



IEC 61508 Functional Safety Certification

This is to certify that the undernoted products have been assessed against the relevant requirements of the applicable standard

Office: **Aberdeen**

Date: **05 October, 2018**

This Certificate is issued to: **Teco Ingenieros, S.L., C/ Río Gállego, 14 50410 CUARTE DE HUERVA, Spain**

Product Description: **Pneumatic and hydraulic linear actuators (single effect)**

Description	Types / Series
Pneumatic Linear Single-effect (fail open) "A/B/C/D" (1 spring)	ACN SE FAA "A/B/C/D" Series
Pneumatic Linear Single-effect (fail open) "E/F/G/I/J" (2 springs)	ACN SE FAA "E/F/G/I/J" Series
Pneumatic Linear Single-effect (fail open) "H/K" (3 springs)	ACN SE FAA "H/K" Series
Pneumatic Linear Single-effect (fail close) "A/B/C/D" (1 spring)	ACN SE FAC "A/B/C/D" Series
Pneumatic Linear Single-effect (fail close) "E/F/G/I/J" (2 springs)	ACN SE FAC "E/F/G/I/J" Series
Pneumatic Linear Single-effect (fail close) "H/K" (3 springs)	ACN SE FAC "H/K" Series
Hydraulic Linear Single-effect (fail open)	ACH SE FAA Series
Hydraulic Linear Single-effect (fail close)	ACH SE FAC Series

Description and Results

- Lloyd's Register has assessed the product to the relevant requirements of the applicable standard and meets the requirements providing a level of integrity of:
 - Systematic Safety Integrity SIL 2 (Route 1S)
 - Random Safety Integrity (Type A, Route 2H Device) SIL 2 (HFT=0) and SIL 3 (HFT=1)

Applicable Standard

- IEC61508-2010 Parts 1 and 2, Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems

Safety Functions Included and Service

- Fail open (families ACN SE FAA, ACH SE FAA) and fail closed (families ACN SE FAC, ACH SE FAC): when the source of pressure is removed from the actuator, the shaft moves to the predefined position
- Service assumed: worst case (offshore environment)

IEC 61508 Failure Rates (FMEDA)

Total failure rates for linear pneumatic actuators (single effect)

Failure Classification	Failure Rate (1/h)					
	ACN SE "A/B/C/D" Series		ACN SE "E/F/G/I/J" Series		ACN SE "H/K" Series	
	Fail open (FAA)	Fail close (FAC)	Fail open (FAA)	Fail close (FAC)	Fail open (FAA)	Fail close (FAC)
Dangerous undetected (DU)	1.96E-07	2.41E-07	3.26E-07	3.71E-07	4.56E-07	5.01E-07
Safe (S)	5.20E-07	6.57E-07	5.20E-07	6.57E-07	5.20E-07	6.57E-07
No Part / No effect (NP / NE)	3.17E-07	3.73E-07	3.17E-07	3.73E-07	3.17E-07	3.73E-07
Diagnostic Coverage (DC)	0%	0%	0%	0%	0%	0%

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Total failure rates for linear hydraulic actuators (single effect)

Failure Classification	Failure Rate (1/h)	
	ACH SE FAA Series Fail open (FAA)	ACH SE FAC Series Fail close (FAC)
Dangerous undetected (DU)	1.96E-07	2.25E-07
Safe (S)	5.37E-07	7.41E-07
No Part / No effect (NP / NE)	1.78E-07	1.78E-07
Diagnostic Coverage (DC)	0%	0%

Supporting Documents

- LR, SIL Capability Assessment to IEC61508, Report no PRJ11081683 Rev 00 dated 05 October 2018.

Notes and Conditions

- The products are installed in low demand applications i.e. expected demand rate of less than once per year and in a De-Energise-To-Trip (DTT) configuration.
- Random hardware failure rates have been determined based on a Failure Modes Diagnostic and Effects Analysis (FMEDA).
- Random Safety Integrity (PFDavg and Architectural Constraints) must be assessed for the entire function for each application.
- Other elements such as solenoid and valves are not included in the assessment.
- The product must be installed, operated and maintained according to TECO instructions by competent personnel.
- A valid ISO 9001 certification is a requirement for the duration of this certificate.

Date of Issue: 05 October, 2018**Expiry date** 05 October, 2023

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