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IEC 61508 Hardware Safety Integrity Assessment

Tyco Fire & Security GmbH (TFSG), FV300 Flame Detector

Manufacturer:	Tyco Fire & Security GmbH (TFSG) Victor Von Bruns-Strasse 21, 8212 Neuhausen am Rheinfall, Schaffhausen, Switzerland
Product:	Flame Detector
Model:	FV300

Application:	Low Demand Mode Safety Instrumented Function
Safety Function:	Upon detection of fire, action is initiated via an external logic solver (Logic solver and final element subsystems not part of this analysis)
Applied standard:	IEC 61508 Ed2 2010 Parts 1-3 (Partial)
Systematic Capability:	Not Assessed
Applicable report:	Failure Mode, Effects, and Diagnostics Analysis for the FV300 Family of Flame Detectors Report: FV300 Review Report – 1p3 – 28 Jun 18.pdf Failure Mode, Effects, and Diagnostics Analysis for the FV300 Family of Flame Detectors Analysis Spreadsheet: ToSira FV300 FMEDA For Report 1p2 - 16Dec10 1945 25C.xlsm

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Assessment Route:	1_H
Hardware Fault Tolerance:	0
Type:	B
Application restrictions:	Assessment applies to the following variants: FV311S – Non-camera, screw-terminal back box (516.300.006) FV311SC – With PAL camera, screw-terminal back box (516.300.008) FV311SC-N – With NTSC camera, screw-terminal back box (516.300.007) FV312S – Non-camera, remote cable back box (516.300.055) FV312SC – With PAL camera, remote cable back box (516.300.057) FV312SC-N – With NTSC camera, remote cable back box (516.300.056)

Model No.	λDU (/hr)	λDD (/hr)	λSU (/hr)	λSD (/hr)	SFF	SIL AC (HFT = 0)
FV300 – Relay Interface	1.8E-06	1.0E-05	6.8E-06	3.8E-06	92%	SIL 2
FV300 – Modbus Interface	1.6E-06	1.0E-05	6.6E-06	3.2E-06	93%	SIL 2

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Model No.	λDU (/hr)	λDD (/hr)	λSU (/hr)	λSD (/hr)	SFF	SIL AC (HFT = 0)
FV300 – 4-20mA Interface	1.6E-06	1.1E-05	6.7E-06	3.1E-06	93%	SIL 2

SIL AC (Architectural Constraints): Represents the maximum allowable SIL of each hardware element, assuming Hardware Fault Tolerance (HFT) = 0.

It should be noted that for a device to claim compliance with a specified SIL, the SIL AC and SC of the device needs to both be met. In addition to this, the required Average Probability of Failure on Demand (PFDavg) value for the complete Safety Instrumented Function (SIF) needs to adhere to the SIL PFDavg ranges.

IMPORTANT: It should be noted that this assessment considers only the Tyco Fire & Security GmbH (TFSG), FV300 Flame Detector. It does not cover opening and closing time requirements and a random hardware failures assessment must be conducted for the entire safety function for each application as per the appropriate Safety Requirements Specification.

The Tyco Fire & Security GmbH (TFSG), FV300 Flame Detector has been assessed and is considered capable for use in a low demand mode safety function up to (and including) SIL 2 with regards to random hardware failures and architectural constraints.

Note 1: The SIL of a complete SIF (sensor, logic solver and final element subsystems) must be verified to calculate the required PFD / Probability of Failure per Hour (PFH), considering any redundancy, Proof Test Interval (PTI), Proof Test Coverage (PTC), Mission Time and Mean Time To Restoration (MTTR) for all elements included in the SIF. Each subsystem should be verified to ensure compliance with the minimum HFT requirements.

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