



ENGINEERING SAFETY CONSULTANTS

The Global Provider of Functional Safety Expertise and Technical Consultancy

Certificate of Conformity to IEC 61508 Safety Integrity Level (SIL) 2/3

Functional Safety of Safety-Related Programmable Electronic Systems

The **Pneumatrol Ltd, Redundant Valve Manifold (RVM 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.

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 2 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:

- **ESC Ltd Report: G210_SV001 rev.3.**

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 with regards to:

- Random Hardware Failure (Predicted failure rate per year):
 - o DETT Mode of Operation; Low Flow variant: <9.5E-05 (assuming a 1 year proof test and average repair time of 168 hrs);
 - o ETT Mode of Operation; Low Flow variant: <1.0E-04 (assuming a 1 year proof test and average repair time of 168 hrs);
 - o DETT Mode of Operation; High Flow variant: <6.0E-05 (assuming a 1 year proof test and average repair time of 168 hrs);
 - o ETT Mode of Operation; High Flow variant: <6.7E-05 (assuming a 1 year proof test and average repair time of 168 hrs);
- Architectural Constraints:
 - o DETT Mode of Operation (Type A, SFF >60% <90%) for Low and High flow variants;
 - o ETT Mode of Operation (Type A, SFF <60%) for Low and High flow variants.

Managing Director: Kenneth G L Simpson

Member of the IEC 61508 committee

Assessment Date: September 2018, valid to September 2020

Certificate: G210_CT001 rev.3

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Reg: 12Q12086

ENGINEERING SAFETY CONSULTANTS LTD

Tuition House

27-37 St George's Road Wimbledon London SW19 4EU UK

Telephone/Fax: +44 (0)20 8542 2807

E-Mail: info@esc.uk.net Web: www.esc.uk.net

Registered in England and Wales: 7006868

Registered Office: 27-37 St George's Road Wimbledon London SW19 4EU