



SAFETY MANUAL – GD10P AND GD10PE INFRARED GAS DETECTOR



INTRODUCTION

This manual describes the safety related information for the installation, operation, configuration, and maintenance of the GD10P and GD10PE Infrared Gas Detector.

For complete information regarding performance, installation, operation, maintenance and specifications of the GD10¹, please refer to the operating manual 850-811250.

The GD10 is an infrared gas detector that is classified as Type B field device according to IEC61508.

It provides an 4-20mA analog signal proportional to gas concentrations from 0 to 100% of the scale.

The GD10 performs continuous self-testing of optical and electronic functions. Fault levels are in the 0-4.0 mA current output range.

The safety function of the GD10 does not include:

- RS-485 Modbus communication
- HART communication

SAFETY MESSAGES

Procedures and instructions in this section may require special precautions to ensure the safety of personnel performing the operations. Information that raises potential safety issues is indicated by the word “Warning”. Always read and understand these safety messages.

INSTALLATION

The GD10 IR Gas Detector is intended for use in hazardous environments that may include explosive levels of flammable gases and vapors.

This product must be properly installed, operated and maintained. Improper installation or use could result in an explosion or fire resulting in death or serious injury.

¹ GD10 is equivalent to GD10P or GD10PE



Warning

- Do not open when energized.
- Detector must be properly installed and wiring compartment cover must be fully engaged to meet hazardous area explosion-proof/ non-incendive requirements.
- Before connecting a HART field communicator to the GD10 IR Gas Detector in a potentially explosive atmosphere, make sure the field communicator is suitable and approved for use in the specific area.

NOTE

The GD10 analog signal output is not safety-rated during detector warm-up. Alternative means should be used at the jobsite to ensure facility safety during these activities.

COMMON MISUSE SCENARIOS

Refer to the Installation, Commissioning and Maintenance sections of the operating manual for information on avoidance and resolution of common misuse scenarios.

No special application restrictions are necessary to meet the safety certification requirements.

MAINTENANCE

GD10 gas detector requires additional testing to be performed.

Visual Field inspection test

1. Inhibit fault response at the control device.
2. Remove the weather protection by unscrewing the front cover plate (two screws),
3. 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.
4. Put back the weather protection in place.
5. Re-activate fault response at the control device.



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.

Visual Field inspection and Beam block test

It is possible to take advantage of the visual field inspection test to also perform function test of the detector.

1. Inhibit fault response at the control device.
2. Remove the weather protection as explained in the previous section
3. Block the optical path between the lens and the mirror
4. Observe the effect on the detector 4-20 mA analogue output or through the control system. Analogue output should be fault current.
5. Unblock the optical path and proceed to the cleaning of the lens and the mirror.
6. Put back the weather protection in place.
7. Re-activate fault response at the control device.

Gas response 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.



Any external alarm equipment, systems or signaling devices that could be automatically initiated by performing this test must be disabled or bypassed before performing this test!

Output response test

1. Inhibit alarm response at the control device.
2. Use HART handheld communicator to perform a Loop Test function at 20 mA or apply test gas to the detector. Verify correct output at the control device.
3. Re-activate alarm response at the control device.

GD10P and GD10PE

INFRARED POINT GAS DETECTOR
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SPECIFICATIONS

Table 1 and Table 2 list specifications for the GD10 Gas Detector. For a complete list of specifications, please refer to the operating manual.

GD10	
Operating Manual	850-811250
Operating Temperature Range	-40°C to +60°C
Humidity Range	100% RH uncondensed
Input Voltage	18 to 32 VDC

Table 1 – Environmental/Electrical Specifications

Status	Output
Detector fault	0.6 mA ^(*)
Dirty Optics Warning (70% signal reduction)	1 mA ^(*)
Early Dirty Optics Warning (55% signal reduction)	2 mA ^(*)
≤ -10% of range	0.6 mA
0-100% of range	4-20 mA

Table 2 – Analogue Output Specifications

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

The monitoring device must be programmed to indicate a fault or overscale condition when current levels reach undercurrent (< 4mA) or overcurrent (> 20mA).

RELIABILITY DATA

Field device	1oo1 architecture	1oo2 architecture
MTBF	826 583 hours	
MTTR	4320 minutes	
Periodic testing interval	12 months	
λ	1.210*10 ⁻⁶ 1/hour	
DC	96.0%	
λ_{du}	2.94*10 ⁻⁸	
SFF	97,6%	
Common mode failure factor β	--	10%
PFH	2.94*10 ⁻⁸ 1/hour	2.95*10 ⁻⁹ 1/hour
PFD	1.83*10 ⁻⁴	1.57*10 ⁻⁵
SIL level	SIL2	SIL3

Table 3 – SIL Parameters for GD10

DIAGNOSTIC RESPONSE TIME

The GD10 Gas Detector will perform all critical diagnostic functions within 2 seconds, worst case diagnostic detection time.

Internal data integrity test performed every 2 minutes at least.