Micro Detectors

Summary of the characteristic data for use of the product in safety-related applications

Product: Safety Control Box SBCR03/S-AM including muting extension,
six SHx/x-xx or THx/x-x sensor pairs and SB300 relay module (Worst Case Combination)

1. Characteristic data acc. to IEC 61508-1 to -7 and IEC 62061:

1.1 Data for use of the product as a subsystem in safety functions

	Value	Remark
Safety Integrity Level	SIL CL 2	
PFH	1.8 E-8 1/h	PFH_D = 1,84 E-8, corresponds to 1.8 % of SIL 2
$PFD_{av}(T)$	1.6 E-3	Corresponds to 16.1 % of SIL 2; this value is valid for the stated Proof Test Interval T
Proof Test Interval T	20 a	

Remark: At a PFH value, which is < 1 % of the allowed SIL-threshold, the performance of special Proof Tests within the mission time of the product is regarded as not necessary.

1.2 Additional data for use of the product as a subsystem element in safety functions

	Value	Remark
Total Failure Rate λ	2.4E-6 1/h	
Dangerous failure rate λ_d	1.2E-6 1/h	
Dangerous undetected failure rate λ_{du}	1.8E-8 1/h	
Diagnostic Coverage DC	98,6 %	Medium
Common Cause Factor β	2 %	
Diagnostic Test Interval T_D	< 1 h	
Proof Test Interval T	124 a	Should be $\geq$ 20 a; calculated based on 100 % of SIL 2

2. Characteristic data acc. to EN ISO 13849-1:

	Value	Remark
Performance Level	PL d	
Category	Cat. 2	
$MTTF_d$	High (> 30 a)	Calculated 83 a
Average Diagnostic Coverage DC_{av}	Medium (90 % – 99 %)	Calculated 98,5 %
Mission Time $T10_d$	20 a	

The calculation of these values is based on the following assumptions:
Number of operating days per year: d_{op} = 250d
Number of operating hours per day: h_{op} = 16h
Operating frequency: 1/h

When the product is used deviant from these assumptions (different load, operating frequency, etc.) the values have to be adjusted accordingly.
Besides these summary of the characteristic data always the information provided in the product documents of the manufacturer have to be considered.

Source of failure rate data: SN 29500, so far no data from the component manufacturer was provided.
Maximum average ambient temperature: 40°C
General assumption that 50% of the component failures are dangerous failures (λ_d = 0.5 x λ, $MTTF_d$ = 2 x MTTF), so far no further information was available.