

Certificate



Nr./No.: 968/V 1109.00/19

Prüfgegenstand Product tested	Pneumatische und elektrische Regelventile (mit Dachmanschette oder Faltenbalg) Pneumatic and electric control valves (with roof sleeve or bellows)	Zertifikatsinhaber Certificate holder	KFM Regelungstechnik GmbH Planckstr. 2 32052 Herford Germany
Typbezeichnung Type designation		Dachmanschette / roof sleeve Pneumatisch / pneumatic: 321, 331, 332 Elektrisch / electric: 421, 431, 432	Faltenbalg / bellows 351, 361, 362 451, 461, 462
Prüfgrundlagen Codes and standards	IEC 61508 Parts 1-2 and 4-7:2010		
Bestimmungsgemäße Verwendung Intended application	Sicherheitsfunktion mit pneumatischem Antrieb: Sicheres Schließen Sicherheitsfunktion mit elektrischem Antrieb: Stehenbleiben in letzter Position Nach Ansicht der Prüfstelle sind die Armaturen zur Verwendung in einem sicherheitsgerichteten System bis SIL 2 (Low Demand Mode) geeignet. Unter Berücksichtigung der mindestens erforderlichen Hardware-Fehlertoleranz von HFT = 1 können die Armaturen in redundanter Ausführung auch bis SIL 3 eingesetzt werden. Safety Function with Pneumatic Actuator: Safe Closing Safety Function with Electric Actuator: Stay in Last Position The assessment of the certification body comes to the result that the valves 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 the valves may be used in a redundant architecture up to SIL 3.		
Besondere Bedingungen Specific requirements	Die Hinweise in der zugehörigen Installations- und Betriebsanleitung sowie des Sicherheitshandbuchs sind zu beachten. The instructions of the associated Installation, Operating and Safety Manual shall be considered.		

Zusammenfassung der Testergebnisse siehe Rückseite des Zertifikates.
Summary of test results see back side of this certificate.

Gültig bis / Valid until 2024-05-16

Der Ausstellung dieses Zertifikates liegt eine Prüfung zugrunde, deren Ergebnisse im Bericht Nr. 968/V 1109.00/19 vom 16.05.2019 dokumentiert sind.

Dieses Zertifikat ist nur gültig für Erzeugnisse, die mit dem Prüfgegenstand übereinstimmen.

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/V 1109.00/19 dated 2019-05-16.

This certificate is valid only for products which are identical with the product tested.

TÜV Rheinland Industrie Service GmbH

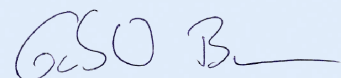
Bereich Automation

Funktionale Sicherheit

Am Grauen Stein, 51105 Köln

Köln, 2019-05-16

Certification Body Safety & Security for Automation & Grid


Dipl.-Ing. Gebhard Bouwer

Holder: KFM Regelungstechnik GmbH
Plank-Str. 2
32052 Herford
Germany

Product tested: Pneumatic and electric control valves (with roof sleeve or bellow seal) Type 3xx and 4xx

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
Diagnostic Coverage	DC	0 %
Systematic Capability		SC 3

Failure Rates

1 FIT = 10^{-9} /h

Model series	Device type	Safety Function	λ_D [FIT]
Valve Body PTFE with roof sleeve	321, 331, 332, 421, 431, 432	Guarantee of strength and internal tightness	475
Valve Body with bellow seal	351, 361, 362, 451, 461, 462	Guarantee of strength and internal tightness	413
Pneumatic actuator	3f1 size I	Reliable closing and internal tightness (< 0.01 % kvs, leakage class IV DIN EN 60534) at loss of pneumatic auxiliary energy	442
Electric actuator	4e1	Stay in the last position when the electrical auxiliary power is lost	408

Probability of Failure on Demand

Assumptions: Proof Test Interval $T_1 = 1$ year; DC = 0 %; $\beta = 10$ %

Model series	Device type	PFD _{AVG 1001}	PFD _{AVG 1002}
Valve Body PTFE with roof sleeve	321, 331, 332, 421, 431, 432	2.08E-03	2.08E-04
Valve Body with bellow seal	351, 361, 362, 451, 461, 462	1.81E-03	1.81E-04
Pneumatic actuator	3f1 size I	1.94E-03	1.94E-04
Electric actuator	4e1	1.79E-03	1.79E-04

Origin of values

The stated values are the results of FMEDAs carried out. In addition, the failure rate was verified by the analysis of field feedback of the last five years. Random and systematic failures which are the responsibility of the manufacturer were examined.

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.