SAFETY DEVICES

Certificate of compliance
In accordance with IEC 61508

N° 202916 / 2021A

The National Institute for Industrial Environment & Risks (INERIS – Institut National de l'Environnement Industriel et des Risques), a public organization, established by decree No.90-1089 of 7 December 1990, and accredited by COFRAC under number 5-0045 for certification of products and services (scope of accreditation available on the website www.cofrac.fr) issues a certificate of compliance related to IEC 61508 standards for the following product:

Denomination:	GD10 series Infrared point gas detectors
Type:	GD10P and GD10PE
Manufacturer:	Teledyne Oldham Simtronics
Applicant of the certificate:	Teledyne Oldham Simtronics Arras, France

Description:

The products are two non-dispersive infrared point gas detectors: GD10P and GD10PE, that can:

Detect target gas and generate analog output between 4 and 20 mA in a linear dependence to detected gas concentration within specified concentration ranges and with specified response time T90;
Implement extensive autotest functionality in order to ensure a high failure identification rate and signal all failures affecting the safety function integrity by analog output signal levels in the 0 to 4mA domain.

Certification procedures are available under www.ineris.fr.

Parc Technologique Alata BP 2 F-60550 Verneuil-en-Halatte
tél +33(0)3 44 55 66 77 **fax** +33(0)3 44 55 66 99 **internet** www.ineris.fr
Institut national de l'environnement industriel et des risques
Etablissement public à caractère industriel et commercial – RCS Compiègne B 381 984 921 – Siret 381 984 921 00019 – APE 7120B

1. Functional safety

a. Safety function

GD10P and GD10PE: activation of 4-20mA output accordingly with gas detection.

b. Classification of safety functions

Product	Safety function	Level of compliance	SFF	PFH	PFD
GD10P & GD10PE	TRACO converter	SIL 2 / SC 3	97,6%	$2,94x10^{-8}$	$1,82x10^{-4}$
	RECOM converter	SIL 2 / SC 3	98,3%	$2,94x10^{-8}$	$2,02x10^{-4}$

Calculations have been performed with the following assumptions:

- Ti (Periodic Test Interval) = 1 year
- MTTR (Mean time to restauration) = 72h

c. Assessed versions and configurations

Hardware :

- GD10P and GD10PE with TRACO or RECOM POWER DC/DC converter,
- Main electronic card version: 399-816587-V4

Software : 4.01, checksum of executed code: 5662

d. Reliability computations

DC/DC converter	TRACO	RECOM
SFF (safe failure fraction)	97,6%	98,3%
λ_{SD} (FIT)	404,8	678,8
λ_{SU} (FIT)	63,9	63,9
λ_{DD} (FIT)	711,8	985,8
λ_{DU} (FIT)	29,4	29,4
λ (FIT)	1209,9	1757,9
DC_D	96,0%	97,1%
PFH	$2,94x10^{-8}$	$2,94x10^{-8}$
PFD_{avg}	$1,82x10^{-4}$	$2,02x10^{-4}$
Architecture	1oo1	1oo1
Ti (h)	8760	
MTTR (h)	72	

Table 1: Functional safety analysis results for GD10P and GD10PE

GD10P and GD10PE are type B safety devices with HFT=0 according to IEC 61508.

3. Assessment

The safety function has been assessed in conformity with the standard IEC 61508 ed. 2 according to route 1S and route 1H. The assessment results are detailed in the report referenced: Ineris - 202916 - 2373892 – v1.0.

The INERIS certifies that, for the configurations, proof test intervals and mode of operation listed in the present certificate, and for the related indicated SIL capabilities:

- the IEC 61508 standard hardware requirements are met;
- the IEC 61508 standard probability of failure requirement are reached;
- the IEC 61508 software safety lifecycle requirements are met;
- the validation by tests has been properly done by Teledyne Oldham Simtronics;
- required Safety integrity level capability (SIL) and the Systematic capability (SC) are achieved for the safety function listed in this certificate.

4. Safety for use

The gas detectors must be used in accordance with the configuration and usage assumptions listed in this certificate and in accordance with the supplier documents to ensure that the certified SIL remain valid as described in Ineris - 202916 - 2373892 – v1.0 as well as in the user guide referenced 850-811250-Revision 13b and the Safety manual NOSP 18157R00.

Any modification to the above item implies to issue an amendment to this certificate.

Verneuil-en-Halatte, le 14/04/2021

The Chief Executive Officer of INERIS,
By delegation
Dominique CHARPENTIER
Certification Manager

INERIS France

Signé électroniquement
Digitally signed by
Dominique CHARPENTIER
Certification Manager /
Responsable Certification