

IEC 61508:2010 FUNCTIONAL SAFETY CONFORMITY CERTIFICATE PAS-PS-PPS-PIS.

MECÁNICA PRISMA, SL Certifies that the following Pneumatic Actuators, are according with this document.

Description and Results

CFSE Trained has assessed the product to the relevant requirements of the applicable standard and verifies it meets the requirements providing a level of integrity of:

Systematic Safety Integrity SIL 3 (Route 1S)

Random Safety Integrity (Type A, Route 2H Device) SIL 2 (HFT=0) and SIL 3 (HFT=1)

Applicable Standard

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

Safety Functions Included

Rotate 90° the stem with the required torque on demand. Upon activation of the SIS, the source of pressure is removed from the actuator by a solenoid valve, the fluid inside is vented, the springs expand rotating the stem 90° with the required torque. It should be noted that in order to fulfil this safety function in a specific time, a correctly designed solenoid valve must be installed. Furthermore, it should be noted that the design of the actuator is the same regardless of the safe state of the actuator i.e. open or closed. This configuration depends only on the way the components are assembled.

IEC 61508 Failure Rates PAS FAMILY.

Failure Classification and Models	Failure Rate (1/h)		Failure Rate (1/h)		
	Note 1 8 bar	PA60S 8 bar	PA70S 8 bar	P40S 8 bar	PAVS 8 bar
Dangerous failure rate λ_D (1/h)	5.77E-07	8.59E-07	1.14E-06	5.67E-07	4.48E-07
Safe failure rate λ_S (1/h)	1.24E-06	1.26E-06	1.26E-06	8.89E-07	7.94E-07
Critical failure rate (DU + S) λ_C (1/h)	1.82E-06	2.12E-06	2.04E-06	1.46E-06	1.24E-06
Diagnostic Coverage (DC) (%)	0%	0%	0%	0%	0%
Safe Failure Fraction (SFF)	68%	59%	53%	61%	64%

Note 1: PA00S, PA05S, PA10S, PA15S, PA20S, PA25S, PA30S, PA50S, PAWS.

IEC 61508 Failure Rates PPS FAMILY.

Failure Classification and Models	Failure Rate (1/h)	
	PP00S, PP10S, PP20S, PPWS 8 bar	
Dangerous failure rate λ_D (1/h)	5.87E-07	
Safe failure rate λ_S (1/h)	8.98E-07	
Critical failure rate (DU + S) λ_C (1/h)	1.48E-06	
Diagnostic Coverage (DC) (%)	0%	
Safe Failure Fraction (SFF)	60%	

IEC 61508 Failure Rates PIS 8 BAR FAMILY.

Failure Classification and Models	Failure Rate (1/h)	
	PI00S, PI10S, PI30S, PI20S 8 bar	PI20S 8 bar
Dangerous failure rate λ_D (1/h)	4.90E-07	4.44E-07
Safe failure rate λ_S (1/h)	1.26E-06	1.26E-06
Critical failure rate (DU + S) λ_C (1/h)	1.75E-06	1.75E-06
Diagnostic Coverage (DC) (%)	0%	0%
Safe Failure Fraction (SFF)	72%	76%

IEC 61508 Failure Rates PIS 12,5 BAR FAMILY.

Failure Classification and Models	Failure Rate (1/h)	
	PI00S, PI10S, PI30S, PI40S 12,5 bar	PI20S 12,5 bar
Dangerous failure rate λ_D (1/h)	4.90E-07	4.44E-07
Safe failure rate λ_S (1/h)	1.26E-06	1.26E-06
Critical failure rate (DU + S) λ_C (1/h)	1.75E-06	1.75E-06
Diagnostic Coverage (DC) (%)	0%	0%
Safe Failure Fraction (SFF)	72%	74%

Notes and Conditions

Random Safety Integrity (PFDavg and Architectural Constraints) must be assessed for the entire function for each application.

Other elements such as valves, solenoids, etc. are not included in the assessment.

The product must be installed, operated and maintained according to vendor instructions by competent personnel.

The design specifications supplied with the products and useful life will be observed by end users to ensure the validity of the assumptions and calculations made on this report.

A valid ISO 9001 certification is a requirement for the duration of this certificate.

X. Albareda / Technical Manager. 2024/09/18.

EN IEC 61508:2010 CONFORMITY CERTIFICATE.

MECÁNICA PRISMA, SL Certifies that the following Pneumatic Actuators, are according with this document.

Actuator	Failure Rate	Dangerous Failure Rate	PFD	Capable SIL (PFD)	HFT	Type	Mode
PA00	2,16E-08	2,16E-08	9,49E-05	SIL3	0	A	Low Demand
PA05	1,81E-08	1,81E-08	7,96E-05	SIL3	0	A	Low Demand
PA10	2,40E-08	2,40E-08	1,05E-04	SIL3	0	A	Low Demand
PA15	2,77E-08	2,77E-08	1,21E-04	SIL3	0	A	Low Demand
PA20	4,09E-08	4,09E-08	1,79E-04	SIL3	0	A	Low Demand
PA25	4,89E-08	4,89E-08	2,15E-04	SIL3	0	A	Low Demand
PA30	8,19E-08	8,19E-08	3,59E-04	SIL3	0	A	Low Demand
PA50	2,26E-06	2,26E-06	1,01E-03	SIL2	0	A	Low Demand
PAW	4,90E-08	4,90E-08	2,15E-04	SIL3	0	A	Low Demand
PAV	2,26E-06	2,26E-06	1,01E-03	SIL2	0	A	Low Demand
P40	2,00E-07	2,00E-07	8,82E-04	SIL3	0	A	Low Demand
PA60	2,26E-06	2,26E-06	1,01E-03	SIL2	0	A	Low Demand
PA70	2,26E-06	2,26E-06	1,01E-03	SIL2	0	A	Low Demand
PP00	2,05E-08	2,05E-08	9,04E-05	SIL3	0	A	Low Demand
PP10	1,93E-08	1,93E-08	8,45E-05	SIL3	0	A	Low Demand
PP20	4,62E-08	4,62E-08	2,03E-04	SIL3	0	A	Low Demand
PPW	1,73E-08	1,73E-08	7,57E-05	SIL3	0	A	Low Demand
PI00	1,03E-06	1,03E-06	4,54E-03	SIL2	0	A	Low Demand
PI10	1,54E-06	1,54E-06	6,75E-03	SIL2	0	A	Low Demand
PI20	2,26E-06	2,26E-06	1,01E-03	SIL2	0	A	Low Demand
PI30	2,26E-06	2,26E-06	1,01E-03	SIL2	0	A	Low Demand
PI40	2,26E-06	2,26E-06	1,01E-03	SIL2	0	A	Low Demand

Remarks:

SSF is limited to the HFT.

The capable assessment results carried out by the CFSE trained, are based on Proven in Use, (Route 2H), obtained from MECÁNICA PRISMA, SL.

X. Albareda / Technical Manager. 2020/01/02