



26 ORCHARD DRIVE,
TONBRIDGE, KENT, TN10 4LG.

Tel: 01732 352532

david.smith@technis.org.uk

www.technis.org.uk

CERTIFICATE of RELIABILITY and FUNCTIONAL SAFETY

This is to certify that

The **Simplex Fibre Optic Temperature Sensing System**, provided by **Sensornet Ltd, 340 Centennial Avenue, Centennial Park, Elstree, WD6 3TJ, UK** has been assessed and is considered suitable for use in low demand safety functions:

- **As an unvoted item (ie hardware fault tolerance of 0) at SIL 2**

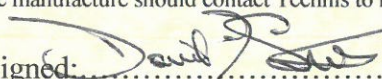
This claim is in respect of an FMEA, addressing random hardware failures and architectural constraints (ie safe failure fraction). The assessment was based on the assumptions, returns failure data, and recommendations given in Technis Report T822 (Issue 2.0 which takes account of an optional PLC within the diagnostic function). The product was assessed against the failure mode:

- **Fail to open a relay contact in response to a specified temperature condition**

The assessment was carried out having regard to the guidance in IEC 61508 [2010] and the related body of guidance in respect of Random Hardware Failures and Architectural Constraints [route 1H]

	Without PLC	With PLC
Safety Integrity	SIL 2	SIL 2
“hazardous” failure rate (revealed)	7.73 10 ⁻⁶ per hour	7.59 10 ⁻⁶ per hour
“hazardous” failure rate (unrevealed)	0.12 10 ⁻⁶ per hour	0.26 10 ⁻⁶ per hour
“safe” failure rate (revealed)	0.47 10 ⁻⁶ per hour	0.47 10 ⁻⁶ per hour
“safe” failure rate (unrevealed)	0	0
Diagnostic Coverage	98%	96%
System Type	B	B
Hardware Fault Tolerance	0	0
Safe Failure Fraction	>98%	>96%
PFD (hazardous failure)	5.2 x10 ⁻⁴	1.2 x10 ⁻³
Proof Test Interval	Up to 1 year	Up to 1 year

The validity of this certificate requires that the product is used in accordance with any assumptions, limitations or intervals stipulated in the underpinning reliability/integrity report. The product build state continues to conform to the drawings and issues quoted in the underpinning reliability/integrity report. The product is used having regard to the instructions, limitations of use, intervals etc as outlined in the manufacturer’s Safety Manual. The manufacturer maintains a credible level of Functional Safety Management in respect of (for example) design configuration control, procurement, manufacturing and defect analysis. The certificate will not apply to any product variation/modification or to the use of functions not addressed in the original study. It is recommended that the design, defect records and the company FSM procedure are reviewed, at least every 2 years, and should any changes have occurred since the original certification then the manufacture should contact Technis to request re-certification.

Signed:  (Certificate No T822-076.1) – 9 May 2017

Dr David J. Smith BSc, PhD, CEng, FIEE, FIQA, HonFSaRS, MIGasE

This certificate does not warrant fitness for any specific applications related purpose and is based on probabilistic and statistical assessment