



Certificate / Certificat Zertifikat / 合格証

ROS 1204020 C001

exida hereby confirms that the:

Rosemount 644 4-20mA HART Temperature Transmitter

Device Label SW 1.1.X

Rosemount Inc.

(an Emerson Automation Solutions company)

Shakopee, 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 3 (SIL 3 Capable)

Random Capability: Type B Element

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

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

Safety Function:

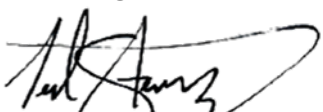
The 644 4-20mA HART Temperature Transmitter will measure temperature within stated performance specifications when operated within the environmental limits found in the product manual.

Application Restrictions:

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




Evaluating Assessor


Certifying Assessor

The manufacturer
may use the mark:



Revision 1.7 November 28, 2017
Surveillance Audit Due
December 1, 2020



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

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Random Capability: Type B Element

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Rosemount 644
4-20mA HART
Temperature
Transmitter

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}	#	SFF
644 Single T/C mode	0	0	362	39	136	90.3%
644 Dual T/C mode	0	0	371	39	140	90.5%
644 Single RTD mode	0	0	317	30	133	91.4%
644 Dual RTD mode (3-wire RTD)	0	0	330	31	135	91.4%

* 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 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: ROS 12/04-020 R002 V2 R3

Safety Manual: 00809-0200-4728 Section 7

**644 can be configured with single or dual RTD or Thermocouple sensors. The failure rates of the device vary with sensor configuration as well as other device configuration parameters. See FMEDA for details on how to calculate the failure rates based on the configuration.



80 N Main St
Sellersville, PA 18960