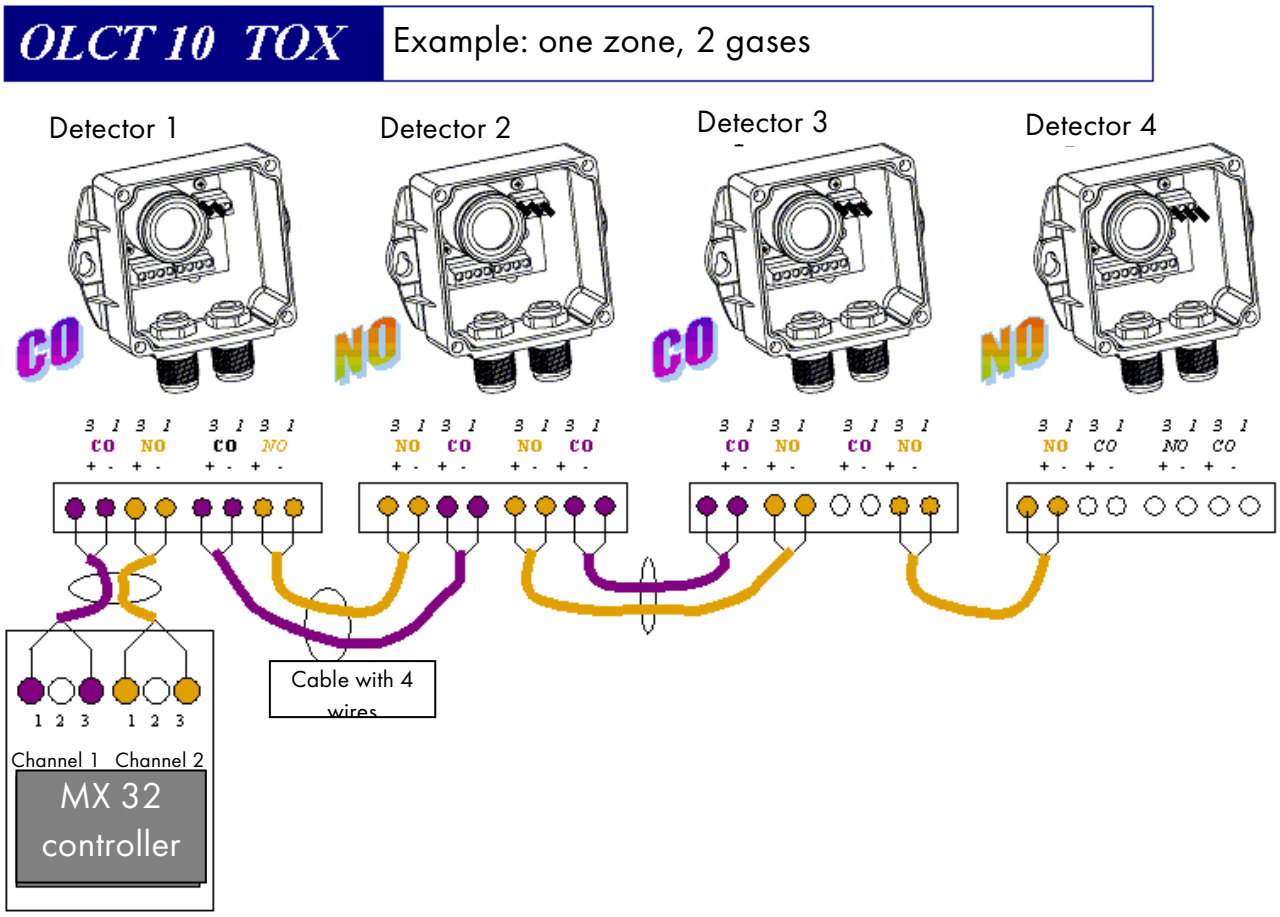
the number of OLCT 10 toxic gas detectors shall be configured on the controller,

the signal read by the controller is the average of the "n" detectors. As a result, a signal fault may not be detected.

In the event that 2 networks are used, it is cost-effective to use a single cable (2 pairs) subject to compliance with wiring as follows:

3.4 Connection of two OLCT 10 TOX networks (5 detectors max. per network) for detection of two different toxic gases or monitoring of two conjoined areas to a two-channel controller

Cable to be used: Two pairscreened cable (0.75 mm²)



Information for this example:

- channel 1 is a channel connected to two sensors for detection of CO
- channel 2 is a channel connected to two sensors for detection of NO
- detector 1 (CO) also acts as junction box for detector 2 (NO)
- detector 2 (NO) also acts as junction box for detector 3 (CO)
- detector 3 (CO) also acts as junction box for detector 4 (NO)

4 Maintenance

Caution: The actions described in this paragraph are intended for authorized and trained individuals who are likely to question the detection safety.

Gas detection instruments are potential life-saving devices. Recognizing this fact, TELEDYNE OLDHAM SIMTRONICS recommends that a functional "bump" test be performed on every fixed gas-monitoring instrument 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.

Bump test frequency depends on application, field conditions, exposure to gas, sensor technology, and environmental conditions. For new installations it may be prudent to carry out bump tests frequently at first, increasing the time intervals as confidence grows with experience in the installation concerned, on the basis of the maintenance record. If an instrument fails to operate properly during any functional "bump" test, a full instrument calibration should be performed successfully prior to use. Calibration frequency will be based on bump tests results. However it cannot be more than 12 months.

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

4.1 Periodic maintenance with an OLC 10 detector (comb. gas)

- The "maintenance" position was selected on the controller in order to disable its relays (see manual of relevant product)

Make sure the detector is in clean air - otherwise inject zero air on the detector (with calibration kit) with a flow rate of 60 l/h, then wait for the stabilisation of measurement

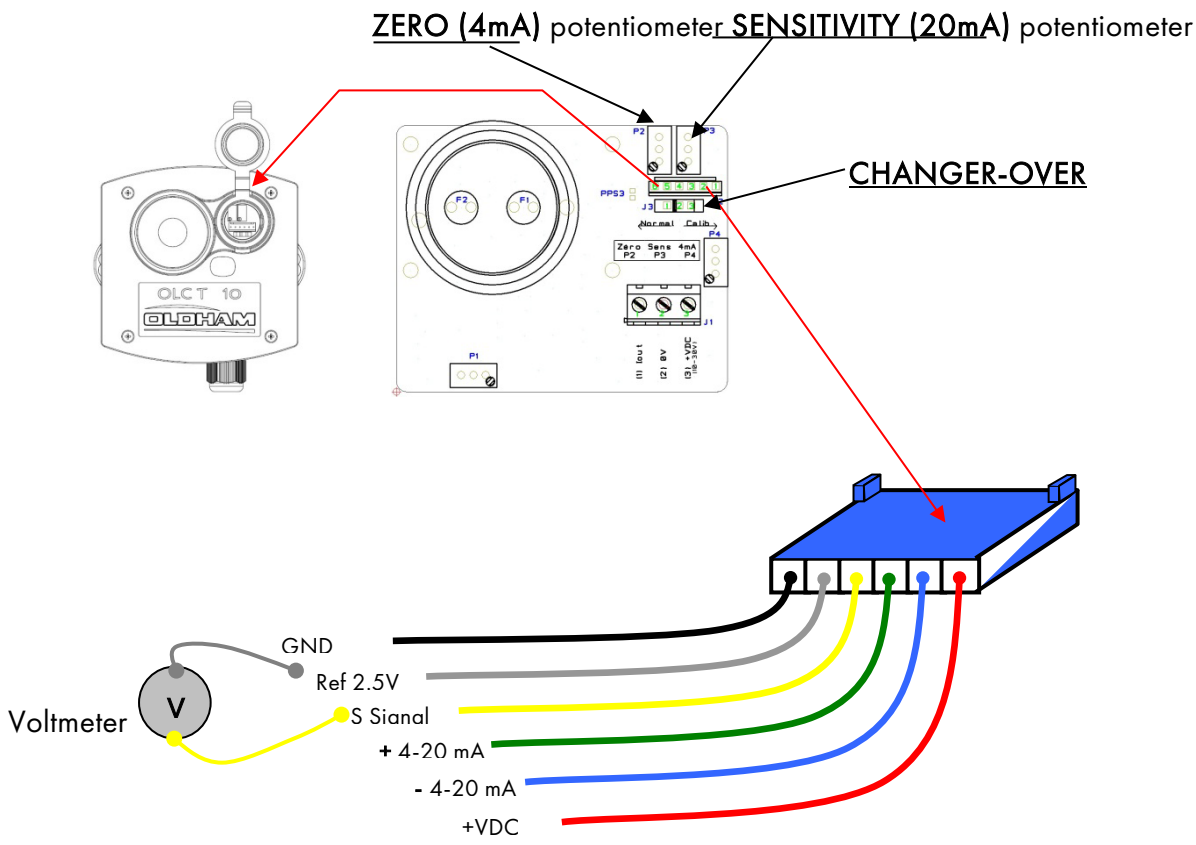
- Perform the zero setting of the controller (see manual of relevant product)
- Now inject the calibration gas (flow rate 60l/h) into the OLC 10 sensor and wait for signal stabilisation on the controller display
- If necessary, calibrate the sensitivity using the "S" potentiometer of the controller (see manual of relevant product)
- Upon completion of calibration: wait for the "return to zero" on the controller display
- Return to the "normal" mode of the controller (see manual of relevant product)

4.2 Periodic maintenance with an OLC 10 TWIN transmitter (comb. gas)

- The procedure is almost identical to point 1 (OLC 10), with the exception of sensitivity adjustment which is performed on the OLC 10 TWIN detector that is less sensitive.
- To determine the least sensitive detector, inject gas on the two detectors, one after the other (wait for the signal to read zero). The detector that gives the lowest measurement is the less sensitive.

4.3 Periodic maintenance with an OLCT 10 transmitter (comb. or toxic gas)

- It is required that the kit provided by TELEDYNE OLDHAM SIMTRONICS be used (P/N 6147872)
- Remove the end-cap that provides access to settings, located on the right side of the sensor
- Connect this kit on the male plug of the circuit, as indicated below:



MAINTENANCE CONNECTOR WIRES:

+VDC/red	+ power supply	
- 4-20mA/blue	- of voltage, image of 4-20mA	Read on the voltmeter 400mV for 4mA and 2000mV for 20mA
+ 4-20mA/green	+ of voltage, image of 4-20mA	
S Signal /yellow	signal from 0mV to 1600mV for zero and sensitivity setting	Voltmeter
Ref 2,5V/gray	zero reference for reading of signal from 0mV to 1600mV	
GND/black	electronic circuit ground	

- Toggle the changer-over (under the connector) on «CAL» position (to the right)

Caution:after 9 minutes the transmitter automatically returns to normal operation! (only version OLCT 10 explo)

Reminder:make sure the detector is in clean air - otherwise inject zero air or nitrogen on the sensor at a flow rate of 60 l/h – and wait for the stabilisation of the measurement given by the voltmeter.

- Set the **ZERO** using the zero potentiometer to read **0 mV** on the voltmeter

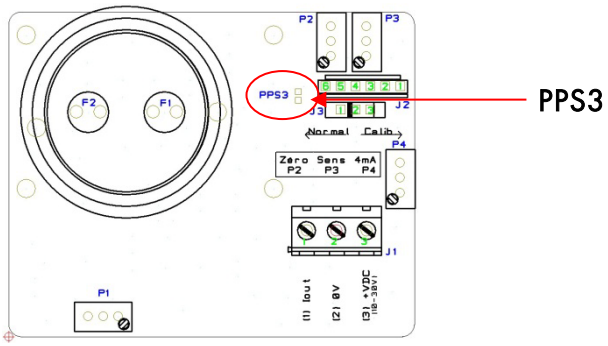
- Now inject the calibration gas (60l/h), wait for the signal stabilisation on the voltmeter
- If required, set the sensitivity using the "**S**" potentiometer to read **1,600mV** for the **full scale** (corresponding to **20mA**)

Note: if you use a gas concentration lower than 100% of the scale, calculate (rule of three) and adjust to obtain the corresponding value (from 0 to 1600 mV)

- Stop calibration gas injection (remove the calibration cup)
- Wait for the "return to zero" on the voltmeter
- Again toggle the changer-over to the normal position (to the left)

<u>Notes regarding the OLCT 10 version for combustible gases:</u>

- The transmitter controls an "**ambiguity resolution**" function: if the sensor detects a gas concentration over 100% LEL (20 mA), it will be locked on a signal of 23.2 mA acknowledgeable through power supply shut-off or toggling of maintenance switch. The ambiguity resolution may be automatically acknowledged if the PPS3 points are short-circuited.



- Upon switching on, the output signal is set to 2mA during the 60-second stabilisation time.

4.4 Reactions to other combustible gases

It is recommended to calibrate the detector with the gas to be measured. When the user wishes to calibrate it with another gas than that detected and factory programmed, refer to the table below, using the recommended gas and corresponding coefficient.

When a VQ1 type sensor is used, the coefficients are as follows: (concern detector PN as 6513559, 6513566, OLCT10-001, OLCT10-002, OLCT10-003, OLCT10-004 and OLCT10-005)

Gas	Empirical formula	LEL	LSE	Vapour density	Coefficient CH_4	Coefficient H_2	Coefficient But
Butane	C_4H_{10}	1.5%	8.5 %	2	1.9	1.25	1.0
Hydrogen	H_2	4.0%	75.6%	0.069		1.0	
Methane	CH_4	5.0%	15.0%	0.55	1.0	0.75	0.55
Propane	C_3H_8	2.0%	9.5	1.6	1.55		0.85
	Gas recommended for the calibration.						

table 1

When a 4F type sensor is used, the coefficients are as follows: (concern detector PN as 6513684, 6513685, OLCT10-AP-001, OLCT10-AP-002, OLCT10-AP-003, OLCT10-AP-004 and OLCT10-AP-005)

Gas	Empirical formula	LEL	LSE	Vapour density	Coefficient CH_4	Coefficient H_2	Coefficient But
Butane	C_4H_{10}	1.5%	8.5 %	2	1.9	1.25	1.0
Hydrogen	H_2	4.0%	75.6%	0.069		1.0	
Methane	CH_4	5.0%	15.0%	0.55	1.0	0.75	0.55
Propane	C_3H_8	2.0%	9.5	1.6	1.55		0.85
	Gas recommended for the calibration.						

table 2

Example (first line in the table 1): calibration of a "Propane" detector with a calibration gas of 1% butane volume

Value to be displayed:

1% (injected butane) x 100 x0.85 (butane/acetone coefficient) = 57% LEL
1.5% (LEL butane)

Note:

LEL varies based on sources.
The coefficients are accurate at ± 15%

4.5 Periodic maintenance with several OLCT 10 transmitters for toxic gas

Use the procedure described in the previous paragraph. However:

- Start with the last transmitter in the loop in relation to the controller
- Calibrate each transmitter in the loop and end with the first

4.6 Sensor replacement

- Sensor has to be replaced as a result of impracticable calibration or as a preventive measure.
- Perform a new calibration after a sensor replacement.

5 Technical specifications

5.1 OLC 10 / OLC 10 Twin Detector

Detection principle:	Catalytic
Range:	0-100% LEL methane, propane or butane.
Output signal:	Wheatstone bridge circuit
Power supply:	Current through TELEDYNE OLDHAM SIMTRONICS MX or SV4B controllers
Connections:	OLC 10 Version: • 3-wire terminal block, maximum distance 300 m in 1.5 mm^2 with MX 15 controller • 1 cable gland M16: cable diameter 4 to 8 mm OLC 10 Twin Version (two sensors on channel input MX 15) • 1 3-wire terminal block to the controller • 1 4-wire terminal block to the second sensor • maximum total distance 300 m in 1.5 mm^2 with MX 15 controller • 2 cable glands M16: cable diameter 4 to 8 mm
Dimensions:	Width 118 mm, Height 126 mm, Depth 63 mm
Material:	Plastic
Protection:	IP65
Storage:	6 months safe from air 0°C<T<20°C +10%<RH<60%
Estimated lifetime:	> 36 months
Temperature range:	-20°C to + 55°C
Humidity range:	0% RH to 95% RH
Pressure range:	1 bar ± 20%
Linearity deviation:	from 0 and 70% LEL: ≤ 1% LEL CH4 from 70 and 100% LEL: ≤ 7% LEL CH4
Long-term drift under normal operating Sensitivity conditions:	Zero < 10% LEL/year < 20 % of the measured value/year
Humidity impact: (10 to 90% RH) at 40°C	± 5 % of relative sensitivity
Response time:	T50 <10 sec, T90<20 sec
Certification:	Electromagnetic Compatibility EN 50270 Explosive Atmospheres: II 3 GD / Ex ec dc IIC T6 Gc Ex tc IIIC T85°C Dc

5.2 OLCT 10 CAT Transmitter

Combustible gas transmitter

Detection principle:	Catalytic
Range:	0-100% LEL methane, propane or butane.
Signal output:	4 – 20 mA, default ≤ 0.5 mA or ≥ 23.2 mA
Ambiguity resolution:	Signal sets at 23.2 mA if measurement ≥ 100% LEL Acquit by power cycling the transmitter Ambiguity resolution may be deleted through point of programming
Settings:	Local through Zero and Sensitivity potentiometers Position Maintenance 2 mA 6-pin connector for gas measuring and current image (100-ohm shunt)
Power supply:	15 to 30 V dc
Consumption:	maximum 100 mA
Cable length:	according to the controller
Load resistance:	300 ohms
Connection:	3-wire terminal block, 2 wires for power supply, 1 wire for signal 1 cable gland M16: cable diameter 4 to 8 mm
Dimensions:	Width 118 mm, Height 126 mm, Depth 63 mm
Material:	Plastic
Protection:	IP65
Storage:	0°C<T<30°C
Estimated lifetime:	> 36 months
Temperature range:	-20 to + 55°C
Humidity range:	0% RH to 95% RH
Pressure range:	1 bar ± 20%
Linearity deviation:	from 0 and 70% LEL: ≤ 1% LEL CH4 from 70 and 100% LEL: ≤ 7% LEL CH4
Temperature drift: (-10°C + 40°C)	< ± 5% LEL Methane or < 20% of indication
Long-term drift normal operating conditions:	under Zero point < 10% LEL methane Sensitivity < 20% of measured value/year
Humidity impact: (10 to 90% RH) at 40°C	± 5% of relative sensitivity
Response time:	T50 <10 sec, T90<20 sec
Certification:	Electromagnetic Compatibility EN 50270

5.3 OLCT 10 CO Transmitter

Detection principle	Electrochemical sensor
Range	0-300 ppm CO
Signal output	4 – 20 mA
Settings	Local through Zero and Sensitivity potentiometers Position Maintenance 2 mA 6-pin connector for gas measuring and current image (100-ohm shunt)
Power supply	15 to 30 VDC
Consumption	maximum 30 mA
Cable length	according to the controller
Connection	1 terminal block with 2 input wires, 1 terminal block with 2 output wires If cable with a gas signal pair 1 terminal block with 2 input wires with copy on 1 terminal with 2 wires 2 cable gland M16 : cable diameter 4 to 8 mm
Dimensions	Width 118 mm, Height 126 mm, Depth 63 mm
Material	Plastic
Protection	IP65
Storage	6 months safe from air 0°C<T<20°C +10%<RH<60%
Estimated lifetime	> 24 months
Temperature range	-20 to + 55°C
Humidity range	15% RH to 90% RH
Pressure range	1 bar ± 20%
Linearity deviation	0 - 100 ppm ± 3 ppm 100 – 1,000 ppm ± 4% relative
Temperature drift (-10°C + 40°C)	< ± 5 ppm or < 5 % of the indication
Long-term drift under normal operating conditions	Sensitivity : < 10% of measured value/year
Response time	T50 <15 sec, T90<30 sec
Certification	Electromagnetic Compatibility EN 50270

5.4 OLCT 10 NO Transmitter

Detection principle	Electrochemical sensor
Range	0-100 ppm NO
Signal output	4 – 20 mA
Settings	local through Zero and Sensitivity potentiometers Position Maintenance 2 mA 4-pin connector for gas measuring and current image (100-ohm shunt)
Power supply	15 to 30 VDC
Consumption	maximum 30 mA
Cable length	according to the controller
Connection	1 terminal block with 2 input wires, 1 terminal with 2 output wires If cable with other gas signal pair 1 terminal block with 2 input wires with copy on 1 terminal block with 2 wires 2 cable glands M16 cable diameter 4 to 8 mm
Dimensions	Width 118 mm, Height 126 mm, Depth 63 mm
Material	Plastic
Protection	IP65
Storage	6 months safe from air 0°C<T<20°C +10%<RH<60%
Estimated lifetime	> 36 months
Temperature range	-20 to + 55°C
Humidity range	15% RH to 90% RH
Pressure range	1 bar ± 20%
Linearity deviation	0 - 10 ppm ± 3 ppm 10 - 100 ppm ± 5 % relative
Temperature drift (-10°C + 40°C)	< ± 10 ppm or < 10% of the indication
Long-term drift under normal operating conditions	Sensitivity < 20% of measured value/year
Response time	T90 < 120 sec
Certification	Electromagnetic Compatibility EN 50270

5.5 OLCT 10 NO2 Transmitter

Detection principle	electrochemical sensor
Range	0-30 ppm NO2
Signal output	4 – 20 mA
Settings	local through Zero and Sensitivity potentiometers Position Maintenance 2 mA 4-pin connector for gas measuring and current image (100-ohm shunt)
Power supply	15 to 30 VDC
Consumption	30 mA max
Cable length	according to the controller
Connection	1 terminal block with 2 input wires, 1 terminal block with 2 output wires If cable with other gas signal pair 1 terminal block 2 input wires with copy on 1 terminal block with 2 wires 2 cable glands M16 : cable diameter 4 to 8 mm
Dimensions	Width 118 mm, Height 126 mm, Depth 63 mm
Material	Plastic
Protection	IP65
Storage	6 months safe from air 0°C<T<20°C +10%<RH<60%
Estimated lifetime	> 24 months
Temperature range	-20 to + 55°C
Humidity range	15% RH to 90% RH
Pressure range	1 bar ± 20%
Linearity deviation	0 - 10 ppm ± 0.3 ppm 10 - 30 ppm ± 5 % relative
Temperature drift (-10°C + 40°C)	< ± 0.4 ppm or < 20% of indication
Long-term drift under normal operating conditions	Sensitivity : < 20% of measured value/year
Response time	T90 < 60 sec
Certification	Electromagnetic Compatibility EN 50270

5.6 OLCT 10 SC Transmitter

Detection principle	semi-conductor sensor
Range	0-2000 ppm R134A, R22
Signal output	4 – 20 mA
Settings	Local through Zero and Sensitivity potentiometers Position Maintenance 2 mA 4-pin connector for gas measuring and current image (100-ohm shunt)
Power supply	15 to 30 VDC
Consumption	maximum 100 mA
Cable length	according to the controller
Connection	3-wire terminal block, 2 wires for power supply, 1 wire for signal 1 cable gland M16 : cable diameter 4 to 8 mm
Dimensions	Width 118 mm, Height 126 mm, Depth 63 mm
Material	Plastic
Protection	IP65
Storage	6 months safe from air 0°C<T<30°C
Estimated lifetime	> 24 months
Temperature range	-10 to + 60°C
Humidity range	20% RH to 90% RH
Pressure range	1 bar ± 10%
Linearity deviation	0 - 10 ppm ± 0.3 ppm
10 – 30 ppm ± 5% relative	
Temperature drift (-10°C + 40°C)	< ± 0.4 ppm or < 20 % of the indication
Long-term drift under normal operating conditions	Sensitivity : < 20% of measured value/year
Response time	T50< 51s (R22) T50 <30 sec, (R134a)
Minimum sensitivity threshold Maximum sensitivity threshold Recommended Alarm Threshold Minimum time to detect the lowest concentration Recovery timeless	10 ppm 5000 ppm during 90s without sensitivity loss 200 ppm less than 25s after injection of 500 ppm R134A than 160s after injection of 8 min of 1000 ppm R134A
Certification	Electromagnetic Compatibility EN 50270 In accordance with EN 14624 certification

6 Detail specifications for use in explosive atmospheres in accordance with the ATEX european directive

The OLC 10, OLC 10 TWIN sensor complies with the requirements of the ATEX 2014/34/UE European Directive regarding explosive atmospheres.

The site manager where the equipment is installed should take into consideration and comply with the information in the following paragraphs. Refer to the provisions of the ATEX 1999/92/CE European Directive regarding the enhancement of safety and health of the workers exposed to explosive atmosphere risks.

6.1 Specifications for installation in ATEX Zone 2GD

The installation will be performed in accordance with existing standards, in particular EN 60079-14 and EN 60079-17 standards.

The OLC 10 and OLC10 TWIN detectors are designed for surface industries Group II, Category (3) GD zone 2 for minimum and maximum ambient temperatures from –20°C to + 55°C. They should not be exposed to mechanical vibrations.

The detectors are installed vertically (wall-mounted type) with the cable output downwards. An angle of over 45° from the vertical or a horizontal position (ceiling-mounted type) will result in measurement errors and will require a recalibration of the detector.

During the installation, the user will take into consideration that the equipment underwent only a shock corresponding to an energy of a low.

Potential electrostatic charging hazard, see instructions.

The equipment shall only be used in an area of at least pollution degree 2, as defined in EN 60664-1.

6.2 Special precautions

Sensors are sensitive to some poisons that may cause their desensitisation: emanation of siliconized vapours with concentrations > 10 ppm, chlorinated species or sulphur with concentrations > 100 ppm

The lack of oxygen (< 15% O2) or over-oxygenation (> 23% O2) may cause an underestimation or overestimation of the measurement.

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