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IEC 61508 Hardware Safety Integrity Assessment

Moto Mecánica Argentina S.A., Electro-Hydraulic Assembly

Manufacturer:	Moto Mecánica Argentina S.A. Río Pilcomayo 449-499, B1657 El Libertador, Provincia de Buenos Aires, Argentina
Product:	Electro-Hydraulic Assembly
Model:	N/A

Application:	Low Demand Mode Safety Instrumented Function
Safety Function:	When the Pressure Transmitter detects the configured alarm settings the Logic Solver (PCB L03-60590-01) will cause de-energising and opening of solenoid relief valve
Applied standard:	IEC 61508 Ed2 2010 Parts 1-3 (Partial)
Systematic Capability:	Not Assessed
Applicable report:	Environmental Resources Management Ltd Report: L115_FM001 Rev. 2 Environmental Resources Management Ltd Report: L115_FM002 Rev. 2

Assessment Route:	1_H
Hardware Fault Tolerance:	0
Type:	A/B (Refer to Table below)
Application restrictions:	For applications in hazardous areas the Wika Intrinsically Safe (IS) barrier is required in conjunction with the Wika pressure transmitter The Pressure Transmitter is to be configured in such a way that any self-detected fault or out of range (high or low) causes de-energising and opening of solenoid relief valve via Logic Solver (PCB L03-60590-01) Any self-detected fault in the Logic Solver will cause de-energising and opening of solenoid relief valve It must be noted that a well actuator/valve is not considered in this certificate. In order to determine the achieved SIL capability of a function intended to isolate a well, the well actuator/valve would have to be considered in the calculations to ensure that the required SIL is met

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Function Block	λDU (/hr)	λDD (/hr)	λS (/hr)	SFF	Type	SIL AC (HFT = 0)
Non-Hazardous Area Applications						
Pressure Transmitter	7.9E-08	5.2E-07	3.9E-07	92%	B	SIL 2
Power Supply / Analogue Input (PCB)	2.5E-09	3.8E-08	9.0E-08	98%	A	SIL 3
Microcontroller / Memory (PCB)	1.5E-08	5.8E-08	8.3E-08	90%	B	SIL 2
Digital Output (PCB)	2.7E-08	0.0E+00	1.3E-07	83%	A	SIL 2
Hydraulic Assembly	9.0E-08	0.0E+00	3.7E-06	98%	A	SIL 3
Hazardous Area Applications						
Pressure Transmitter	4.0E-08	5.1E-08	2.7E-08	66%	B	SIL 1
IS Barrier	5.5E-08	2.9E-07	2.3E-07	90%	A	SIL 3
Power Supply / Analogue Input (PCB)	2.5E-09	3.8E-08	9.0E-08	98%	A	SIL 3
Microcontroller / Memory (PCB)	1.5E-08	5.8E-08	8.3E-08	90%	B	SIL 2
Digital Output (PCB)	2.7E-08	0.0E+00	1.3E-07	83%	A	SIL 2
Hydraulic Assembly	9.0E-08	0.0E+00	3.7E-06	98%	A	SIL 3

SIL AC (Architectural Constraints): Represents the maximum allowable SIL of each hardware element, assuming Hardware Fault Tolerance (HFT) = 0.

It should be noted that for a device to claim compliance with a specified SIL, the SIL AC and SC of the device needs to both be met. In addition to this, the required Average Probability of Failure on Demand (PFDavg) value for the complete Safety Instrumented Function (SIF) needs to adhere to the SIL PFDavg ranges.

IMPORTANT: It should be noted that this assessment considers only the Moto Mecánica Argentina S.A., Electro-Hydraulic Assembly. It does not cover opening and closing time

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requirements and a random hardware failures assessment must be conducted for the entire safety function for each application as per the appropriate Safety Requirements Specification.

The Moto Mecánica Argentina S.A., Electro-Hydraulic Assembly has been assessed and is considered capable for use in a low demand mode safety function up to (and including) SIL 2 (applications in non-hazardous area) and up to (and including) SIL 1 (applications in hazardous area), with regards to random hardware failures and architectural constraints.

Note 1: The SIL of a complete SIF (sensor, logic solver and final element subsystems) must be verified to calculate the required PFD / Probability of Failure per Hour (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.

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