
Certificate of Conformity to IEC 61508 Safety Integrity Level (SIL) 3

Functional Safety of Safety-Related Programmable Electronic Systems

The **Pneumatrol Ltd, Redundant Valve Manifold (RVM) No Isolation Low Flow and High Flow variants** have been assessed and are considered capable for use in a low demand Safety Function with regard to random failure rate and architectural constraints. Systematic Capability (SC) was not addressed as part of this analysis.

The function of the RVM is to allow the pneumatic solenoid valves connected to the block to remove the pneumatic supply at the output of the of the block within the specified time. The function applies to use of pneumatic solenoid valves operating as De-Energise To Trip (DETT) or Energise To Trip (ETT).

- SIL 3 SIF suitable for ETT mode of operation for both Low and High flow variants;
- SIL 3 SIF suitable for DETT mode of operation for both Low and High flow variants.

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

- **Engineering Safety Consultants Ltd Report: K191_FM001 rev.2.**

The product was assessed against the following failure modes:

- RVM Block with 4x solenoid valves in a DETT mode of operation (Low and High Flow variants);
- RVM Block with 4x solenoid valves in an ETT mode of operation (Low and High Flow variants).

The proposed configuration of the RVM block is in a 2oo3 voting arrangement and the results presented in this certificate are based upon this proposed arrangement and as per recommended practices in the report. If another voting arrangement is used, the PFD calculations will need to be revisited in order to ensure that the SIL is still achieved.

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

- Random Hardware Failure (Predicted PFD):
 - DETT Mode of Operation; Low Flow variant: $<1.4E-04$ (assuming a 1 year proof test, average repair time of 168 hrs, Proof Test Coverage (PTC) of 95% and an Overhaul Interval of 10 years);
 - ETT Mode of Operation; Low Flow variant: $<1.5E-04$ (assuming a 1 year proof test, average repair time of 168 hrs, PTC of 95% and an Overhaul Interval of 10 years);
 - DETT Mode of Operation; High Flow variant: $<5.6E-05$ (assuming a 1 year proof test, average repair time of 168 hrs, PTC of 95% and an Overhaul Interval of 10 years);
 - ETT Mode of Operation; High Flow variant: $<6.9E-05$ (assuming a 1 year proof test, average repair time of 168 hrs, PTC of 95% and an Overhaul Interval of 10 years).
- Architectural Constraints:
 - DETT Mode of Operation (Type A, SFF $>60\%$ $<90\%$) for Low and High flow variants;
 - ETT Mode of Operation (Type A, SFF $>60\%$ $<90\%$) for Low and High flow variants.

IMPORTANT: It should be noted that this assessment does not include confirmation of the response time of the device. 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.



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