



Certificate / Certificat Zertifikat / 合格証

ELL 1610010 C001

exida hereby confirms that the:

Pneumatic Trip System

**Elliott Company
Jeannette, PA - USA**

The manufacturer
may use the mark:



Revision 1.0 August 31, 2017
Surveillance Audit Due
September 1, 2020

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 3 (SIL 3 Capable)

Random Capability: Type A Element

SIL 1 @ HFT=0; SIL 2 @ HFT = 1; Route 1_H

SIL 2 @ HFT=0; SIL 3 @ HFT = 1; Route 2_H

**PFH/PFD_{avg} and Architecture Constraints
must be verified for each application**

Safety Function:

The Pneumatic Trip System will reduce turbine speed to less than 500 RPM in 15 minutes on an overspeed trip.

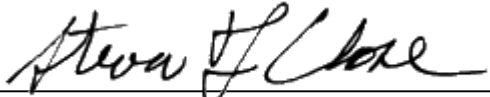
Application Restrictions:

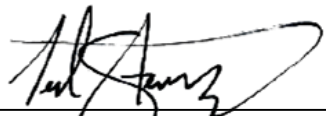
The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.



ANSI Accredited Program
ISO/IEC 17065
PRODUCT CERTIFICATION BODY
#1004




Evaluating Assessor


Certifying Assessor

ELL 1610010 C001

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type A Element

SIL 1 @ HFT=0; SIL 2 @ HFT = 1; Route 1_H

SIL 2 @ HFT=0; SIL 3 @ HFT = 1; Route 2_H

PFH/PFD_{avg} and Architecture Constraints must be verified for each application

Systematic Capability:

The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. 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. This device meets *exida* criteria for Route 2_H.

IEC 61508 Failure Rates in FIT*

Application/Device/Configuration	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}	MTTFS
Full Stroke, Clean Service, 1oo2 Solenoid Architecture	1182	0	0	799	97
Full Stroke with PVST, Clean Service, 1oo2 Solenoid Architecture	1099	83	200	599	104
Full Stroke, Clean Service, 2oo2 Solenoid Architecture	202	0	0	1156	566
Full Stroke with PVST, Clean Service, 2oo2 Solenoid Architecture	119	83	200	956	963

* FIT = 1 failure / 10⁹ hours

See the assessment report for the applicable models.

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFH/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: ELL 16/10-010 R002 V1 R1 (or later)

Safety Manual: 5046521



80 N Main St
Sellersville, PA 18960