Certificate

SIL/PL Capability

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Nr./No.: 968/V 1298.00/22

Prüfgegenstand **Product tested**	Füllstandsbegrenzer Level Limiter	**Zertifikats-inhaber** **Certificate holder**	Fischer Mess- und Regelungstechnik GmbH Bielefelder Str. 37a 32107 Bad Salzuflen Germany
Typbezeichnung **Type designation**	NK10 / NK10 H		
Prüfgrundlagen **Codes and standards**	IEC 61508 Parts 1-2 and 4-7:2010		
Bestimmungsgemäße Verwendung **Intended application**	Sicherheitsfunktion 1: Sicheres Schalten bei Erreichen des eingestellten Grenzwertes (Schalter S1) Sicherheitsfunktion 2: Sichere Vorwarnung bei Erreichen des eingestellten Grenzwertes (Schalter S2) - Option Die Füllstandsbegrenzer sind zur Verwendung in einem sicherheitsgerichteten System bis SIL 2 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 1: safe switching when the set limit value is reached (switch S1) Safety function 2: safe pre-warning when the set limit value is reached (switch S2) - option. The level limiter are suitable for use in a safety instrumented system up to SIL 2. 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 Seite 2 des Zertifikates.
Summary of test results see page 2 of this certificate.

Der Ausstellung dieses Zertifikates liegt eine Evaluierung entsprechend dem Zertifizierungsprogramm CERT FSP1 V1.0:2017 in der aktuellen Version zugrunde, deren Ergebnisse im Bericht Nr. 968/V 1298.00/22 vom 08.08.2022 dokumentiert sind. Dieses Zertifikat ist nur gültig für Erzeugnisse, die mit dem Prüfgegenstand übereinstimmen.

The issue of this certificate is based upon an evaluation in accordance with the Certification Program CERT FSP1 V1.0:2017 in its actual version, whose results are documented in Report No. 968/V 1298.00/22 dated 2022-08-08. 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, 2022-08-11	Certification Body Safety & Security for Automation & Grid	Dipl.-Ing. (FH) Wolf Rückwart

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Holder: Fischer Mess- und Regeltechnik GmbH
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Germany

Product tested: **Level indicator / level limiter**
NK10 / NK10 H

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**

Safe switching when the set limit value is reached (switch S1)

Dangerous Failure Rate	λ_D	3.13 E-07 / h	**313 FIT**
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	1.39 E-03	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	1.41 E-04	

Safe prewarning when the set limit value is reached (switch S2) - option

Dangerous Failure Rate	λ_D	3.13 E-07 / h	**313 FIT**
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	1.39 E-03	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	1.41 E-04	

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

High Demand Mode
In the opinion of the testing laboratory, the failure rates determined for the low demand mode can also be used for high demand mode applications up to a maximum demand rate of n_{op} = 12 / a. No failures due to wear are to be expected.

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.
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.