



ENGINEERING SAFETY CONSULTANTS

The Global Provider of Functional Safety Expertise and Technical Consultancy

Certificate of Conformity to IEC 61508 / IEC 61511 Safety Integrity Level (SIL) 2

Functional Safety of Safety-Related Programmable Electronic Systems

Manufacturer: Tyco Fire & Security GmbH (TFSG)
Victor Von Bruns-Strasse 21
8212 Neuhausen am Rheinfall
Schaffhausen
Switzerland

Fire & Gas Detection Systems

This certificate summarises the hardware failure data affecting the application of the Fire & Gas Detection Systems equipment as part of a Safety Instrumented Function, in order to comply with the requirement of IEC 61508. The Fire & Gas Detection Systems fulfil the requirements to achieve SIL 2 conformity.

HFT is the Hardware Fault Tolerance. All devices are Type B, with the exception of the IOB800 Expansion Board which is a Type A device.

Devices	SFF (%)	λ_{DU} (/hr)	λ_{DD} (/hr)	λ_S (/hr)	HFT	PFD with a $T_p = 12$ months
Detectors						
Failure Mode: Unable to detect an alarm condition and process alarms over the addressable system.						
CP840Ex – Weatherproof Break Glass Callpoint	94	1.9E-08	2.1E-07	1.0E-07	0	1.2E-04
DDM800 – Universal Fire & Gas Detector Module	96	5.3E-08	1.2E-06	3.1E-08	0	4.2E-04
EXI800 – IS Loop Interface Module	97	9.1E-09	3.1E-07	0.0E+00	0	9.2E-05
SNM800 – Sounder Notification Module	60	3.1E-07	3.3E-07	1.4E-07	1*	1.4E-03
801CHEx – IS Carbon Monoxide & Heat Detector	97	9.1E-09	3.0E-07	1.7E-08	0	9.0E-05
801HEx – IS Heat Detector	98	6.2E-09	2.5E-07	1.3E-08	0	6.9E-05
801PHEx – IS Optical Smoke & Heat Detector	97	1.4E-08	3.8E-07	1.6E-08	0	1.2E-04
MX / ZX Fire Panel						
Failure Mode: Failure to respond (executive action).						
CPU801	94	1.1E-07	2.6E-06	1.2E-10	0	9.3E-04
TLI800EN Network Module	97	8.3E-09	9.5E-07	0.0E+00	0	2.0E-04
IOB800 Expansion Board (local audible output)	67	7.9E-08	9.9E-08	6.6E-08	0	3.6E-04
Overall MX/ZX Fire Panel (without local audible output)	95	2.6E-07	3.0E-06	-	0	1.2E-03

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Reg: 12Q12086

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* In order to the SNM800 module to achieve SIL 2 in terms of architectural requirements, at any one location a person in a given area should be able to hear at least two of the sounders (duplex configuration) to give a level of redundancy in the event of a fault in one sounder output.

The assessments were based on the assumptions, data provided, and recommendations given in:

- CP840Ex: ESC Ltd report D152_SV001 rev.3;
- DDM800: ESC Ltd report D152_SV002 rev.3;
- EXI800: ESC Ltd report D152_SV003 rev.3;
- SNM800: ESC Ltd report D152_SV004 rev.3;
- 801CHEx: ESC Ltd report D152_SV005 rev.3;
- 801Hex: ESC Ltd report D152_SV006 rev.3;
- 801PHEx: ESC Ltd report D152_SV007 rev.3;
- CPU801: ESC Ltd report D152_SV008 rev.4;
- TLI800EN: ESC Ltd report D152_SV009 rev.4;
- IOB800: ESC Ltd report D152_SV010 rev.3;
- Technis report No. T432, Issue 4.0;
- CP840Ex, DDM800, EXI800, TLI800EN and CPU801 Renewal Letters from Tyco Fire & Security GmbH, signed by Deepika Sahni, Regulatory Engineer, Dated 2nd May 2019;
- SNM800, 801CHEx, 801Hex, 801PHEx and IOB800 Renewal Letters from Tyco Fire & Security GmbH, signed by Deepika Sahni, Regulatory Engineer, Dated 2^{9th} April 2019.

Notes:

- The TLI800EN Network Module & IOB800 Expansion Board can be used in conjunction with the T2000, MX & ZX Fire Panel;
- The assessment undertaken for the CPU801 is valid also for the CPU800 as part of the T2000, MX & ZX Fire Panel;
- A complete analysis of the total Safety Instrumented Function will need to be undertaken to ensure the suitability of the complete SIF meeting the hardware reliability and architectural requirements of the target SIL;
- A one-year proof test interval and repair time of 168 hours was assumed for the above assessments;
- Source data for these analyses is taken from Handbook of Reliability Data-5 & FARADIP.

Managing Director: Kenneth G L Simpson
Member of the IEC 61508 committee
Assessment Date: April 2015
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Certificate: D152_CT011 rev. 3

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