Certificate / Certificat
Zertifikat / 合格証

ROS 1102057 C001

exida hereby confirms that the:

Rosemount 3144P 4-20mA HART Temperature Transmitter
Device Label SW 1.1.X and 1.2.X

Rosemount Inc.
(an Emerson Automation Solution company)

Shakopee, MN - USA

Have been assessed per the relevant requirements of:

IEC 61508 : 2010 Parts 1-3

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 1_H

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

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

Safety Function:

Emerson's Rosemount 3144P Temperature Transmitters will measure temperature within stated performance specifications when operated within the environmental limits found in the product manual. Extended ambient operating temperature range options[1] (down to -60C) must be specified in the model code along with option code QT for this certificate to remain valid across the extended ambient temperature limits.

Rudolf P. Chalupa
_____
Evaluating Assessor

Molly Lynn O'Brien
_____
Certifying Assessor

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Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type B Element

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

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

PFD$_{AVG}$ and Architecture Constraints must be verified for each application

Rosemount 3144P 4-20mA HART Temperature Transmitter

Systematic Capability:

These products have 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 element meets *exida* criteria for Route 2$_H$.

IEC 61508 Failure Rates in FIT[2, 3]

Application/Device/Configuration	λ_{SD}	λ_{SU}[4]	λ_{DD}	λ_{DU}
3144P, Single T/C mode	0	0	282	28
3144P, Dual T/C mode	0	0	284	28
3144P, Single RTD mode	0	0	239	24
3144P, Dual RTD mode	0	0	244	24

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 11/02-057 R002 V4 R2 (or later)

Safety Manual: 00809-0100-4021 Section 6

[1.] BR6 must be ordered with option code QT for this certificate to be valid below -40C.

[2.] FIT = 1 failure / 10^9 hours

[3.] 3144Pcan 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 paramenters. See FMEDA for details on how to calculate the failure rates based on the configuration.

[4.] It is important to realize that the No Effect failures are no longer included in the Safe Undetected failure category according to IEC 61508, ed2, 2010.