Certificate

No.: 968/V 1155.00/20

Product tested	Electro pneumatic positioner (called smart positioner) for the control of pneumatic valve actuators	**Certificate holder**	Rotork YTC Limited 81, Hwanggeum-ro 89 Beon-gil, Yangchon-eup Gimpo-si, Gyeonggi-do, 10048 South Korea
Type designation	YT-3300 L/R, YT-3301 L/R, YT-3302 L/R, YT-3303 L/R, YT-3350 L/R YT-3400 L/R, YT-3410 L/R, YT-3450 L/R YT-3700L/R, YT-3701 L/R, YT-3702 L/R, YT-3703 L/R, YT-3750 L/R YT-3800 L/R, YT-3810 L/R, YT-3850 L/R		
Codes and standards	IEC 61508 Parts 1-2 and 4-7:2010		
Intended application	Safety Function: Single acting: Depressurize the related actuator through Out1 port according to return spring in pilot valve and the return spring moves the valve to a safe end position. Double acting: Depressurize the related actuator through Out1 port and pressurizes the related actuator through Out2 port according to return spring in pilot valve and the return spring moves the valve to a safe end position in pre-selected direction. The positioners 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 positioners may be used in a redundant architecture up to SIL 3 according IEC 61508 and IEC 61511.		
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 2025-04-30

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/V 1155.00/20 dated 2020-04-30.
This certificate is valid only for products which are identical with the product tested.

Köln, 2020-04-30

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Precisely Right.

Holder: **Rotork YTC Limited**
81, Hwanggeum-ro, 89 Beon-gil, Yangchon-eup,
Gimpo-si,Gyeonggi-do, 10048,
South Korea

Product tested: **Smart Positioner - Pneumatic valve positioner as single or double acting version**

YT-3300 L/R, YT-3301 L/R, YT-3302 L/R,
YT-3303 L/R, YT-3350 L/R
YT-3400 L/R, YT-3410 L/R, YT-3450 L/R
YT-3700L/R, YT-3701 L/R, YT-3702 L/R,
YT-3703 L/R, YT-3750 L/R
YT-3800 L/R, YT-3810 L/R and YT-3850 L/R

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

		Single Acting		Double Acting	
Lambda Dangerous Undetected *assumed Diagnostic Coverage DC = 0 %*	λ_{DU}	2.29 E-07 / h	229 FIT	2.68 E-07 / h	268 FIT
Average Probability of Failure on Demand 1oo1 *assumed Proof Test Interval T_1 = 1 year*	**$PFD_{avg}(T_1)$**	**1.00 E-03**		**1.17 E-03**	
Average Probability of Failure on Demand 1oo2 assumed Proof Test Interval T_1 = 1 year assumed β_{1oo2} = 10 %	**$PFD_{avg}(T_1)$**	**1.01 E-04**		**1.19 E-04**	

Origin of values

The stated values are the results of a FMEDA. To support the results qualification tests on the reliability of the safety function under critical conditions have been performed. In addition, the failure rate was verified by the analysis of field feedback of the last five years.
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.

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.