



Certificate / Certificat Zertifikat / 合格証

DET 1409202 C001

exida hereby confirms that the:

LS2000 Infrared Gas Detector Detector Electronics Corp. Minneapolis, MN - USA

Has been assessed per the relevant requirements of:

IEC 61508 : 2010 Parts 1-7

and meets requirements providing a level of integrity to:

Systematic Capability: SC 2 (SIL 2 Capable)

Random Capability: Type B Element

SIL 2 @ HFT=0; Route 1_H

**PFD_{AVG} and Architecture Constraints
must be verified for each application**

Safety Function:

The line of sight infrared Gas Detection System will sense gas concentrations present between the transmitter and receiver components, and signal an alarm on the 4-20mA output (mA output only model), or one or both of the optional Alarm relay outputs, to indicate the potentially dangerous condition (mA output with optional relay model).

Application Restrictions:

The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.

The manufacturer
may use the mark:



Valid until May 1, 2016
Revision 1.0 April 30, 2015



ANSI Accredited Program
PRODUCT CERTIFICATION
#1004



Evaluating Assessor

Certifying Assessor

DET 1409202 C001

Systematic Capability: SC 2 (SIL 2 Capable)**Random Capability: Type B Element****SIL 2 @ HFT=0; Route 1_H****PFD_{AVG} and Architecture Constraints
must be verified for each application****LS2000 Infrared Gas
Detector****Systematic Capability :**

The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 2. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than stated.

Random Capability:

The SIL limit imposed by the Architectural Constraints must be met for each element.

IEC 61508 Failure Rates in FIT*

Device	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}	SFF
LS2000 (mA)	0	77	1037	47	96.0%
LS2000 (Relay)	350	76	716	115	90.9%

* FIT = 1 failure / 10⁹ hours

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD_{AVG} considering redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each element must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

The following documents are a mandatory part of certification:

Assessment Report: DET 14-09-202 R001 V1R0

Safety Manual: 95-8727-1.1 and later



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