

# INTERTEK ASSURANCE SAFETY INTEGRITY LEVEL SUMMARY REPORT PCB SIL SENSOR RATING

**CLIENT NAME**

PCB Piezotronics, Inc.  
3425 Walden Ave  
Depew, NY 14043-2417

**REPORT NO**

103685042CSLT-001

**COMPILED BY**

Ashton D. Hainge, CFSP, PMP

**PROJECT NAME**

G103685042

**DATE**

26 April 2019





# PCB FUNCTIONAL SAFETY SIL SUMMARY AND RESULTS

## Summary

This summary report details results of the reliability analysis performed on the PCB Piezotronics 4-20 mA Output Velocity Sensor model 64XYZZ series. These results are based the following PCB Piezotronics documentation. Design changes from this documentation package would need to be evaluated for the impact on reliability characteristics.

1. Electrical schematic 23927-B
2. Electrical schematic 24297-E
3. BOM 21459-01-L
4. BOM 24297-01-209-100-G
5. Manual 640b00

## Results

The results from the FMEA are given below for the 4-20 mA Output Velocity Sensor model 64XYZZ:

Name	Result
Architecture	<b>1001</b>
Proof test interval (Annual)	<b>8,760 h</b>
PFD <sub>avg</sub>	<b>1.299x10<sup>-3</sup></b>
SFF	<b>86.12%</b>
HFT	<b>0</b>
SIL Capability (Low Demand Mode)	<b>2</b>
SIL Capability (Continuous Demand Mode)	<b>2</b>
Architecture	<b>1001</b>

**PCB Sensor Product Meets SIL 2 Capability**



Name		Result
Safe Detected failure rate	$\lambda_{SD} \times 10^{-6}$	0.5117
Safe Undetected failure rate	$\lambda_{SU} \times 10^{-6}$	0.3411
Dangerous Detected failure rate	$\lambda_{DD} \times 10^{-6}$	1.2993
Dangerous Undetected failure rate	$\lambda_{DU} \times 10^{-6}$	0.3468
Average frequency of a dangerous failure on demand	PFH $\times 10^{-6}$	0.3468

**Type B components: 64XYZZ Series (includes EX64XYZZ Series)**

The safety relevant parameter  $PFD_{avg}$  is in compliance with the corresponding requirements for SIL 2 according to IEC 61508<sup>1</sup>.

The safety relevant parameters HFT and SFF are in compliance with the corresponding requirements for SIL 1 according to IEC 61508.

The user should consider, that the hardware fault tolerance of all inspected devices is zero and that a single fault can lead to a dangerous failure.

Senior Consultant,

Ashton Hainge, Intertek  
CFSP, PMP

---

<sup>1</sup> The assessment results described in this report only refer to the safety-related parameters  $PFD_{avg}$ , HFT, and SFF according to IEC 61508.

This report does not make any statements, that the manufacturer meets all other requirements of the above cited standards for hardware, software, documentation, management of functional safety, verification, and validation.

This report does not imply that the examined pressure sensors have been certified for functional safety by the assessor according to IEC 61508 or any other standards.

The sensors are only one part of a complete safety function. It is at the responsibility of the end-user to prepare and to apply an extensive reliability model, that brings out the complete safety function and that meets all requirements of the claimed SIL level according to IEC 61508.