ENGINEERING SAFETY CONSULTANTS
The Global Provider of Functional Safety Expertise and Technical Consultancy

Random Hardware Reliability Certificate

Functional Safety of Safety-Related Programmable Electronic Systems

The **Thermocable Flexible Elements Ltd, ProReact Digital Monitoring Module (DiMM-M) and ProReact Digital Sensor Control Unit (DSCU-EN)** have been assessed and are considered capable for use in a low demand Safety Function up to (and including) SIL 2, with respect to random hardware failures and architectural constraints.

The function of the ProReact DiMM-M and DSCU-EN is to simultaneously monitor up to two zones of Digital Linear Heat Detection (LHD) cable for an alarm or fault condition. If an overheat or fire situation triggers either zone of the Digital LHD cable, the DiMM-M and DSCU-EN automatically calculates and displays the distance along the cable, in feet and meters, to the alarm point.

The assessment was based on the assumptions, data provided, and recommendations given in:

- **Engineering Safety Consultants Ltd Report: F125_FM001 rev.3;**
- **Renewal letter from Thermocable Flexible Elements Ltd, signed by Thomas Robst, Technical Director, dated 12th December 2022.**

The products were assessed against the following failure modes:

- **A fault causing a failure of the DiMM-M and its ability to detect and identify a genuine fire condition when using a LHDC.**
- **A fault causing a failure of the DSCU-EN and its ability to detect and identify a genuine fire condition when using a LHDC.**

The assessment was carried out to determine compliance with IEC 61508 (2010 Edition) with regards to:

- SIL 2 with a HFT = 0 via Route 1_H;
- Architectural Constraint (Type B, SFF >90% - <99%).

Device	λ_{DU} (/hr)	λ_{DD} (/hr)	λ_S (/hr)	SFF (%)	Device Type	Estimated SIL Capability
ProReact DiMM-M	2.9E-08	2.5E-07	7.3E-08	92	B	SIL 2
ProReact DSCU-EN	2.7E-08	2.2E-07	7.3E-08	92	B	SIL 2

Note 1: The SIL of a complete SIF (sensor, logic solver and final element subsystems) must be verified to calculate the required PFD / 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.

Note 2: This study did not consider Systematic Capability.

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IMPORTANT: It should be noted that this assessment does not include confirmation of the response time of the devices. For response times (along with any relevant assumptions) reference should be made to the Safety Manual of each device and the total SIF response time **MUST** be compared against the process safety time for the specific application.

Managing Director: Simon Burwood
Assessment Date: August 2017
Renewal Date: December 2022. Valid to December 2024
Certificate: F125_CT001 rev. 4

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