



IEC 61508 Safety Integrity Level Capability Certificate

Functional Safety of Safety-Related Programmable Electronic Systems

The **Pneumatrol Ltd, Solenoid Valves Series C, E and T** have been assessed and is considered capable for use in a low demand Safety Function up to (and including) SIL 1 / 2 with respect to random hardware failures, architectural constraints and Systematic Capability.

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

- **Environmental Resources Management Ltd Report: F127_SV001 rev. 4;**
- **Renewal letter from Pneumatrol Ltd, signed by Jamie C Dummer, Managing Director, dated: 18/05/2023.**

The products were assessed against its ability to move the valve to the designated safe state within the specified time for both De-Energise To Trip (DETT) and Energise To Trip (ETT).

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

- DETT: SIL 2 with a HFT = 0 via Route 1H;
- DETT: SIL 3 with a HFT = 1 via Route 1H;
- ETT: SIL 1 with a HFT = 0 via Route 1H;
- ETT: SIL 2 with a HFT = 1 via Route 1H;
- Architectural Constraints;
- Systematic Capability of SIL 2 against IEC 61508 (2010 Edition) Route 2s.

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.

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.

A handwritten signature in black ink, appearing to read 'Simon Burwood', is positioned above the partner's name.

Partner: Simon Burwood
Assessment Date: March 2017
Renewal Date: June 2023, valid to June 2025
Certificate: F127_CT001 rev. 7

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Model Series	Failure Mode	λ_{DU} (/hr)	λ_{DD} (/hr)	λ_S (/hr)	SFF	Type	Achieved SIL (Arch. Constraints, HFT = 0)	Achieved SIL (Arch. Constraints, HFT = 1)
C Series + Terminal Box EXN	De-Energised to Trip	7.2E-08	0.0E+00	3.9E-07	85%	A	2	3
	Energised to Trip	3.7E-07	0.0E+00	7.6E-09	2%	A	1	2
C Series + Terminal Box EXM	De-Energised to Trip	7.2E-08	0.0E+00	4.0E-07	85%	A	2	3
	Energised to Trip	3.7E-07	0.0E+00	7.6E-09	2%	A	1	2
C Series + Terminal Box IA	De-Energised to Trip	7.2E-08	0.0E+00	4.0E-07	85%	A	2	3
	Energised to Trip	3.7E-07	0.0E+00	9.6E-09	3%	A	1	2
E Series + Terminal Box EXN	De-Energised to Trip	7.2E-08	0.0E+00	4.0E-07	85%	A	2	3
	Energised to Trip	3.7E-07	0.0E+00	7.6E-09	2%	A	1	2
E Series + Terminal Box EXM	De-Energised to Trip	7.2E-08	0.0E+00	4.0E-07	85%	A	2	3
	Energised to Trip	3.7E-07	0.0E+00	7.6E-09	2%	A	1	2
E Series + Terminal Box IA	De-Energised to Trip	7.2E-08	0.0E+00	4.0E-07	85%	A	2	3
	Energised to Trip	3.7E-07	0.0E+00	9.6E-09	3%	A	1	2
T Series + Terminal Box EXN	De-Energised to Trip	7.2E-08	0.0E+00	3.9E-07	85%	A	2	3
	Energised to Trip	3.7E-07	0.0E+00	7.6E-09	2%	A	1	2
T Series + Terminal Box EXM	De-Energised to Trip	7.2E-08	0.0E+00	4.0E-07	85%	A	2	3
	Energised to Trip	3.7E-07	0.0E+00	7.6E-09	2%	A	1	2
T Series + Terminal Box IA	De-Energised to Trip	7.2E-08	0.0E+00	4.0E-07	85%	A	2	3
	Energised to Trip	3.7E-07	0.0E+00	9.6E-09	3%	A	1	2