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IEC 61508 Hardware Safety Integrity Assessment

Patol Ltd, Digital Linear Heat Detection Cable (LHDC) Locator Module (LDM-621-DDL/Z/G)

Manufacturer:	Patol Ltd Archway House, Bath Rd, Reading RG7 5HR
Product:	Digital Linear Heat Detection Cable Locator Module
Model:	LDM-621-DDL/Z/G
Application:	Low Demand Mode Safety Instrumented Function
Safety Function:	Upon detection of high temperature, action is initiated (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:	Environmental Resources Management Ltd Report: M092_FM001 rev. 4
Assessment Route:	1_H
Hardware Fault Tolerance:	0
Type:	B
Application restrictions:	This FMEA analysis has been conducted on the listed device and not on any external equipment (i.e. the zener / galvanic barriers). Therefore, it is recommended that any external equipment to be used with the device for hazardous areas must be assessed with regards to its suitability for use as in a Safety Function
System Modules:	LDM-621-DDL Module (Part No. 700-453) Standard Digital Linear Heat Detecting Cables: 700-070 Digital LHDC. Alarm temperature 70°C, max ambient 45°C 700-090 Digital LHDC. Alarm temperature 90°C, max ambient 70°C 700-140 Digital LHDC. Alarm temperature 140°C, max ambient 110°C 700-180 Digital LHDC. Alarm temperature 180°C, max ambient 150°C Stainless Steel Over-Braid (Armoured) Digital Linear Heat Detecting Cables: 700-071 Digital LHDC. Alarm temperature 70°C, max ambient 45°C 700-091 Digital LHDC. Alarm temperature 90°C, max ambient 70°C 700-141 Digital LHDC. Alarm temperature 140°C, max ambient 110°C

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700-181 Digital LHDC. Alarm temperature 180°C, max ambient 150°C

Low Smoke Zero Halogen (LS0H) Version Digital Linear Heat Detecting Cables:

700-070LS0H Digital LHDC. Alarm temperature 70°C, max ambient 45°C

700-090LS0H Digital LHDC. Alarm temperature 90°C, max ambient 70°C

LSH01 Stainless Steel Over-Braid (Armoured) Digital Linear Heat Detecting Cables:

700-071LS0H Digital LHDC. Alarm temperature 70°C, max ambient 45°C

700-091LS0H Digital LHDC. Alarm temperature 90°C, max ambient 70°C

Model No.	λDU (/hr)	λDD (/hr)	λS (/hr)	SFF	SIL AC (HFT = 0)
LDM-621-DDL/Z/G	1.2E-08	7.3E-08	2.5E-07	96%	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 meet a required SIL that the SIL AC and SIL SC of the device needs to both be met. In addition to this, the required Probability of Failure on Demand (PFD) value for the complete Safety Instrumented Function (SIF) needs to adhere to the SIL PFD ranges.

IMPORTANT: It should be noted that this assessment considers only the Patol Ltd, Digital Linear Heat Detection Cable (LHDC) Locator Module (LDM-621-DDL/Z/G). 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 Patol Ltd, Digital Linear Heat Detection Cable (LHDC) Locator Module (LDM-621-DDL/Z/G) has been assessed and are 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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