



## ENGINEERING SAFETY CONSULTANTS

*The Global Provider of Functional Safety Expertise and Technical Consultancy*

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# Certificate of Conformity to IEC 61508 Safety Integrity Level (SIL) 2 in terms of Random Hardware Requirements

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### ***Functional Safety of Safety-Related Programmable Electronic Systems***

The **Grupo Moto Mecánica** produced **Printed Circuit Board (PCB) L03-60590-01** has been assessed and is considered capable for use in a low demand Safety Function up to SIL 2, with respect to random hardware failures and architectural constraints.

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

- Random Hardware Failure (Predicted PFD) (20% of SIL 2 range) with a Proof Test Interval (PTI) of 1 year (8,760 hours), a Proof Test Coverage (PTC) of 100% and an Overhaul Interval of 10 years (87,600 hours);
- Architectural Constraint (HFT = 0).

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

- **Engineering Safety Consultants (ESC) Ltd Report: L115\_FM001 Rev.1**

The product was assessed against the following safety function:

- A 4-20 mA analogue input signal (4-20 mA two-wire interface) is received by microcontroller U5 (LPC1769FBD100) which digitalizes the signal and compares the value to reference values stored in Serial Peripheral Interface (SPI) flash external memory. In case input signal value is outside of the safe range, a digital output signal is activated with a logic "0" value.

The system assessed comprises the following modules/sub-elements:

- Power supply;
- Four analogue inputs;
- Micro-controller;
- SPI Flash Memory;
- Four digital outputs.

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Reg: 12Q12086

### **ENGINEERING SAFETY CONSULTANTS LTD**

2nd Floor, Exchequer Court, 33 St. Mary Axe,  
London, EC3A 8AA UK

Telephone: +44 (0)20 8542 2807

E-Mail: [info@esc.uk.net](mailto:info@esc.uk.net) Web: [www.esc.uk.net](http://www.esc.uk.net)

Registered in England and Wales: 7006868

Registered Office: 33 St. Mary Axe, London, EC3A 8AA



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The assessment results are as follows:

Module	$\lambda_{DU}$ (/hr)	$\lambda_{DD}$ (/hr)	$\lambda_s$ (/hr)	SFF (%)	Component Type	Achieved PFD	Achieved SIL
Power Supply / Analogue Input / Digital Output	4.38E-07	3.83E-08	2.34E-06	84	A	1.92E-03	SIL 2
Microcontroller / Flash Memory	1.50E-08	5.75E-08	8.27E-08	90	B	6.58E-05	
<b>Total PCB</b>	4.53E-07	9.58E-08	2.42E-06	85	B	1.99E-03	

**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.

Managing Director: Simon Burwood

Member of IEC 61508 (MT61808-1-2) & IEC 61511 (MT61511) Maintenance Committees

Assessment Date: July 2021, valid to July 2023

Certificate: J038\_CT001\_Eng. Rev.2

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