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IEC 61508 Hardware Safety Integrity Assessment

ROSS Pneumatrol Ltd, Redundant Valve Manifold (RVM) Auto Isolation High Flow Variant

Manufacturer:	ROSS Pneumatrol Ltd Blackburn Rd, Oswaldtwistle, Accrington BB5 4WZ
Product:	Redundant Valve Manifold (RVM)
Model:	Auto Isolation High Flow Variant

Application:	Low Demand Mode Safety Instrumented Function
Safety Function:	Upon detection of inability to allow pneumatic solenoid valves connected to the block to remove pneumatic supply at the output of the block within the specified time, valve is closed (DETT) / opened (ETT) (Sensing, logic solver and additional final element subsystems not part of this analysis)
Applied standard:	IEC 61508 Ed2 2010 Parts 1-3 (Partial)
Systematic Capability:	None
Applicable report:	Environmental Resources Management Ltd Report: L011_FM001 rev. 4

Assessment Route:	1_H
Hardware Fault Tolerance:	0
Type:	A
Application restrictions:	Proposed configuration of the RVM is in a 2oo3 arrangement. Any other configuration arrangement would require the analysis to be reconducted.

Model No.	λDU (/hr)	λDD (/hr)	λS(/hr)	SFF	SIL AC (HFT = 0)
RVM Block – Auto Isolation Variant (High Flow)	1.4E-08	0.0E+00	6.2E-08	82.2%	SIL 2
Auto Isolation Valve (DETT)	6.3E-08	0.0E+00	2.1E-07	76.9%	SIL 2
Auto Isolation Valve (ETT)	2.7E-07	0.0E+00	7.2E-09	2.6%	SIL 1

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.

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IMPORTANT: It should be noted that this assessment considers only ROSS Pneumatrol Ltd, Redundant Valve Manifold (RVM) Auto Isolation High Flow Variant and does not include confirmation of the response time of the device(s).

The ROSS Pneumatrol Ltd, Redundant Valve Manifold (RVM) Auto Isolation High Flow Variant 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 Probability of Failure on Demand (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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