



Italia

COMPLIANCE

with IEC EN 61508 and IEC EN 61511

Certificate No.: C-IS-722201443

CERTIFICATE OWNER: ALPHA POMPE S.P.A.
 VIA MOLINO EMILI, 16
 25030 – MACLODIO (BS)

ALPHAIR Pneumatic Rack&Pinion Actuators

Products:

- AP Series (Aluminium) – std 90° / 120° / 180° rotation
- AP-A Series (AISI 316 Stainless Steel) – std 90° / 120° / 180° rotation
- RE Series (Aluminium) – std 90° rotation

**WE HEREWITH CONFIRM THAT THE ANALYSIS DEVELOPED BY ALPHA POMPE S.P.A.,
 REPORTED IN THE REPORT:**

*“Technical Report for SIL Classification according to IEC 61508:2010 and IEC 61511:2016
 Pneumatic Rack&Pinion Actuators Double Acting & Single Acting (Spring Return)
 SIL TECHNICAL REPORT 2019_apr Rev.4 dated July, 05th 2019”*

**MEETS THE SIL REQUIREMENTS DETAILED IN THE ANNEXED TABLE
 FOR THE FOLLOWING SAFETY FUNCTION:**

*“ACTUATE A VALVE INTO A SAFE POSITION: Complete switching on demand
 (open to closed & closed to open) with correct torque, as for technical data sheets,
 in low demand mode operation”*

Examination result: **SYSTEMATIC CAPABILITY SIL3**

The above described report was found to meet the standard defined requirements of the safety levels detailed in the following table according to IEC EN 61508 and IEC EN 61511, under fulfillment of the conditions listed in the Report R-IS-722201443 Rev.1 dated July, 30th 2019 in its currently valid version, on which this Certificate is based

Examination parameters: Compliance of the operational approach adopted and followed in the aforementioned report by Alpha Pompe S.p.A.: “SIL TECHNICAL REPORT 2019_apr Rev.4”.

Official Report No.: R-IS-722201443 Rev.1

Expiry Date October, 12th 2022

**IT IS TO BE INTENDED THAT THE ABOVE OFFICIAL REPORT AND ITS ANNEXES ARE AN
 INTEGRAL PART OF THIS DOCUMENT
 THE PRESENT DOCUMENT SUBSTITUTES AND REPEALS THE DOCUMENTS C-IS-273532-01**

Reference Standard IEC EN 61508:2010 Part 2, 4, 6, 7
 IEC EN 61511:2016 Part 2, 3

Sesto San Giovanni, July, 30th 2019

TÜV ITALIA Srl



TÜV ITALIA Srl
 Industry Service Division
 Technical Manager

Paolo Marcone

SUMMARY TABLE

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E/EE/EP safety-related system (final element)	Pneumatic Rack&Pinion Actuators, AP, AP-A and RE Series produced by ALPHA POMPE S.p.A.		
Systematic Capability ⁽²⁾	SC3		
Size (Class)	7,6 < Nm ≤ 40 at 6 BAR feeding pressure (Class A)	40 < Nm ≤ 175 at 6 BAR feeding pressure (Class B)	175 < Nm ≤ 10500 at 6 BAR feeding pressure (Class C)
Safety Function Definition	"Complete switching on demand (open to closed & closed to open) with correct torque, as for technical data sheets, in low demand mode operation"		
Max SIL ⁽³⁾	HFT = 0, SIL 2 HFT = 1, SIL 3 HFT = 2, SIL 4	HFT = 0, SIL 2 HFT = 1, SIL 3 HFT = 2, SIL 4	HFT = 0, SIL 2 HFT = 1, SIL 3 HFT = 2, SIL 4
Additional requirements for the max SIL classification	Execution of Partial Stroke Test with time interval not higher than 6 months AND Full Functional Proof Test with time interval not higher than 12 months	Execution of Partial Stroke Test with time interval not higher than 6 months AND Full Functional Proof Test with time interval not higher than 12 months	Execution of Partial Stroke Test with time interval not higher than 6 months AND Full Functional Proof Test with time interval not higher than 12 months
λ_{TOT}	4,919E-09 h ⁻¹	2,169E-08 h ⁻¹	9,570E-08 h ⁻¹
λ_{SD}	0 h ⁻¹	0 h ⁻¹	0 h ⁻¹
λ_{SU}	5,554E-10 h ⁻¹	2,449E-09 h ⁻¹	1,080E-08 h ⁻¹
λ_{DU}	4,364E-09 h ⁻¹	1,924E-08 h ⁻¹	8,490E-08 h ⁻¹
$\lambda_{DU,FPT}$	3,443E-09 h ⁻¹	1,518E-08 h ⁻¹	6,698E-08 h ⁻¹
$\lambda_{DU,PST}$	9,208E-10 h ⁻¹	4,060E-09 h ⁻¹	1,792E-08 h ⁻¹
λ_{DD}	0 h ⁻¹	0 h ⁻¹	0 h ⁻¹
PFD ⁽¹⁾	1,710E-05	7,538E-05	3,326E-05
β and β_D factor	10%	10%	10%
MTTR	0,4274 h	0,6774 h	1,2820 h
Hardware Safety integrity	Route 2h	Route 2h	Route 2h
Systematic Safety integrity	Route 2s	Route 2s	Route 2s
Remarks			
<p>(1) PFD of reference calculated on the basis of a Full Functional Proof Test with time interval reported in the line Additional requirements for the max SIL classification for HFT = 0 configuration. This time intervals are considered by TÜV as reasonably consistent with the implementation of the equipment for safety related-applications, with reference to the overall range of results shown in the report, where other possible combination of time intervals adequate for a classification up to SIL 2 are reported. Note that, concerning Full Proof Tests, time intervals for higher than 36 months are considered by TÜV as not adequate and consistent for equipment for safety related applications.</p> <p>(2) The achieved failure rates allow the use of ALPHAIR actuators in Safety Related Systems up to SIL-3 (SIL-3 Systematic Capability) according to IEC EN 61508 and IEC EN 61511.</p> <p>(3) Constraints concerning the requested HFT as defined in the relevant application standards e.g. IEC EN 61511 and information given in the relevant document: "Instruction Manual for Installation, Use and Maintenance" have to be considered.</p>			



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NOTE: The present table is integral part of the Document: C – IS – 722201443
Date: July, 30th 2019