



ENGINEERING SAFETY CONSULTANTS

The Global Provider of Functional Safety Expertise and Technical Consultancy

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

Functional Safety of Safety-Related Programmable Electronic Systems

The **Michell Instruments UK Ltd, XTP601 Process Oxygen Analyser & XTC601 Binary Gas Analyser** have been assessed and are considered capable for use in a low demand Safety Function up to SIL 2 capability with regards to systematic, random failure rates and architectural constraints.

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

- **ESC Ltd Report: H215_FM001 rev. 3.**

The products were assessed against the following failure modes:

- XTP601: Ability to detect oxygen presence within another gas stream and generate a 4-20mA output;
- XTC601: Ability to detect target gas in another gas stream and generate a 4-20mA output.

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

- Random Hardware Failures (20% of SIL 2 range) (refer to Table below) with a Mean Down Time (MDT) of 168 hours, a Proof Test Interval (PTI) of one year (8760 hours) and capable of revealing 100% of undetected failures;
- Architectural Constraint (Type B, SFF >90%, <99%), HFT = 0;
- Systematic SIL 2 capability against IEC 61508 (2010 Edition) Parts 1, 2 and 3.

Device	λ NSR (/hr)	λ_s (/hr)	λ_{DU} (/hr)	λ_{DD} (/hr)	SFF	Achieved PFD
XTP601	1.3E-07	1.6E-07	5.4E-08	7.4E-07	94%	3.6E-04
XTC601	1.3E-07	1.6E-07	3.9E-08	7.0E-07	96%	2.9E-04

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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Member of the IEC 61508 committee
Assessment Date: February 2020, February 2022
Certificate: H215_CT001 rev. 2

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