

Certificate



No.: 968/V 1139.02/25

Product tested Electromagnetic Control Valve **Certificate holder** IMI International s.r.o.
Evropska 852
664 42 Modrice
Czech Republic

Type designation Series 97105
(see Revisionlist)

Codes and standards IEC 61508 parts 1-2:2010 EN 17955:2024 (non accred.)

Intended application Safety Function: Safe Return to Zero Position when De-Energized
The valves are suitable for use in a safety instrumented system up to SIL 2 (low demand mode) and SIL 1 (high demand mode of operation). Under consideration of the minimum required hardware fault tolerance HFT = 1 for the complete final element the valves may be used up to SIL 3.

Specific requirements The instructions of the associated Installation, Operating and Safety Manual shall be considered.

Summary of test results see back side of this certificate.

Valid until 2030-09-30

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 1139.02/25 dated 2025-09-30. 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-11052-02-00.

TÜV Rheinland Industrie Service GmbH
Bereich Automation
Funktionale Sicherheit
Am Grauen Stein, 51105 Köln

Köln, 2025-09-30

Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. (FH) Wolf Rückwart

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Results of Assessment

| | |
|--------------------------|--|
| Route of Assessment | $2_H / 1_S$ |
| Type of Sub-system | Type A |
| Mode of Operation | Low Demand Mode / High Demand Mode |
| Utilization Rate | High Utilization Rate |
| Hardware Fault Tolerance | HFT = 0 |
| Systematic Capability | SC 3 |
| Safety Function | Safe Return to Zero Position when De-Energized |

Low Demand Mode

| | | | |
|---|------------------|---------------|---------------|
| Dangerous Failure Rate | λ_D | 3,00 E-08 / h | 30 FIT |
| Safe Failure Rate | λ_S | 6,00 E-09 / h | 6 FIT |
| Average Probability of Failure on Demand 1oo1 | $PFD_{avg}(T_1)$ | 1,34 E-04 | |
| Average Probability of Failure on Demand 1oo2 | $PFD_{avg}(T_1)$ | 1,34 E-05 | |

Assumptions for the calculations above: DC = 0 %, $T_1 = 1$ year, MRT = 72 h, $\beta_{1oo2} = 10$ %

High demand Mode (see note)

| | | |
|---|------------|---|
| B_{10D} | 5.000.000 | |
| Average Frequency of a dangerous Failure per Hour | PFH | $PFH = \frac{0,1 \cdot n_{op}}{8760 \cdot B_{10D}}$ |

Note: PFH has to be verified by the end user with the correct demand rate for the certain application. The resulting PFH shall not be lower than 10 FIT. If the PFH calculation results in a lower value, 10 FIT shall be used for further investigation.

Origin of failure rates

The stated failure rates for low demand are the result of an FMEDA with tailored failure rates for the design and manufacturing process. The stated failure rates for high demand are the result of tests over the whole temperature range. If the conditions vary widely from the test conditions the failure rates might be adjusted. Furthermore the results have been verified by qualification tests and field-feedback data. 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.