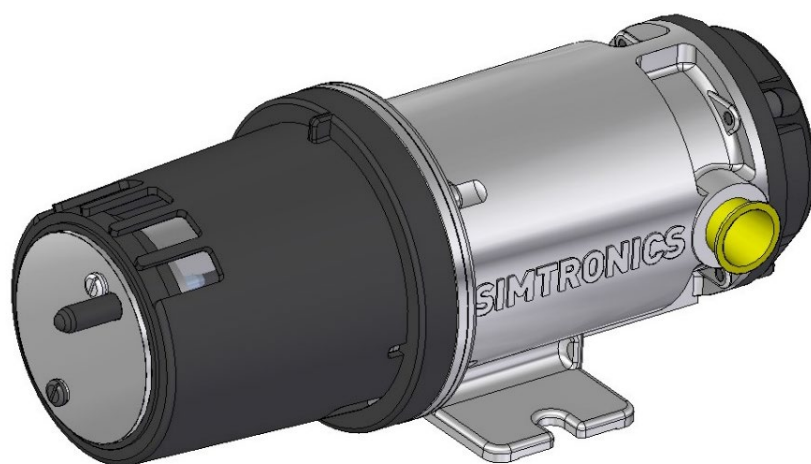


GD10-P00 and GD10-PE0

INFRARED POINT GAS DETECTOR



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User Manuals in other languages are available on
Website

<https://teledynegasandflamedetection.com>



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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.

English version is the original version

TELEDYNE OLDHAM SIMTRONICS S.A.S.

Rue Orfila

Z.I. Est – CS 20417

62027 ARRAS Cedex

Thank you for choosing this TELEDYNE OLDHAM SIMTRONICS instrument.

All 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.

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.**

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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 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.

TELEDYNE OLDHAM SIMTRONICS recommends regular testing of fixed gas detection installations (read Chapter 7).

Before any intervention on the detector, please refer to IEC 60079-29-2 standard.

Warranty

Under normal conditions of use and on return to the factory, parts and workmanship are guaranteed for 5 years, IR sources are guaranteed for 15 years.

Waste Electrical and Electronic Equipment (WEEE directive)



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

UK. This symbol indicates that, in conformity with directive WEEE: SI 2018 N°1214 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.

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1. Product description

The GD10P/PE is a detector based on non dispersive infrared (NDIR) gas detection technology.

Compared with catalytic sensors, the GD10P and GD10PE has the following advantages:

- Presence of oxygen is not required for correct measurement, which makes the GD10P/PE suitable even in an inert gas atmosphere.
- No possibility of poisoning of the detector since no chemical reaction occurs, i.e. silicon vapors and H₂S have no effect on the detector or the measurement.
- The gas velocity has no influence on accuracy.
- There are no saturation effects which could lead to false measurements. Thus, the detector is capable of measuring gas concentrations up to 100% vol.
- The detector has a continuous self-test function and reports dirty optics and fault conditions to the control system.
- Total system costs can be dramatically reduced with the GD10P/PE:
- High reliability results in low test frequency and practically no calibration costs.

GD10P and GD10PE are sensitive to absorption bands related to carbon - hydrogen bonds.

As a result, all molecules with this type of bond are susceptible to detection. The intensity of this absorption line is, however, significantly dependent on the molecule under consideration.

In general, the larger the molecule is, the greater the absorption strength will be, and so the better it is detected.

There is therefore some measurement interference between hydrocarbon vapor compounds since their absorption bands share some spectral regions.

The level of interference depends on the relative position of these absorption bands, relative to the working range of the interference filter.

1.1 GD10P Description

The GD10P has been designed with features that provide an effective response to the detection of gas hazards in a wide range of industrial environments from boiler plant rooms to offshore petrochemical installations.

The GD10P infrared gas detectors use solid-state infrared sources. The complete opto-mechanical design and construction is so stable that an ultra-fast speed of response

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can be achieved whilst providing unparalleled service life and detector stability, thus saving on maintenance and service costs.

We offer the longest combined detector and IR source warranty on the market.

Supplied with worldwide performance (CSA / IECEx / ATEX / INMETRO) and hazardous area approvals.

Suitable for use in SIL 2 and SIL 3 systems ¹

A weather protection accessory is used for exposed detector installations:

- General outdoor locations
- Directly mounted on an air intake
- Duct mounted close to the air intake

1.2 GD10PE Description

The GD10PE is the GD10P version designed for critical applications involving large volumes of air with high velocity, in places where one needs fast reliable detection of low gas concentrations. GD10PE is in a class of its own.

Typical critical applications include the monitoring of air intakes for HVAC systems or air generators serving inhabited areas, and monitoring for potential gas leakages in high temperatures areas of gas turbine installations.

The GD10PE is a stable instrument, and with a measuring range of 0 – 20 %LEL the sensitivity for the GD10PE is 5 times higher than standard point detectors.

The GD10PE is designed for installation in air ducts and for mounting through walls and bulkheads in places such as pump rooms, but may also be used as a standalone point detector in places where the properties of the GD10PE is required, such as low ppm level detection.

The response time is among the fastest on the market, as proven by experimental data. Trip levels down to 4 %LEL combined with a response time in the range of 1 second (option), should cover even the most demanding requirements.

1.3 GD10P/PE Design Principle

The GD10P/PE uses a dual wavelength infrared (IR) beam, coming from two distinct solid state sources, to measure gas concentration. One of the beam's wavelength is inside the target gas absorption spectrum, while the other is far from it. The gas concentration is inferred from measuring infrared light absorption on the first beam compared with the second one. This differential measuring principle avoids false alarms caused by dirt or other objects present in the detection chamber.

This first compensation mechanism is supplemented by a second one, involving the same beams measured in a guaranteed gas free context. On one hand, this allows to

¹ Except for the ethylene 86EG variant detector which uses legacy software. Please refer to section 8.1.

compensate for IR source decay in time and thus eliminate the need for periodic calibration; on the other it gives the possibility to evaluate dirt level in the detection chamber and warn users when preventive maintenance needs to be performed.

The GD10P/PE design bears in it the premises of detector qualities:

Lifetime warranty for solid state IR-source

The proprietary silicon-based IR-source used in the GD10PE is insensitive to shock and vibration. Its exceptional reliability added to the dual compensation mechanism eliminates the need for replacement during the detector service life.

No spurious gas alarms

A false alarm, resulting in a production shutdown is extremely expensive. The dual wavelength, dual path concept, together with the electronic and software design, guarantees that there are no spurious gas alarms.

Preventive maintenance

GD10P/PE warns users when dirt is accumulated in the gas detection chamber well before the detection capability is affected by it. Maintenance can be performed in advance, without production loss resulting from detection system unavailability which would be triggered by a fault annunciation.

No field recalibration needed

The GD10P/PE stays within the specifications for its service lifetime without recalibration.

1.4 Pressure and Temperature Impact in Infrared based Gas Detection

As said in the beginning of the chapter, infrared gas detection is based on infrared light absorption by target gas molecules: gas is opaque to it on certain wavelengths which form its absorption bands. When the temperature and the pressure of the gas mixture at a given concentration varies, two phenomena impact its opacity to an infrared light beam:

- Density variations modify the number of molecules on its path
- Gas molecules absorption bands form change

Thus, all infrared gas detectors “see” concentration variations when ambient temperature and pressure change; some compensation mechanisms must be put in place to mitigate this problem.

GD10P/PE detectors are calibrated at manufacture time at sea level and indoor usual ambient temperatures, but they are likely to be operated in different conditions.

As temperature is concerned, the operating interval from -40°C to 60°C may incur large variations if not compensated. The GD10P/PE is equipped with a temperature sensor and fully compensated over this temperature range such as to maintain specified accuracy all over it.

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For a given location, pressure varies for meteorological reasons; Rarely these variations go beyond $\pm 2\%$ around the mean value. On the other hand, mean atmospheric pressure largely varies with altitude: at 1000m it is around 900 mbar and at 2000m it goes below 800 mbar.

This behavior motivated a simpler solution for pressure: there is no pressure sensor for the GD10P/PE but mean atmospheric pressure is inferred using the elevation of the operating site using ISO 2533/1975 standard atmosphere formulae.

For optimal accuracy, at manufacture time current ambient pressure is taken into account in GD10P/PE detectors calibration process such as to yield exactly the reference concentration at 1013 mbar.

When operating the detector, the user can specify the elevation as a parameter based on which the average ambient pressure can be inferred. This allows the detector to apply a compensation formula in order to infer real gas concentration.

2. GD10P Technical Specifications

GENERAL

Detection method	IR-absorption, dual wavelength, dual path
IR-Source	Solid state IR source, 32Hz flash
Gases detected	Hydrocarbon gases and CO ₂ ⁽²⁾
Self-test	Continuous
Calibration	Factory set, no field recalibration needed

PERFORMANCE

Lifetime stability	±5% of full scale (FS) reading
Accuracy ⁽³⁾	±3% FS between 0-50 % reading ±5% FS between 50-100 % reading
Response time ⁽⁴⁾	T20 = 0.7 sec.(Optional 0.2 sec) T50 = 1.7 sec.(Optional 0.4 sec) T90 = 4.0 sec.(Optional 1.0 sec)
Start-up time	Typically 65 sec
Warm up time	30 minutes (to full specification performance)

DETECTOR WARNINGS

Early Dirty Optics	55% signal attenuation
Dirty Optics	70% signal attenuation
Detector failure	Main function fault or blocked optics.

OUTPUT SIGNAL

- Standard Current source 4 – 20 mA, max. load impedance 500 Ohm
- Option Current sink 4 – 20 mA

² Please refer to section 8.1 for a short list of available gases and scales. The target gas and scale are indicated through the product reference on the label. The detector is intended to measure the gas for which it is indicated.

³ At 1013 mbar; pressure impact on infrared detectors is explained in previous chapter, section 1.4

⁴ In natural diffusion and without the weather protection. Although given here for methane, the response time does not depend on the gas and is the same on analog and numerical outputs of the device.

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MAINTENANCE

HART® interface

ELECTRICAL

Power supply 24 VDC, range 18-32 VDC

Power consumption Approx. 3.5 W

GD10P (NON-UL)

- Connection: 3 wires (0.5mm² - 1.5mm²) + 2 wires RS485 (factory use)
- Cable entry: M20 Ex e cable gland

GD10P (UL)

- Connection: 5 wires flying leads (22AWG) for wiring into termination box
- Cable conduit connection: 1 x 3/4" NPT (Male) or 1 x 1/2" NPT (Female)

ENVIRONMENT

Storage

Temperature: -40°C to + 70°C (-40°F to +158°F)

Duration: 2 years in clean atmosphere

Pressure: 1013 hPa +/- 20%

Humidity: 100% relative humidity (RH) uncondensed

Operating

Temperature: -40°C to + 60°C (-40°F to +140°F) ⁽⁵⁾

Humidity (operation) 100% relative humidity (RH)
uncondensed

Pressure (operation) 1013 hPa +/- 20% ⁽⁶⁾

HOUSING

- GD10P (NON-UL)

Main compartment Ex db IIC T6 Gb

Terminal compartment Ex eb

Protection category IP66/IP67 EN/IEC 60529 and ABNT NBR IEC 60529 ⁽⁷⁾

- GD10P (UL)

UL rating Class I Div 1, Group C&D

⁵ Temperature limits for hazardous location and performance certifications

⁶ Pressure limits for performance and explosion protection certifications. Pressure impacts measure as described in section 1.4 :
elevation can be taken into account, please see section 6.4.16

⁷ IP ratings does not mean that the equipment will detect gas during or after exposure to the defined conditions. It is
also recommended to use the weather protection.

Protection category NEMA4X (IP67 DIN 40050)

- Common

Housing material Stainless steel SIS2343 (ASTM 316)

Weight Approx. 2.9 kg (6.4 Lbs)

Dimensions 264L x 104W x 106H (mm) - 10.4 x 4.1 x 4.2 (inches)

EMC

Compliant to EN 50270 and IEC 61326-3-1 ⁽⁸⁾

WARRANTY

5 years full warranty on complete instrument

15 years warranty on the IR-sources

⁸ When connected behind an industry compliant safety isolating transformer or powered by the host system controller (cf. table 5 in EN 61326-3-1:2017).

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3. GD10PE Technical Specifications

GENERAL

Detection method	IR-absorption, dual wavelength, dual path
IR-Source	Solid state IR source, 32 Hz flash
Detection range	0-20% LEL (0-1% Vol.) methane
Gases detected ⁽⁹⁾	Methane
Self-test	Continuous
Calibration	Factory set, no field recalibration needed

PERFORMANCE

Lifetime stability	±1.4%LEL
Accuracy	±1%LEL (0-10 % LEL reading) ±1.4%LEL (10-20 %LEL reading)
Response time ⁽¹⁰⁾	T20 = 0.7 sec. T50 = 1.7 sec. T90 = 4 sec.
Start-up time	Typically 65 sec
Warmup time	30 min (to full specification performance)

DETECTOR WARNINGS

Early Dirty Optics	55% signal attenuation
Dirty Optics	70% signal attenuation
Detector failure	Main function fault or blocked optics

OUTPUT SIGNAL

- Standard Current source 4 – 20 mA, max. load impedance 500 Ohm
- Option Current sink 4 – 20 mA

MAINTENANCE HART® interface

⁹ Other gases are available on demand; the target gas and scale are indicated through the product reference on the label (refer to section 8.1). The detector is intended to measure the gas for which it is indicated.

¹⁰ In natural diffusion and without the weather protection. Although given here for methane, the response time does not depend on the gas and is the same on analog and numerical device outputs.

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ELECTRICAL

Power supply 24 V DC, range 18-32 V DC

Power consumption Approx. 3.5 W

GD10PE (NON-UL)

- Connection: 3 wires (0.5mm² - 1.5mm²) + 2 wires RS485 (factory use)
- Cable entry: M20 Ex e cable gland

GD10PE (UL)

- Connection: 5 wires flying leads (22AWG) for wiring into termination box
- Cable conduit connection: 1 x 3/4" NPT (Male) or 1 x 1/2" NPT (Female)

ENVIRONMENT

Storage Temperature: -40°C to + 70°C (-40°F to +158°F)
Duration: 2 years in clean atmosphere
Pressure: 1013 hPa +/- 20%
Humidity: 100% relative humidity (RH) uncondensed

Operating -40°C to + 60°C (-40°F to +140°F) ⁽¹¹⁾

Humidity (operation) 100% relative humidity (RH) uncondensed

Pressure (operation) 1013 hPa +/-20% ⁽¹²⁾

EXPLOSION PROOF HOUSING

- GD10PE (NON-UL)

Main compartment Ex db IIC T6 Gb

Terminal compartment Ex eb

Protection category IP66/IP67 EN/IEC 60529 and ABNT NBR IEC 60529 ⁽¹³⁾

- GD10PE (UL)

UL rating Class I Div 1, Group C&D

Protection category NEMA4X (IP67 DIN 40050)

- Common

Housing material Stainless steel SIS2343 (ASTM 316)

Weight Approx. 6.5 kg

Dimensions 805L x 104W x 106H (mm)

¹¹ Temperature limits for explosion protection and performance

¹² Pressure limits for performance and explosion protection certifications. Pressure impacts measure as described in section 1.4 : elevation can be taken into account, please see section 6.4.16

¹³ IP ratings does not mean that the equipment will detect gas during or after exposure to the defined conditions. It is also recommended to use the weather protection.

EMC

Compliant to EN 50270 and IEC 61326-3-1 ⁽¹⁴⁾

WARRANTY

5 years full warranty on complete instrument

15 years warranty on the IR-sources

¹⁴ When connected behind an industry compliant safety isolating transformer or powered by the host system controller (cf. table 5 in EN 61326-3-1:2017).

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4. Installation



Installation shall be in accordance with the standards in force, classification of the zone, and in conformity with standard EN/IEC 60079-14, the editions in force, or with other national and/or local standards.

4.1 Positioning

Both GD10P and GD10PE detectors should be mounted where gas leakage is most likely to occur. To detect methane, which is lighter than air, inside an enclosed area the detector should be mounted high in the area to be protected or immediately above potential leakage sites.

To detect gases heavier than air, e.g. propane, the detector should be mounted below the potential leakage site.

The detector should be mounted in a place where maintenance, i.e. cleaning of the optics, is easily performed.

The detector may be mounted in areas where no oxygen is present.

The detector may be mounted in areas with strong airflow

The detector can be mounted where it could be drenched by water.

However, immersion has its limits. It assumes that the cable glands have been correctly mounted.

Furthermore, the detector will trigger an optical fault. After immersion, the detector will require cleaning because of the possible traces caused by immersion on the optical parts.

Finally, it is also important to check that the gas inlet tube is properly covered so that there is nothing getting inside.

Please note that the 4 holes in each end of the GD10PE weather protection are for water drainage and should not be blocked.



Air velocity limits: none ⁽¹⁵⁾

¹⁵ Taking into account the principle of detection, a pressure variation will proportionally influence the measurement compared to the calibration one (1013HPa).

4.2 GD10P Fixing¹⁶

The detector is mounted by means of a projecting mounting leg using two M8 screws and washers, or by means of the Duct Mounting Flange Kit (4 x M8 screws). The detector should preferably be mounted so that the longitudinal axis of the detector is horizontal. This will prevent accumulation of water and dust on the optics. The Weather Protection must always be oriented correctly for optimal performance.

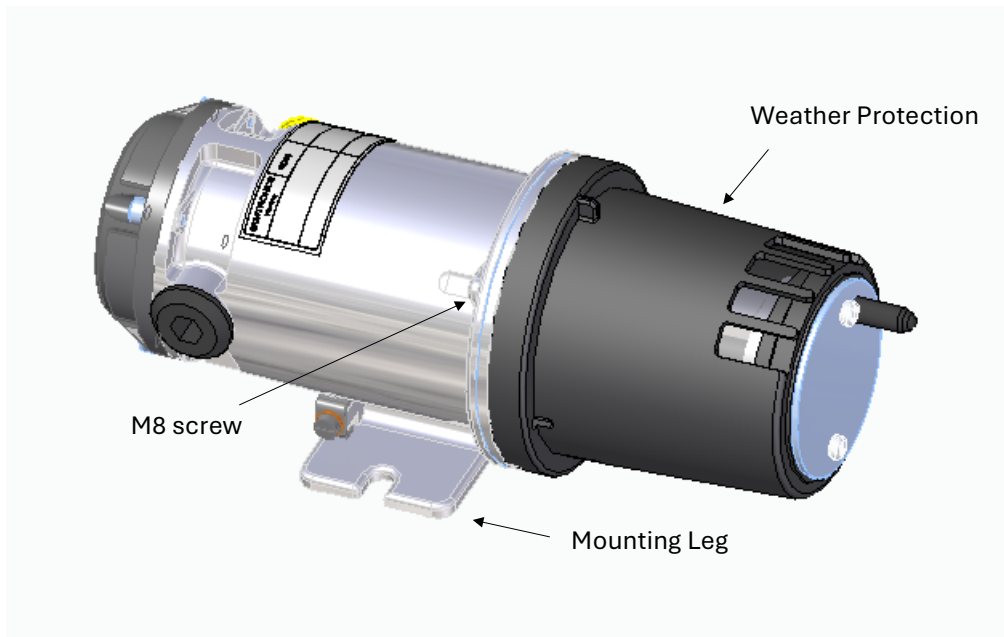


Figure 1: GD10P mounting

4.3 GD10P Weather Protection¹⁷



When the GD10P is mounted outdoors, the flow direction indicator (see Figure 2 below) must point upwards.

Orientation of the Weather Protection is performed as follows:

- Use a screwdriver to loosen the two screws on the Weather Protection
- Rotate the Weather Protection to correct position
- Tighten the screw with a torque of max. 0.5 Nm

¹⁶ Applicable to all GD10P and GD10PE versions (UL and NON-UL)

¹⁷ Applicable to all GD10P and GD10PE versions (UL and NON-UL)

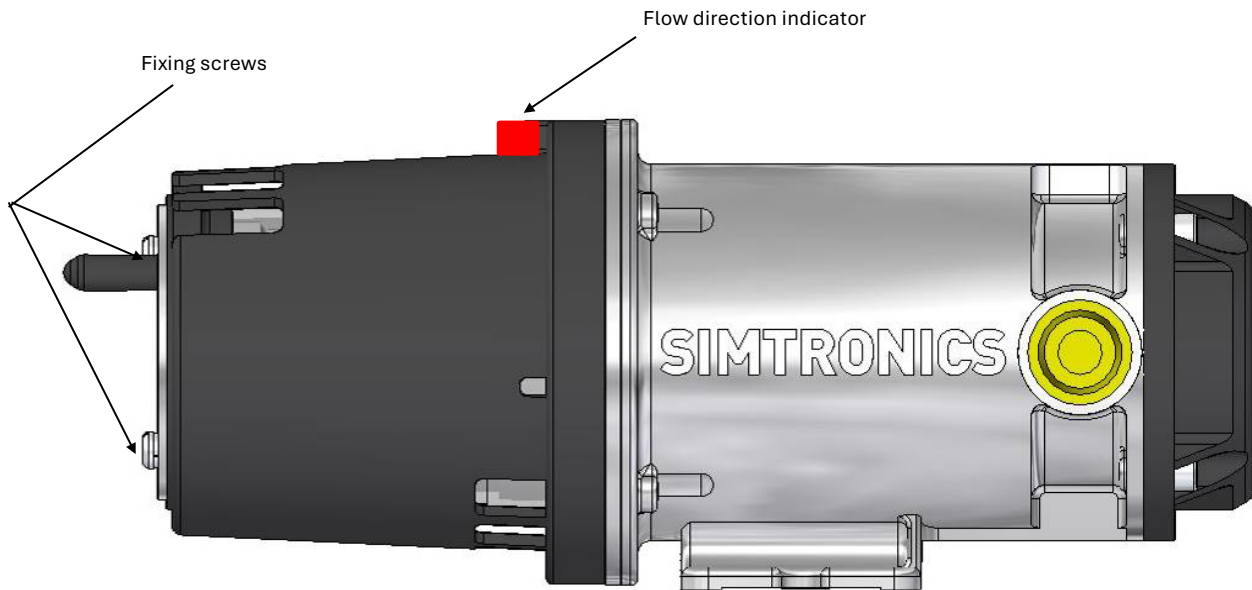


Figure 2 : Orientation of GD10P weather protection in relation to flow direction

4.4 GD10P Duct or Pipe Mounting¹⁸

If installed in a ventilation duct or pipe, the mounting arrangement and accessories shown in Figure 3 and Figure 4 should be used. The Duct Mounting Bracket shown in Figure 3 allows the GD10P to be positioned in the core of the airflow in wide ducts or pipes.



Avoid direct light on lens and mirror if the GD10P is mounted without the Weather Protection.

In order to achieve minimum response time, the Weather Protection must be oriented with the flow direction indicator facing into the air flow. See Figure 2 and Figure 4.

The sensor must be mounted in straight parts of the duct with undisturbed airflow. Avoid areas with possible turbulent flow e.g. immediately after sharp bends or junctions.

The kit includes a modified weather protection as well as piping for functional testing.

¹⁸Applicable to all GD10P and GD10PE versions (UL and NON-UL)

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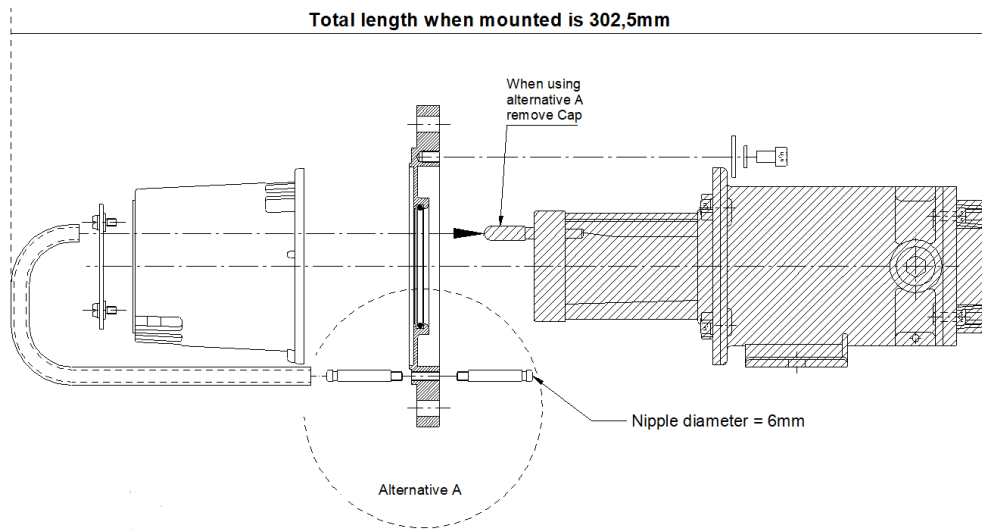


Figure 3: Exploded view, Duct Mount Flange Kit

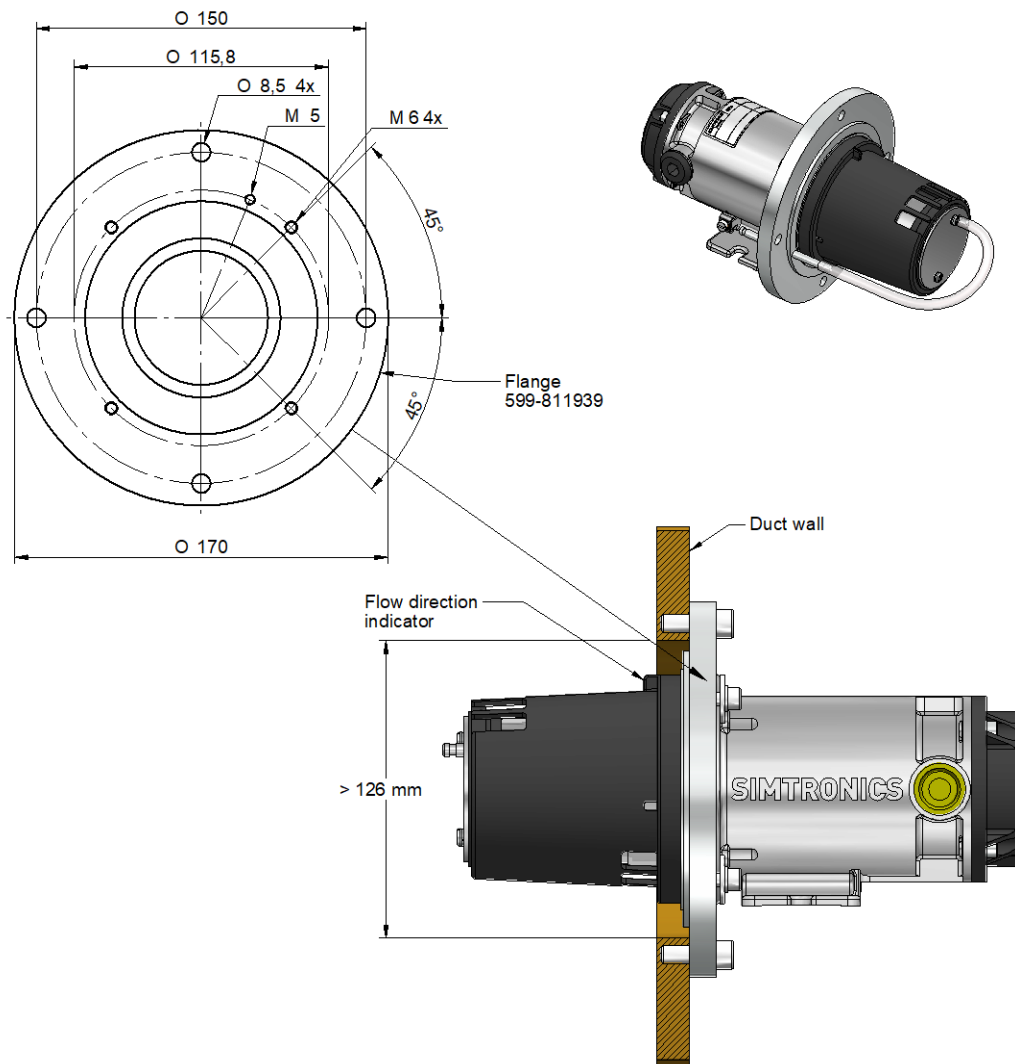


Figure 4: Ventilation duct or pipe mounting using Duct Mounting Flange Kit (Refer to Figure 3 for details)

4.5 GD10PE Fixing¹⁹

The detector should be mounted so that the longitudinal axis of the detector is horizontal. This will prevent accumulation of water and dust on the optics.

4.6 GD10PE Weather Protection/Standalone Mounting²⁰

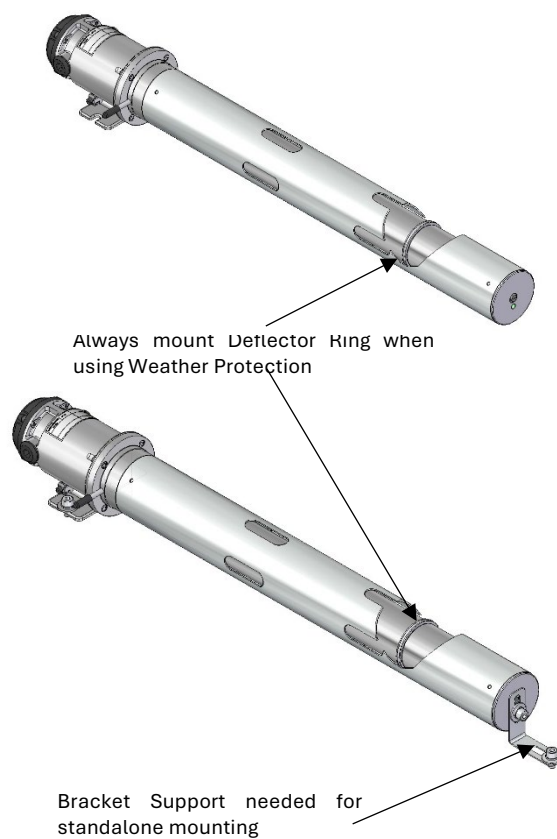


Figure 5 GD10PE standalone mounting

¹⁹ Applicable to all GD10P and GD10PE versions (UL and NON-UL)

²⁰ Applicable to all GD10P and GD10PE versions (UL and NON-UL)

4.7 GD10PE Duct or Pipe Mounting²¹

By using the optional duct mounting kit, GD10PE is very suitable for monitoring ventilation air in ducts and channels. The flange is bolted to a vertical, flat surface of sufficient strength. The detector is supported by the flange only, no other fixture of the “nose” is necessary. If necessary, a flat support plate may be welded to the duct wall if the wall itself is not suitable (too weak or curved).

The best position is at some distance behind the first filter, or grille when used for forced flow air intakes. You may also just bolt the detector as “stand alone” with the nose bracket support, but this is not advisable in harsh offshore conditions.

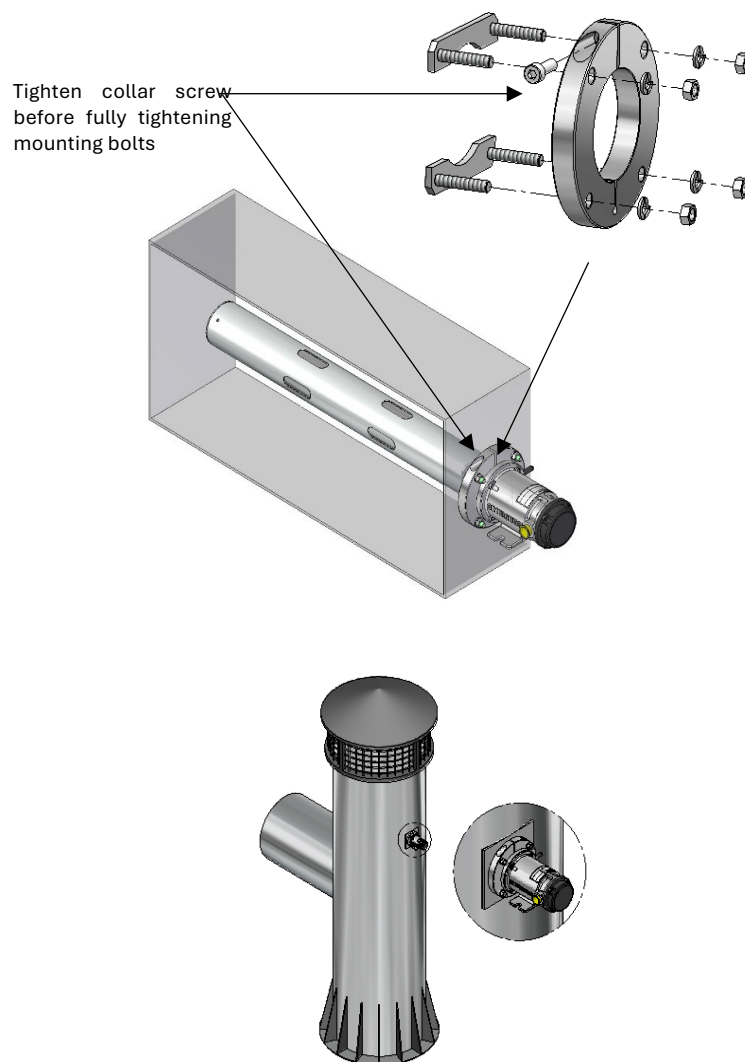


Figure 6 GD10PE duct or pipe mounting

²¹ Applicable to all GD10PE and GD10P versions (UL and NON-UL)

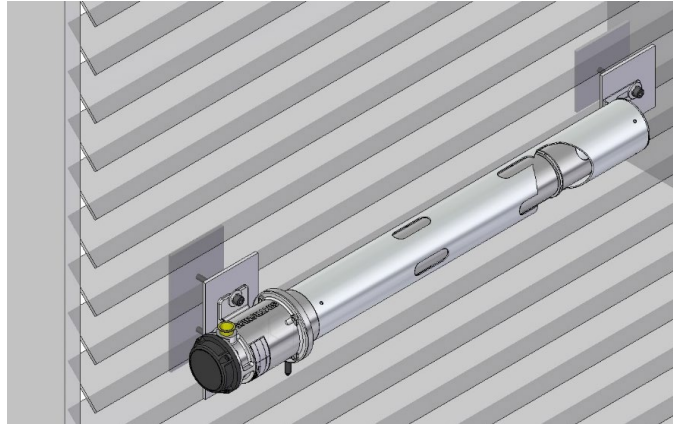


Figure 7: GD10PE in front of a ventilation grille

Footprint/bore dimensions for Mounting Flange Kit:

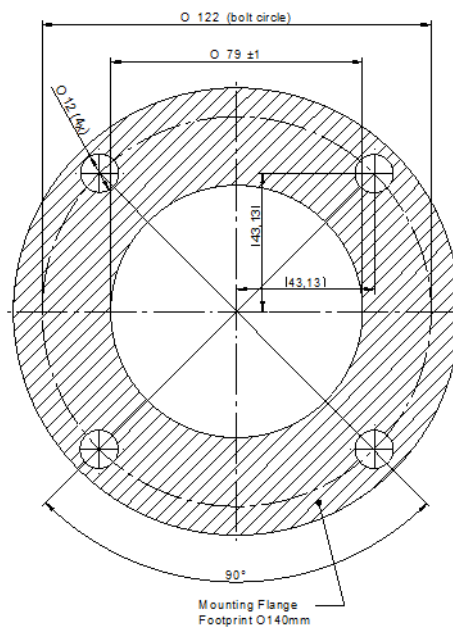


Figure 8: Flange 599-815272

For insulated ducts, it is necessary to remove some insulation.

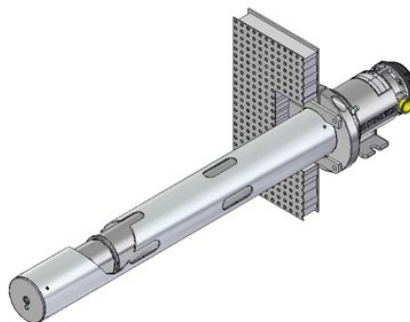


Figure 9: GD10PE through a partition wall

4.8 External cable

The cable type must be chosen in accordance with applicable regulations.

The table below indicates maximum cable lengths (2-wire) restrictions due to voltage drop over the power supply cable.

Core size cable	0,5 mm ²	0,9-1 mm ²	1,5 mm ²
Maximum length (with a 24VDC power supply)	250m	500m	750m

4.9 Electrical connection

The terminal compartment is accessible by removing the circular terminal cover (loosen the four M5 screws).

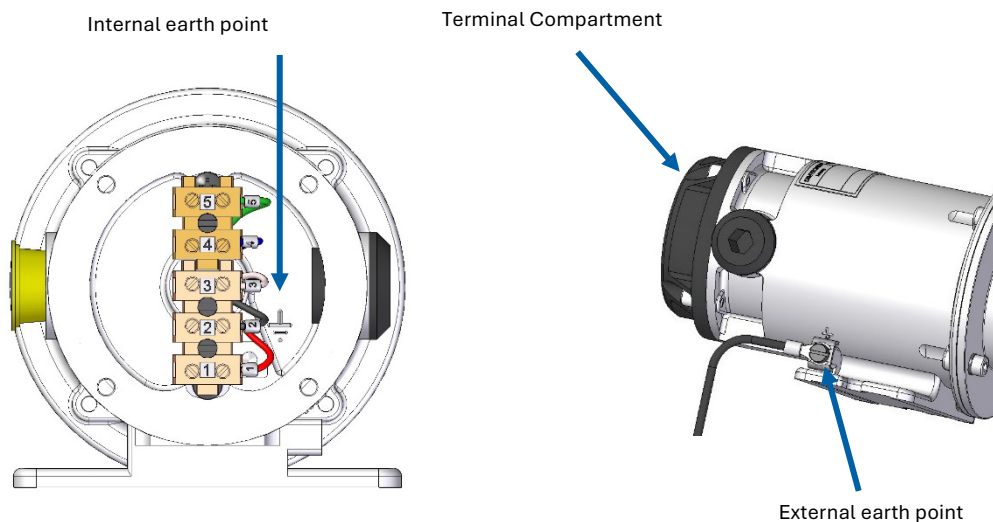


Figure 10 : GD10P and GD10PE (NON-UL) terminal arrangement

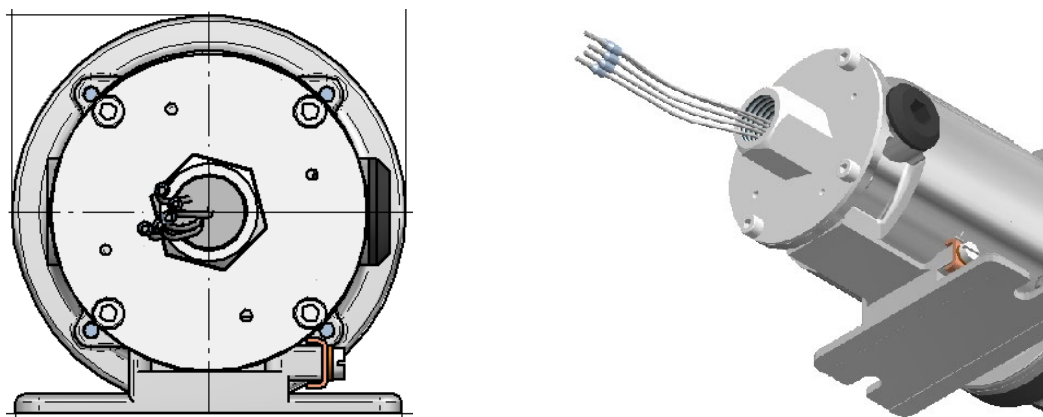


Figure 11: GD10P and GD10PE (UL) terminal arrangement

- | | |
|--------------|------------------|
| • Terminal 5 | Factory use only |
| • Terminal 4 | Factory use only |
| • Terminal 3 | 4-20 mA output |
| • Terminal 2 | 0 V |
| • Terminal 1 | +24 VDC |

For GD10P and GD10PE (NON-UL), the installation wiring enters the terminal compartment via a single M20 Ex e cable gland, which can be mounted on either side of the compartment. The unused entry is blanked with an Ex e cover.

GD10P and GD10PE (UL) must be supplied through a Class 2 power supply.



The detector housing must be connected to local ground via the external earth point. The wire should be minimum 4 mm² (8 AWG) and as short as possible.

The shield of the cable should be connected at both sides (at detector side and at the controller). The shield must be terminated to local ground via the cable gland at the detector and must not enter the terminal compartment.

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5. Commissioning

5.1 Visual inspection

The following should be checked before initial powering up:

- The axis of the detector shall be horizontal,
- Correct cable gland installation,
- Electrical connection,
- Electrical grounding,
- Termination of cable shield,
- Orientation of the weather protection,
- All bolts and screws are tight.

Check the presence and good condition of the O-ring (no cracks, cuts, good elasticity) on the back cover. Make sure that the flat support surface is clean, properly greased and that it does not show any visible scratches or "knocks".

Please refer to Chapter 4 "Installation" for details.

5.2 Power up

Ensure that system wiring and control system are in working condition before powering up the detector.

On power up, the detector first performs some basic integrity tests (volatile and non volatile memory, software image integrity) for 1-2 seconds. During these tests, the analog output is set to 0 and RS485 and HART communications are disabled. Failure of any of these tests permanently blocks the detector in this state.

On success, the detector enters the startup mode, in which the output current is fixed at 3.6 mA for 65 seconds ⁽²²⁾. When in startup mode, numerical communications are available, but physical measures (gas concentration, temperature, optical quality) are blocked at default values and auto-tests are deactivated.

After the startup mode the detector enters operating mode; in absence of gas and without any faults, the output goes to 4 mA.

²² The current level as well as the duration are configurable (please see section 6.4.6)

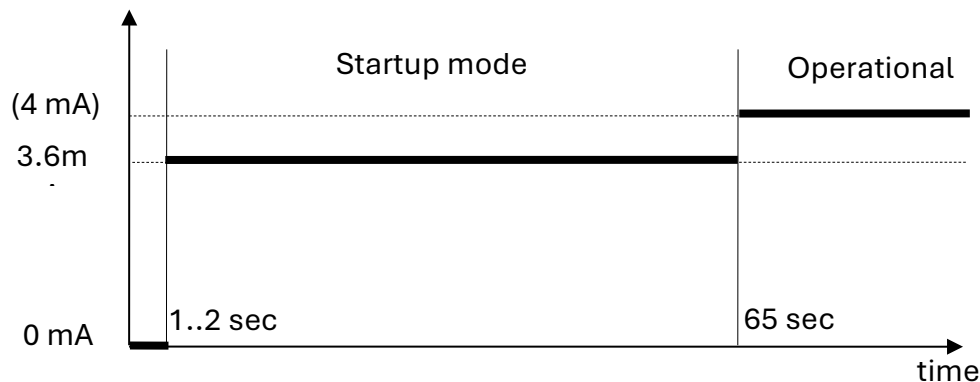


Figure 12: Output current at detector power up (default settings)



If the analog output of the detector goes to fault state after the startup period, then the detector may have a zero drift issue. This issue can be identified with an appropriate HART terminal and solved by applying a “Re-Zero” to the detector. This procedure is described in section 7.3.

5.3 Checking System Functions



Full specification obtained after 30 min. warmup time

The GD10P is factory calibrated and does not require any adjustments before operation. A check prior to putting into service should however consist of:

- 1) Clean the optical surfaces.

The detector may have been collecting dirt after being initially installed. It is thus crucial to clean the optical parts before testing the detector (refer to section 7.1 “Cleaning of optical lens/mirror”).

- 2) Do a gas test.

To make sure the detector works fine you should as a minimum do a function check as described in section 7.2 “Function test”.

Optionally you may do a full measure test as described in section 7.4.

6. Operation

6.1 Analog Output Protocol

Gas reading and fault signals are given through the 4-20mA current loop interface. The table below shows the analog output level for the various conditions.

Status	Output	Comment
Detector fault	< 0.6 mA ^(*)	No detection
Dirty Optics Warning (70% signal reduction)	1 mA ^(*)	No detection
Early Dirty Optics Warning (55% signal reduction)	2 mA ^(*)	Detector will still output gas concentration if it is greater than 7% of range (FS)
≤ -10% of range	0.6 mA	Default
0 % of range	4 mA	0%
10 % of range	5.6 mA	10% Alarm if threshold reached
30 % of range	8.8 mA	30% Alarm if threshold reached
50 % of range	12 mA	50% Alarm if threshold reached
70 % of range	15.2 mA	70% Alarm if threshold reached
90 % of range	18.4 mA	90% Alarm if threshold reached
100 % of range	20 mA	100% Alarm
>100% of range	Disabled ^(*)	Overscale

^(*) Shows default factory settings. Can be configured via HART® terminal

6.2 HART® Protocol

Refer to NOSP19193

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7. Maintenance



The GD10P and GD10PE have no user adjustable parts. It is not recommended to open the GD10P, as this will change the internal atmosphere, and the initial calibration could be affected. Opening the GD10P/PE voids all warranty offered at the time of sale.



Periodicity of the maintenance must be adjusted (reduced) when the equipment is likely to be exposed to conditions close to the limits defined by the IP ratings.

7.1 Cleaning of optical lens/mirror

Remove the weather protection by unscrewing the front cover plate (two screws), use a soft, clean tissue to rub off the contamination. The window and mirror are made of sapphire, which is highly resistant to scratching. Make sure that the whole optical surface is clean.



For difficult contaminants the mirror and lens can be cleaned with an equal-part mixture of isopropyl alcohol and water. Do not perform any testing of the detector before this solution has dried and residues have been wiped away.

7.2 Function test

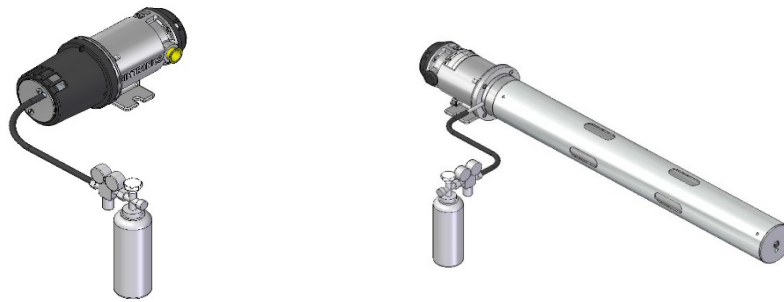
In order to perform function test of the detector, a test gas can be applied through a 6 mm test nozzle on the front of the Weather Protection housing as shown in the figure and observe the effect on the detector 4-20mA analog output or through the control system.

This is a simple test to verify the main function of the detector, please note the actual reading may be substantially lower than the calibration gas concentration due to leaks/ventilation of the weather protection. As long as the detector responds to the gas, the function of the detector is verified.

- 1) Clean the optical surfaces
- 2) Verify that the zero point (at no gas) is within the tolerance for the detector. Normal readings should be below 4.5mA

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- 3) Apply gas as shown. If there is no air movement, a test gas flow of minimum four liters per minute will give approximately the same value as the test gas.

Air movement dilutes test gas ⁽²³⁾. If there is an air movement of 0.5 m/sec., the test gas flow has to be increased (up to 20 liters per minute) to get a reasonable reading. Covering the ventilation grid will also help getting a higher reading. However, with the weather protection in place you may not be able to reach the actual test gas concentration, and any reading above 10% is OK.²⁴



Avoid direct light on lens and mirror if testing without the Weather Protection.

Ensure that no gas is present in the measuring chamber when testing.

7.3 Zero-point Test and Re-zero



This maintenance activity should only be carried out by special trained operators. If this is not done in a controlled and proper way, the performance of the detector may be inadvertently reduced.

Please note that this operation must be done when the detector is in the following temperature range +16°C/+26°C. TELEDYNE OLDHAM SIMTRONICS has no responsibility for faults introduced by on-site re-zeroing.

The GD10P/PE detector is calibrated and temperature tested in a controlled environment at the TELEDYNE OLDHAM SIMTRONICS factory. No further calibration is required during the lifetime of the product, as the zero point and calibration will stay inside the given tolerances. This implies that slight offsets from the zero point of 4.0mA (0%LEL) is to be expected and values up to 4.5mA (for GD10P) or 5.0mA (for GD10PE) at room temperature are within specification.

In some environments with excessive heat and/or vibration we have noticed that some detectors develop an offset outside the specified tolerances. These detectors should normally be returned to the factory for service. An alternative is to do this re-zeroing on site with a dedicated hand held terminal, or HART® communicator.

²³ This phenomenon has nothing to do with detector measure independence on gas velocity: the concentration of a air/gas mix stream will be correctly measured no matter the speed with which it traverses the detector chamber.

²⁴ Please refer to the measure test described in section 7.4.1 if detector accuracy is to be assessed.



Note that “on site” does not mean “in service”. Before concluding that re-zero is necessary, proper cleaning of the detector should be done (even an invisible layer of oil on the lens or mirror can have negative impact on the zero-point reading). Then, before re-zeroing is conducted, the detector should be removed from the system and moved to a controlled environment in a workshop

7.3.1 Zero-point Test in Workshop

Prior to performing a re-zero, the zero level should be checked with a sample flow housing and nitrogen test gas (clean instrument air may be used if nitrogen is unavailable).

- 1) Clean the sensor optics again, both mirror and lens.
- 2) Attach a Sample Flow housing (P/N 499-810874 for GD10P or 499-815733 for GD10PE)
- 3) Connect the power supply, switch it on and wait about 30 minutes for the detector to warm up
- 4) Connect the HART® terminal
- 5) Apply nitrogen gas to the Sample Flow housing
- 7) Read current loop output
- 8) If output is outside specification, then a re-zero may be applicable

7.3.2 Re-zeroing With HART® Communicator

Refer to section 6.2

7.4 Measure Test



A measure test is not required to verify the correct function of the detector. Normal maintenance of the detector is covered by the simple operations described in sections 7.1 and 7.2. The following measure test is only applicable if it is required by regulations or in cases where you need to verify system performance during commissioning or similar thorough testing.



Likewise, site calibration is not required for correct function of the detector. The detector has no consumable part in it and the dual compensation mechanism ensures sensitivity preservation during its lifetime. Re-zero

operation described in section 7.3 automatically aligns gain on the whole detection range.

7.4.1 Measure Test

In order to perform a measure test, two alternatives (the sample flow housing or the test gas socket) can be used, depending on the material on site.

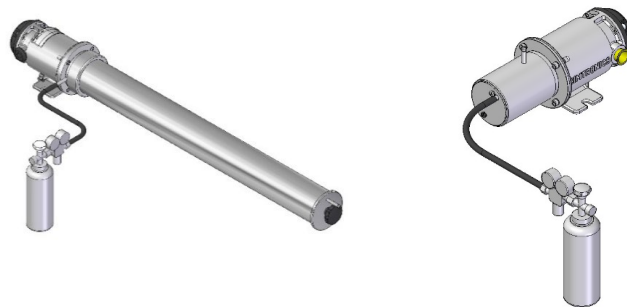
Gas flow should be approximately 1 liter/minute for GD10P and 3 liters/minute for GD10PE.

Wait approximately 2 min. to ensure that the Sample Flow Housing or the Gas Test Socket is completely filled with gas.

7.4.1.1 Using Sample Flow Housing

First alternative is to use a certified test gas and apply it via a Sample Flow Housing (reg. no. 499-810874 for GD10P or 499-815733 for GD10PE).

- 1) Remove the Weather Protection and clean the optical surfaces.
- 2) Attach the Sample Flow Housing. Its two o-ring seals fit tightly on the detector nose and some force may be needed to perform the operation. Please note that the o-rings are not equally sized, so the housing will only fit with its output test nozzle close to the detector housing. Use the weather protection fixation plate and screws to secure it in place.
- 3) Apply a certified test gas having a concentration around 50 % of the tested GD10P/PE scale as shown in the drawing. The test gas should be the same as the target gas. Make sure that the ambient is free of condensing humidity.

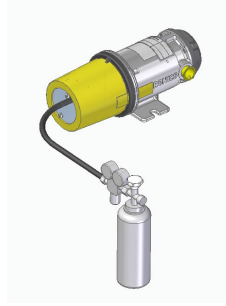


7.4.1.2 Using Gas Test Socket

Second alternative is to use a certified test gas and apply it via a Gas Test Socket (reg. no. 599-818154 for GD10P).

- 1) Remove the Weather Protection and clean the optical surfaces.

- 2) Put the Weather Protection back in place on GD10P. Insert the Gas Test Socket over the Weather Protection. The notch of the Socket must be aligned with the flow direction indicator of the Weather Protection.
- 3) Apply a certified test gas having a concentration around 50 % of the tested GD10P scale as shown in the drawing. The test gas should be the same as the target gas and dry.



Humidity presence in test gas may impact the test. For instance, at 40°C, 50% RH means %volume H₂O = 3.5% v/v.

7.4.1.3 Performing the Test

Measure the detector analog output or read it on the HART terminal or through the gas detection system. The reading should be within the tolerance of the detector plus the tolerance of the test gas. In practical terms this is the gas concentration +/- 10% of full scale.

Although no further calibration is required during the lifetime of the product, it is recommended to make this measure test once a year.

As the detector is an optical measurement device, it is not damaged by high gas concentrations associated with overscale conditions.



Do not forget to remove the Gas Test Socket and aerate the detector when calibration test is over. Failure to do so may trigger spurious alarms on the host system.

7.5 Troubleshooting

GD10P/PE detector software permanently performs advanced auto tests allowing early detection of faults and detailed diagnostic actions. Among these, incipient zero drift detection and early dirt accumulation signaling can prevent most of potential problems before they occur.

This way safety is optimally preserved and supervised plant installations unavailability in case of detection system fault or spurious alarm are avoided. Preventive maintenance is always preferable to curative one.



As a general principle, in case of problems encountered in detector operation, please clean up optical module before concluding on a diagnosis and especially before taking any calibration action. This will not be explicitly reminded on all occasions in the rest of the chapter.



DO NOT OPEN DETECTOR ENCLOSURE. There are neither serviceable parts nor supplementary diagnostic resources inside. Moreover, opening enclosure invalidates detector factory calibration and voids warranty.

The following table synthetizes most frequent problems susceptible to occur in exploitation and proposes mitigation actions, based on the previous chapters.

Lines colored in yellow and indicating fault require immediate action: the detector is unable to correctly perform its safety function. Lines colored in orange require supplementary diagnose actions; the detector may be unable to perform its safety function.

Problem	Identification on analog/numerical interface	Mitigation
Incipient dirt presence	EARLY_CLEAN current / state level	Clean optical module (§ 7.1)
Dirt presence (fault)	CLEAN current / state level	
Incipient zero drift	Current < 4 mA / concentration < 0	Perform a zero test / re-zero calibration (§ 7.3)
Zero drift (fault)	FAULT current / state level	
Slow periodic zero drift	Current / concentration drifts on a daily / weekly / weather dependent base; zero drift fault may occur or not	Check for mechanical fixation ⁽²⁵⁾ Perform a zero test / re-zero calibration (§ 7.3)

²⁵ Especially for GD10PE

Problem	Identification on analog/numerical interface	Mitigation
Noisy zero	Noisy 4 mA current / 0 concentration (generally associated to fast T90)	Clean optical module (§ 7.1) Check for high temperature Return detector for repair
Measure test failure	Current / concentration out of specifications or required accuracy	Perform a re-zero (§ 7.3) Return detector for calibration
Function test failure	Current / concentration response absent or too weak	Check gas bottle Reduce air flow around detector Perform a measure test (§ 7.4.1) Return detector for repair
Detector fault	FAULT current / state level (fault cause other than zero drift)	Bring to workshop, perform thorough cleanup, allow to warm up, connect to HART terminal to identify the cause Return detector for repair (mention the cause as signaled by HART terminal) ⁽²⁶⁾
Disconnected detector (fault)	Current = 0 mA, HART communication lost after startup (typically 1 min) Very likely analog output fault detected	Check power source Check output current Return detector for repair
Dead detector (fault)	Current = 0 mA, no numerical communication	Check power source Return detector for repair

²⁶ If the detector signals “temperature fault” it is more likely that the thermal sensor is faulty than that the detector is submitted to temperatures outside certified range.

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8. Product Coding

GD10-P00-F1-B-00

F1: Gas range	
****	please refer to section 8.1
B: Configuration	
0**	Fixed default value
Approval	
0	None
B	CSA
C	UL
X	ATEX/IECEX/UKCA/INMETRO
Interface	
**H	4-20mA, source/HART®
**J	4-20mA, sink/HART®
Optional, future use	
00	Fixed default value

Example :

GD10-P00-17EG-0XH-00:

GD10P, Methane, 0-100 %LEL CH₄ (4.4% vol.), ATEX/IECEX/UKCA/INMETRO, 4-20mA source/HART®

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GD10-PE0-**F2-B**-00 (Code for detector only. See section 12 for accessories)

F2: Gas range (a selection of most used variants)	
03AM	Ethylene, C ₂ H ₄ , 5000 ppm
17DE	Methane, CH ₄ , 20% LEL-1
B: Configuration	
0**	Fixed default value
Approval	
0	None
B	CSA
C	UL
X	ATEX/IECEX/UKCA/INMETRO
Interface	
**H	4-20mA, source/HART®
**J	4-20mA, sink/HART®
Optional, future use	
00	Fixed default value

Example:

GD10-PE0-17DE-0XH-00:

GD10PE, Methane, CH₄, 20 %LEL-1, ATEX/IEC Ex/UKCA/INMETRO, 4-20mA, source/HART®

8.1 GD10P Gas and Range Code

For the most part of gases, we are using the data from INRS 2015 or IEC80079-20-1.

F1	Product Name	Formula	%vol equivalent to 100% LEL
02DG	Acetylene	C ₂ H ₂	2.5
03DG	Ethylene	C ₂ H ₄	2.7
05DG	Ethanol	C ₂ H ₅ OH	3.3
05EG	Ethanol	C ₂ H ₅ OH	3.1
07DG	Propene	C ₃ H ₆	2.0
08DG	Acetone	C ₃ H ₆ O	2.6
09DG	Propane	C ₃ H ₈	2.2
09EG	Propane	C ₃ H ₈	1.7
11DG	Pentane	C ₅ H ₁₂	1.4
12DG	n-Hexane	C ₆ H ₁₄	1.1
13DG	Benzene	C ₆ H ₆	1.2
14DG	Toluene	C ₇ H ₈	1.2
15DG	Styrene	C ₈ H ₈	1.1
17DG	Methane	CH ₄	5.0
17EG	Methane	CH ₄	4.4
19EG	Methanol	CH ₃ OH	6.0
38DG	n-Butane	C ₄ H ₁₀	1.7
56DG	Ethane	C ₂ H ₆	2.4
73DG	Cyclohexane	C ₆ H ₁₂	1.3
79DG	Ethylene (low interference C ₂ H ₆)	C ₂ H ₄	2.7
86EG ⁽²⁷⁾	Ethylene	C ₂ H ₄	2.4

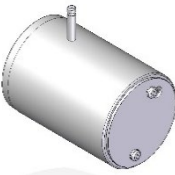
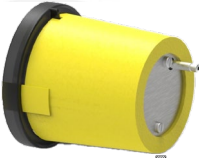
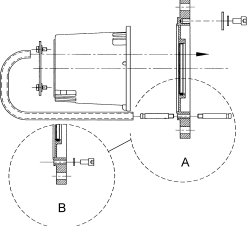
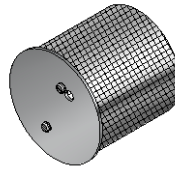
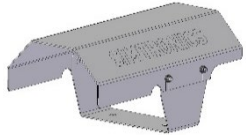
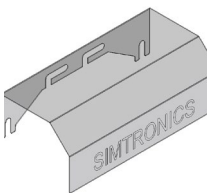
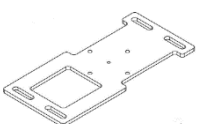
²⁷ This detector is not SIL compliant as it makes use of legacy non-certified software.

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9. Accessories and spare parts

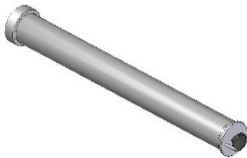
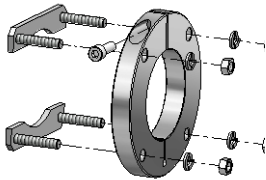
9.1 GD10P Accessories

Accessories	Description	Part Number
	GD10P Sample Flow Housing: Airtight chamber for sampling systems. Also used for calibration test.	499-810874 ❶
	GD10P Gas Test Socket: Non airtight chamber used for calibration test.	599-818154 ❷
	Duct Flange Tube Kit GD10P	499-811938 ❶
	Mosquito Set Assy GD10P: Insect protection in stainless steel mesh. Slides on the outside of the standard weather protection.	499-813397 ❷
	Sun shade Assy GD10P for horizontal mounting: protects from direct sunlight or snow fall.	499-815712 ❶
	Sun shade GD10P for pipe mounting (horizontal or vertical pipe): protects from direct sunlight or snow fall. To be used with pipe mounting plate P/N 499-816867.	599-816841 ❶
	GD10P Pipe mounting plate. U-bolts are included.	499-816867 ❶

❶ Sensitivity and response time of the detector are not modified.

❷ Sensitivity of the detector is not modified. Response time can increase.

9.2 GD10PE Accessories

Accessories	Description	Part Number
	GD10PE Weather Protection/Stand Alone Kit	499-815430 ②
	GD10PE Sample Flow Housing	499-815733 ①
	GD10PE Duct Mounting Flange	499-815271 ①

9.3 Spares

Spare Parts	Description	Part Number
	Weather Protection Kit GD10P	499-810913 ② ③
	Cap, cover for the gas test nozzle GD10P and GD10PE.	599-904176 ①
	Rear cover kit, composite	499-816584 ①

① Sensitivity and response time the detector are not modified.

② Sensitivity of the detector is not modified. Response time can increase.

③ This accessory is included in the EN60079-29-1 performance certificate.

9.3.1.1 Storage conditions of accessories and spare parts:

Ref	Temperature	Humidity	Pressure	Duration
499-810874	Same as detector	100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere
599-818154		100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere
499-811938		100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere
499-813397		100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere
499-815712		100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere
599-816841		100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere
499-816867		100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere
499-815430		100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere
499-815733		100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere
499-815271		100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere
499-810913		100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere
599-904176		100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere

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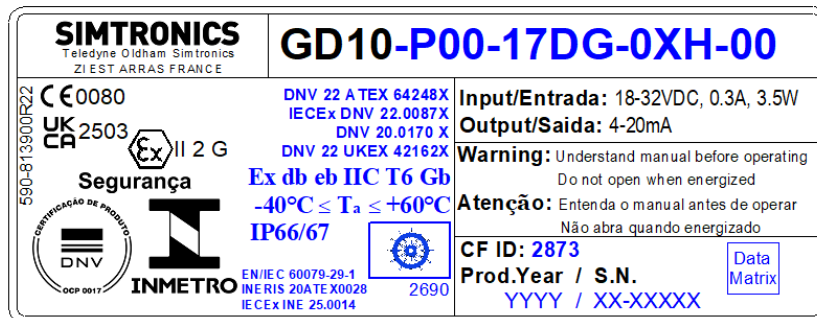
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499-816584	100% RH (uncondensed)	1013 hPa +/- 10%	2 years in clean atmosphere
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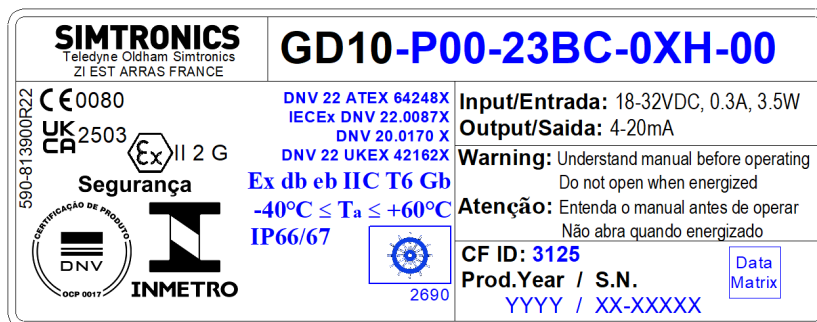
10. Marking

The GD10P/PE identification labels are shown in the figures below, as example.

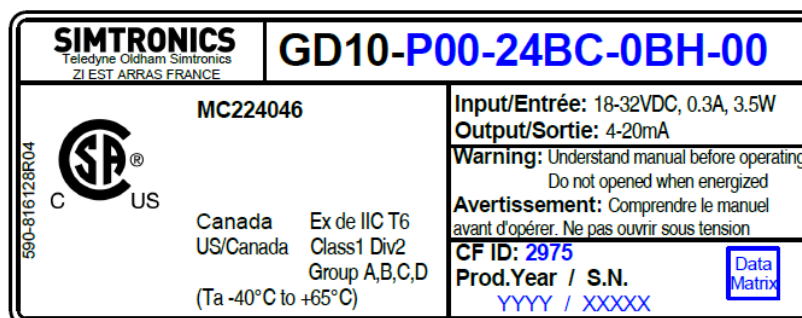
ATEX/IECEX/UKCA/INMETRO/MED markings (combustible gases version)



ATEX/IECEX/UKCA/INMETRO/MED markings (CO₂ version)



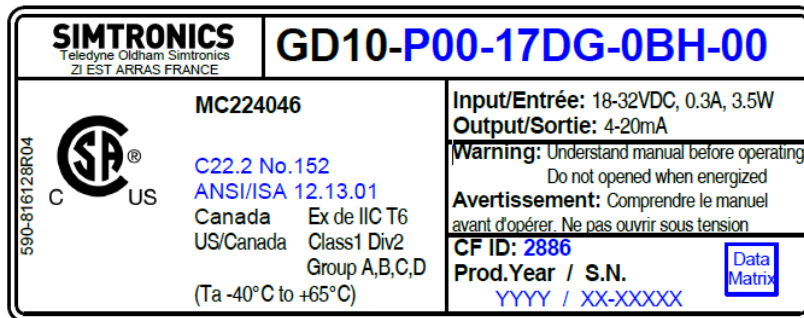
CSA marking (CO₂ version)



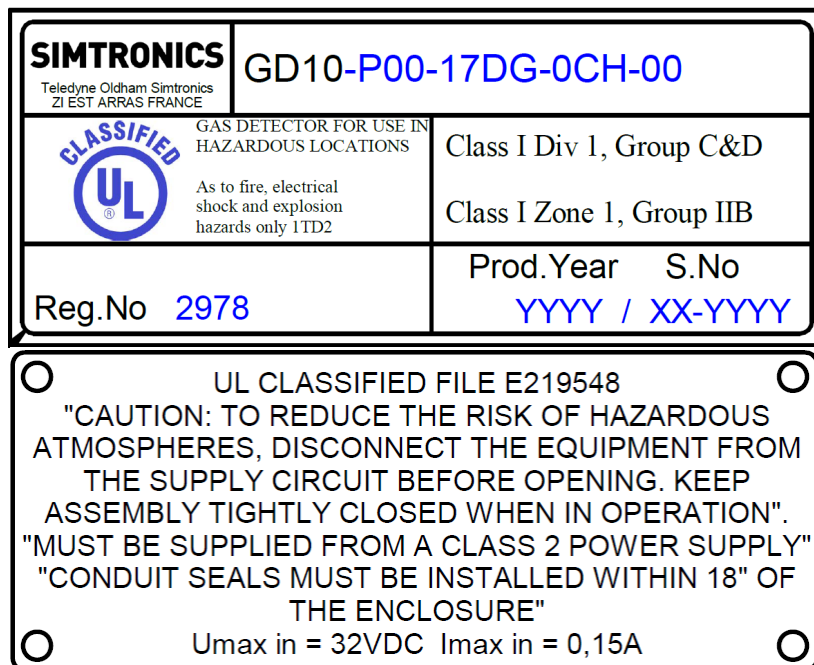
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CSA marking (combustible gases version)



UL marking (GD10P UL / GD10PE UL)



11. Specific instructions for use in explosive atmospheres and operational safety

11.1 General comments

GD10P/PE gas detectors comply with the requirements of:

- European Directive ATEX. See UE Declaration
- UK ATEX: SI . See UK Declaration
- INMETRO Ordinance No. 179 of 2010

relating to gas explosive atmospheres.

The information described below must be taken into account and fulfilled by the site manager. Refer to ATEX 1999/92/EC European Directive on requirements for improving the safety and health of workers potentially at risk from explosive atmospheres.

The HART output has not been evaluated for Performance testing to Standard C22.2 No. 152.

11.2 Warnings

Do not open when energized. Read user manual.

11.3 Cable Entries ⁽²⁸⁾

Cable glands and accessories (plugs, adaptors, etc.) shall be flameproof certified “db” or “eb” for use in gas atmospheres and Ingress Protection will be greater or equal to IP 66. They shall be of M20x1.5 type according to ISO965-1 and ISO965-3 standards. Installation must comply with ABNT NBR IEC/EN 60079-14 standard (current edition) and, if necessary, additional requirements of domestic or national regulations that apply to the place of installation. Cables used shall have an operating temperature range equal or greater than 80 °C.

11.4 Installation

When the weather protection is mounted, the detector shall be installed horizontally ($\pm 15^\circ$) with the flow direction indicator looking upward (see Figure 2).

11.5 Special condition of use

- 1) Regarding ATEX specification, the measuring function according to Annex II paragraph 1.5.5 of the Directive is not covered by this EU-type examination. It shall comply with the requirements from the relevant European harmonized standards

²⁸ Applicable to NON-UL GD10P and GD10PE

which provide guidance on the performance of gas detection equipment and safety devices.

- 2) Repairs of the flameproof joints must be made in compliance with the structural specifications provided by the manufacturer. Repairs must not be made on the basis of values specified in tables 1 and 2 of EN/IEC 60079-1.
- 3) ATEX certified cable glands to be used.

For CH₄ use, GD10P detector shall be used with calibration cap (499-810874) to ensure response time.

11.6 Functional safety certification

For all information related to the safety function of the GD10P/PE gas detectors, please refer the safety manual NOSP18157.

Material Declaration

<Date of Declaration>		<Supplier (respondent) information>	
Date.	2024-03-01	Company	Teledyne Oldham Simtronics
<MD ID Number>		Division name	Gas & Flame Detection
MD-ID-No.	GD10_MD_04	Address	ZI Est, Rue Orfila, CS20417, 62027 Arras Cedex , France
<Other information>		Contact person	Thibault Fourlegne
Remark 1		Telephone name	+33 (0) 3 21 60 80 13
Remark 2		Fax number	
Remark 3		Email address	thibault.fourlegne@teledyne.com
		SDoC ID-No.	GD10_SDoC_04

<Product information>

Product Name	Product number	Delivered unit		Product information
		Amount	Unit	
GD10P	GD10-P00-XXXX-XXX-XX	1	piece	Designed for the detection of explosive gases, toxic gases or oxygen

<Material information>

This materials information shows the amount of hazardous materials contained in

Unit
1 piece

Table	Material name	Threshold Level	Present above threshold level	If yes, material mass		If yes, information on where it is used
			Yes/No	Mass	Unit	
Table A** (Materials listed in appendix 1 of the Convention))	Asbestos	0.1%*	No			
	Polychlorinated biphenyls (PCBs)	50mg/kg	No			
	Ozone Depleting substance	No threshold level	Chlorofluorocarbons (CFCs)	No		
			Halons	No		
			Other fully halogenated CFCs	No		
			Carbon tetrachloride	No		
			1,1,1-Trichloroethane	No		
			Hydrochlorofluorocarbons	No		
			Hydrobromofluorocarbons	No		
			Methyl bromide	No		
			Bromochloromethane	No		
	Anti-fouling systems containing organotin compounds as a biocide	2,500mg total tin/kg	No			
Table B** (Materials listed in Appendix 2 of the Convention)	Cadmium and cadmium compounds	100mg/kg	No			
	Hexavalent chromium and hexavalent chromium compounds	1,000mg/kg	No			
	Lead and lead compounds	1,000mg/kg	No			
	Mercury and mercury compounds	1,000mg/kg	No			
	Polybrominated biphenyl (PBBs)	50mg/kg	No			
	Polybrominated diphenyl ethers (PBDEs)	1,000mg/kg	No			
	Polychloronaphthalenes (Cl >= 3)	50mg/kg	No			
	Radioactive substances	No threshold level	No			
Annex II** (Additional materials)	Certain shortchain chlorinated paraffins	1%	No			
	Perfluorooctane sulfonic acid (PFOS)	10mg/kg****	No			
	Brominated Flame Retardant (HBCDD)	100mg/kg	No			

* Please refer to footnote 18 on the "Form of Material Declaration" in the IMO Guidelines Resolution MEPC.269(68).

** Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 (SR/CONF/45).

*** Regulation EU No. 1257/2013 of the European Parliament and of the Council of 20 November 2013 on Ship recycling and amending Regulations EC No. 1013/2006 and Directive 2009/16/EC EMSA's Best Practice Guidance on the Inventory of Hazardous Materials, dated 2016-10-28.

**** Concentrations of PFOS above 10mg/kg (0.001% by weight) when it occurs in substances or in preparations or concentrations of PFOS in semi-finished products or articles, or parts thereof equal to or above than 0.1% by weight calculated with reference to the mass of structurally or micro-structurally distinct parts that contain PFOS or for textiles or other coated materials if the amount of PFOS is equal to or above than 1 µl/m² of the coated material.**IMPORTANT Notice:** The content and specifications of this form may not be change or amended. Any changes or amendments by others than the author of this form constitute a breach of copyright.

Supplier's Declaration of Conformity
for Material Declaration Management

1. **SDoC No.:** GD10_SDoC_04
2. **Issuers Name:** Teledyne Oldham Simtronics
- Issuers Address:** ZI Est, Rue Orfila, CS 20417, 62027 Arras Cedex France
3. **Object(s) of Declaration:** 1) GD10P
2)
3)
4)
4. *The object(s) of the declaration described above is/are in conformity with the following documents*
5. **Applicable Regulations or other stipulated requirements and documents**

Document No.	Title	Edition	Date of issue
1	Regulation (EU) 1257/2013 of the European Parliament	1	2018-11-13
2	GD10-DOC-Materials Report	1	2018-11-13

6. Additional Information

No hazardous material

Signed for and on behalf of: Teledyne Oldham Simtronics**Place of issue:** ARRAS, FRANCE**Name & function:** Thibault Fourlegnie, General Manager**Signature:**

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Teledyne Confidential; Commercially Sensitive Business Data

GD10-P00 and GD10-PE0

INFRARED POINT GAS DETECTOR
OPERATING MANUAL

GD10-P00 and GD10-PE0

INFRARED POINT GAS DETECTOR
OPERATING MANUAL

GD10-P00 and GD10-PE0

INFRARED POINT GAS DETECTOR
OPERATING MANUAL



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