



Industrie Service

CERTIFICATE

according to IEC EN 61508

Certificate No.: TUV IT 23 SIL 0164

CERTIFICATE OWNER: Ascend Torque Flow Controls Co., Ltd.
No.28, Chengtang Road,
Chang'an Street, Huishan District,
Wuxi City,
PC:214174, Jiangsu Province,
P.R. China

**WE HEREWITH CONFIRM THAT
AR SERIES PNEUMATIC ACTUATORS
MEET THE SIL REQUIREMENTS DETAILED IN THE ANNEXED TABLE
FOR THE SAFETY FUNCTION:**

*Correct switching on demand (open to closed and closed to open), in low
demand mode of operation*

Examination result: The above reported AR Series Pneumatic Actuators were found to meet the standard defined requirements of the safety levels detailed in the following table according to IEC EN 61508, under fulfillment of the conditions listed in the Report R TUV IT 22 SIL 0148 in its currently valid version, on which this Certificate is based

Examination parameters: Construction/Functional characteristics and reliability and availability parameters of the above mentioned AR Series Pneumatic Actuators

Official Report No.: R TUV IT 22 SIL 0148

Expiry Date January, 09th 2026

THE PRESENT DOCUMENT SUBSTITUTES AND REPEALS THE DOCUMENT C-IS-722209411

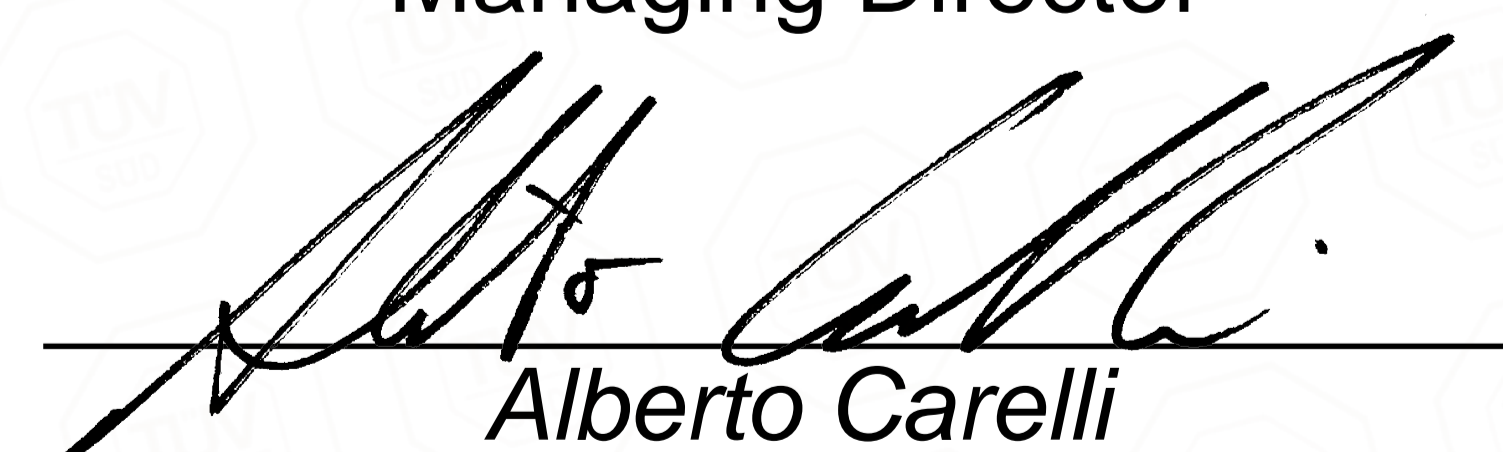
Reference Standard IEC EN 61508:2010 Part 1, 2, 3, 4, 5, 6, 7

Milan, January, 10th 2023

TÜV ITALIA Srl

TÜV ITALIA Srl
Industrie Service Division
Managing Director




Alberto Carelli

SUMMARY TABLE



Industrie Service

<i>E/EE/EP safety-related system (final element)</i>	AR Series Pneumatic Actuators produced by Ascend Torque Flow Controls Co., Ltd.
<i>System type</i>	Type A
<i>Systematic Capability</i>	SC3
<i>Safety Function Definition</i>	<i>Correct switching on demand (open to closed and closed to open), in low demand mode of operation</i>
<i>Max SIL⁽¹⁾</i>	SIL3
λ_{TOT}	3,394E-10
λ_{NE}	0,000E+00
λ_{SD}	0,000E+00
λ_{SU}	2,190E-10
$\lambda_{DD,PST}^{(2)}$	7,448E-11
$\lambda_{DU,FPT}$	4,599E-11
<i>β and β_D factor</i>	10%
<i>MRT</i>	8 h
<i>Hardware Safety Integrity</i>	Route 2 _H
<i>Systematic Safety Integrity</i>	Route 2 _S
Remarks	
<p>(1) The Safety Integrity Level (SIL) of the entire Safety Instrumented Function (SIF) must be verified via a calculation of $PFDAVG$ considering the redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each subsystem must be checked to assure compliance with the minimum hardware fault tolerance (HFT) requirements.</p> <p>(2) Considering an automatic Partial Stroke Test.</p>	

SIL classification according to Standard IEC EN 61508:2010 for AR Series Pneumatic Actuators produced by Ascend Torque Flow Controls Co., Ltd.

NOTE: The present table is integral part of the Document TUV IT 23 SIL 0164
Date: January, 10th 2023