

Certificate



SIL/PL
Capability

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ID 0600000000

No.: 968/V 1075.01/23

| | | | |
|-----------------------|-----------------------------------|---------------------------|---|
| Product tested | Pneumatic and Hydraulic Actuators | Certificate holder | Air Torque S.p.A. Via dei Livelli di Sopra, 11 24060 Costa di Mezzate (BG) Italy |
|-----------------------|-----------------------------------|---------------------------|---|

| | |
|-------------------------|---|
| Type designation | AT-HD – SR and AT-HD – DA Models: 065, 085, 100, 130, 160, 200 |
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|----------------------------|----------------------------------|
| Codes and standards | IEC 61508 Parts 1-2 and 4-7:2010 |
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|-----------------------------|---|
| Intended application | Safety Function: Type SR (Spring Return): Safe closing due to internal energy storage when external power supply fails or is removed Type DA (Double Action): Safe closing/opening when operating command fails or is removed meanwhile the safe command is triggered |
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The actuators are suitable for use in a safety instrumented system up to SIL 2 (low demand mode). Under consideration of the minimum required hardware fault tolerance HFT = 1 for the complete final element the actuators may be used up to SIL 3.

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| Specific requirements | The instructions of the associated Installation, Operating and Safety Manual shall be considered. |
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Summary of test results see back side of this certificate.

The issue of this certificate is based upon an evaluation in accordance with the Certification Program CERT FSP1 V3.0:2020 in its actual version, whose results are documented in Report No. 968/V 1075.01/23 dated 2023-11-24. This certificate is valid only for products, which are identical with the product tested. Issued by the certification body accredited by DAkkS according to DIN EN ISO/IEC 17065. The accreditation is only valid for the scope listed in the annex to the accreditation certificate D-ZE-11052-02-01.

TÜV Rheinland Industrie Service GmbH
Bereich Automation
Funktionale Sicherheit
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Köln, 2024-01-16

Certification Body Safety & Security for Automation & Grid


Dipl.-Ing. (FH) Wolf Rückwart

Holder: Air Torque SpA
Via dei Livelli di Sopra, 11
I – 24060 – Costa di Mezzate (BG)
Italy

Product tested: Heavy Duty Pneumatic and Hydraulic Actuators
AT-HD - SR/DA
Models: 065, 085, 100, 130, 160, 200

Results of Assessment

| | |
|--------------------------|---------------------------------|
| Route of Assessment | 2 _H / 1 _S |
| Type of Sub-system | Type A |
| Mode of Operation | Low Demand Mode |
| Hardware Fault Tolerance | HFT = 0 |
| Systematic Capability | SC 3 |

| Power Module | | Pneumatic without tie rod | Pneumatic with tie rod | Hydraulic |
|--|--|---------------------------|------------------------|---------------|
| | | Single Acting | | |
| Dangerous Failure Rate | λ_D | 226 FIT | 226 FIT | 160 FIT |
| Average Probability of Failure on Demand | 1001 PFD _{avg} (T ₁) | 1.01 E-03 / h | 1.01 E-03 / h | 7.12 E-04 / h |
| | 1002 PFD _{avg} (T ₁) | 1.02 E-04 / h | 1.02 E-04 / h | 7.18 E-05 / h |
| Double Acting | | | | |
| Dangerous Failure Rate | λ_D | 317 FIT | 302 FIT | 125 FIT |
| Average Probability of Failure on Demand | 1001 PFD _{avg} (T ₁) | 1.41 E-03 / h | 1.34 E-03 / h | 5.57 E-04 / h |
| | 1002 PFD _{avg} (T ₁) | 1.43 E-04 / h | 1.36 E-04 / h | 5.60 E-05 / h |

| Available Options | | Override Systems | | Quick & Damper |
|---|-------------|------------------|------------|----------------|
| | | Bevel Gear | Hydr. Pump | |
| If an actuator is used with an override system the following failure rates have to be added: | λ_D | 127 FIT | 57 FIT | / |
| If an pneumatic actuator is used with Quick & Damper System (Q & D) the following failure rate has to be added: | λ_D | | | |

Assumptions for the calculations above: DC = 0 %, T₁ = 1 year, MRT = 72 h, β₁₀₀₂ = 10 %

Origin of failure rates

The stated values are the results of extensive qualification tests on the reliability of the safety function under critical conditions and a FMEDA.

Failure rates include failures that occur at a random point in time and are due to degradation mechanisms such as ageing.

The stated failure rates do not release the end-user from collecting and evaluating application-specific reliability data.

Periodic Tests and Maintenance

The given values require periodic tests and maintenance as described in the Safety Manual.

The operator is responsible for the consideration of specific external conditions (e.g. ensuring of required quality of media, max. temperature, time of impact), and adequate test cycles.