

# Certificate



**No.: 968/V 1089.01/24**

<b>Product tested</b>	Pneumatic and hydraulic rotary actuators	<b>Certificate holder</b>	HUS-Antriebe GmbH Am Senneberg 7 D-56472 Nisterau Germany
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<b>Type designation</b>	pneumatic - DSKM double acting - DKSM FR single acting hydraulic - DKSE double acting
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<b>Codes and standards</b>	IEC 61508 Parts 1-2 and 4-7:2010
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<b>Intended application</b>	Safety Function: Move a quarter-turn valve into its safe position  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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<b>Specific requirements</b>	The instructions of the associated Installation, Operating and Safety Manual shall be considered.
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Summary of test results see page 2 of this certificate.

Valid until 2029-04-09

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 1089.01/24 dated 2024-03-18. 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, 2024-04-09

Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. (FH) Wolf Rückwart

**Holder:** HUS-Antriebe GmbH  
**Hersteller:** Am Sennenberg 7  
 D-56472 Nisterau  
 Germany

**Product tested:** Pneumatic rotary actuators  
**Prüfgegenstand:** *Pneumatische Schwenkantriebe*  
 DKSM double acting / doppeltwirkend  
 DKSM FR single acting / einfachwirkend

Hydraulic rotary actuators  
 Hydraulische Schwenkantriebe  
 DKSE double acting / doppeltwirkend

## Results of Evaluation

### Ergebnisse der Evaluierung

Route of Assessment	2 <sub>H</sub> / 1 <sub>S</sub>
Type of Sub-system	Type A
Mode of Operation	Low Demand Mode
Hardware Fault Tolerance	HFT = 0
Systematic Capability	SC 3

#### DKSM

Dangerous Failure Rate	$\lambda_D$	5.55 E-07 / h	555 FIT
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	2.47 E-03	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	2.54 E-04	

#### DKSM FR

Dangerous Failure Rate	$\lambda_D$	3.55 E-07 / h	355 FIT
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	1.58 E-03	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	1.61 E-04	

#### DKSE

Dangerous Failure Rate	$\lambda_D$	4.38 E-07 / h	438 FIT
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	1.95 E-03	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	1.99 E-04	

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

### 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 results have been verified by 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.

*Die angegebenen Ausfallraten für geringe Anforderungen sind das Ergebnis einer FMEDA mit maßgeschneiderten Ausfallraten für den Entwurfs- und Fertigungsprozess. Die Ergebnisse wurden durch Feld-Feedback-Daten verifiziert. Die Ausfallraten umfassen Ausfälle, die zu einem zufälligen Zeitpunkt auftreten und auf Degradationsmechanismen wie Alterung zurückzuführen sind. Die angegebenen Ausfallraten entbinden den Endanwender nicht davon, anwendungsspezifische Zuverlässigkeitsdaten zu sammeln und auszuwerten.*

### 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.

*Die angegebenen Werte erfordern eine periodische Prüfung und Wartung, wie im Sicherheitshandbuch beschrieben. Der Betreiber ist für die Berücksichtigung spezifischer äußerer Bedingungen (z.B. Sicherstellung der erforderlichen Medienqualität, Maximaltemperatur, Einwirkzeit) und geeigneter Prüfzyklen verantwortlich.*