

# Honeywell

2500 W. Union Hills Drive  
Phoenix, AZ 85027

## STT250 (Model STT25H) Temperature Transmitter coupled to a temperature

Date: \_\_\_\_\_  
Honeywell Model: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Tag Number: \_\_\_\_\_  
Customer PO Number: \_\_\_\_\_

A Failure Modes, Effects and Diagnostics Analysis (FMEDA) is one of the steps taken to achieve functional safety certification per IEC61508 of a device. From the FMEDA, failure rates and safe failure fraction are determined for the analog operating mode. This FMEDA includes all hardware, electronic and mechanical. For full certification purposes all requirements of IEC61508 must be considered including the software of the transmitter.

The STT250 transmitter is an isolated two-wire 4 to 20mA smart device classified as Type B according to IEC61508. It contains self-diagnostics and is programmed to send its output to a specified failure state, either high or low, upon internal detection of a failure.

The failure rates, Safe Failure Fraction and PFDavg calculation for the STT250 temperature transmitter, considering the STT250 temperature transmitter connected to a closely coupled thermocouple sensing device and accounting for the additional failure rates of the thermocouple temperature sensing device show as follows:

$$\begin{aligned}\lambda^H &= 31.31 * 10^{-9} \text{ failures per hour} \\ \lambda^L &= 4984.26 * 10^{-9} \text{ failures per hour} \\ \lambda^{DU} &= 375.83 * 10^{-9} \text{ failures per hour} \\ \text{SFF} &= 93.03\% \\ \text{PFDavg} &= 1.65\text{E-}03 \text{ for a 1 year time interval.}\end{aligned}$$

$$\begin{aligned}\lambda^H &= 31.31 * 10^{-9} \text{ failures per hour} \\ \lambda^L &= 2214.26 * 10^{-9} \text{ failures per hour} \\ \lambda^{DU} &= 145.83 * 10^{-9} \text{ failures per hour} \\ \text{SFF} &= 93.90\% \\ \text{PFDavg} &= 6.40\text{E-}04 \text{ for a 1 year time interval.}\end{aligned}$$

Based on a 35% PFDavg budget for the sensor subsystem, the transmitter connected to a closely coupled thermocouple or RTD sensing device would meet the PFDavg requirements of SIL2 in a single configuration. The transmitter, connected to a closely coupled thermocouple or RTD sensing device, would meet the architectural constraint requirements in IEC61508 at a level of SIL2 for a single configuration.

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