Certificate

SIL/PL Capability

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ID 0600000000

No.: 968/V 1048.00/18

Product tested	Electro pneumatic positioner	**Certificate holder**	Metso Flow Control Oy Vanha Porvoontie 229 01301 Vantaa Finland
Type designation	ND9000, ND7000, SD9000, SD7000		
Codes and standards	IEC 61508 Parts 1-2 and 4-7:2010		
Intended application	Safety Function: De-energizing the positioner drives the internal prestage and spool valve to safe position by pre-loaded springs and the supply pressure will be vented that the attached actuator can drive the process valve into its safe state. The positioners are suitable for use in applications (e.g. acc. to IEC 61511-1) up to SIL 3 under consideration of the minimum required hardware fault tolerance (HFT=1).		
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 2023-02-26

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/V 1048.00/18 dated 2018-02-26.
This certificate is valid only for products which are identical with the product tested.

Köln, 2018-02-26

TÜV Rheinland Industrie Service GmbH
Bereich Automation
Funktionale Sicherheit
Am Grauen Stein, 51105 Köln
Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. Stephan Häb

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DAkkS Deutsche Akkreditierungsstelle D-ZE-11052-02-01

TÜVRheinland® Precisely Right.

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TÜVRheinland®
Precisely Right.

Holder: **Metso Flow Control Oy**
Vanha Porvoontie 229
01380 Vantaa
Finland

Product tested: **ND9000, ND7000**
SD9000, SD7000

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	
Lambda Dangerous confidence level of calculation 1-α = 95 %	λ_D	1.23 E-07 / h	123 FIT
Lambda Dangerous Undetected assumed Diagnostic Coverage DC = 0 %	λ_{DU}	1.23 E-07 / h	123 FIT
Mean Time To Dangerous Failure	$MTTF_D$	8.10 E+06 h	924 a
Average Probability of Failure on Demand 1oo1 assumed Proof Test Interval T_1 = 1 year	**$PFD_{avg}(T_1)$**	**5.41 E-04**	
Average Probability of Failure on Demand 1oo2 assumed Proof Test Interval T_1 = 1 year assumed β_{1oo2} = 10 %	**$PFD_{avg}(T_1)$**	**5.44 E-05**	

Origin of values

The stated values are the results of the analysis of field feedback of the last five years. Random and systematic failures which are the responsibility of the manufacturer were examined.

Systematic Capability

The development and manufacturing process and the functional safety management applied by the manufacturer in the relevant lifecycle phases of the product have been audited and assessed as suitable for the manufacturing of products for use in applications with a maximum Safety Integrity Level of 3 (SC 3).

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.