Certificate

No.: 968/V 1029.01/22

Product tested	Pneumatic Scotch Yoke Actuators SK Series	**Certificate holder**	Actreg, S.A.U. C/ De l´Energia 15-25, naves 1-2 P.I. Barnasud 08850 Gavá (Barcelona) Spain

Type designation

SK 10-12-15
Spring Return (SR) and Double Acting (DA)

Codes and standards

IEC 61508 Parts 1-2 and 4-7:2010

Intended application

Safety Function:
Spring Return Variant:
- To move in direction of spring force
- To move in reverse direction of spring force

Double Acting Variant:
- Acting (to move) on demand

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 valves may be used up to SIL 3.

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 2025-01-09

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/V 1029.01/22 dated 2022-02-24.
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, 2022-03-09

Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. (FH) Wolf Rückwart

TÜVRheinland®
Precisely Right.

Holder: ACTREG S.A.U
C/ De l'Energia 15-25, naves 1-2,
P.I. Barnasud
08850 Gavà (Barcelona), Spain

Product tested: Valve Actuator Scotch & Yoke Compact
SK Series (SR & DA)
• Spring Return: SY01K10-12-15 (SR)
• Double Acting SY01K10-12-15 (DA)

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**

Spring Return

To move on direction of force Spring

Dangerous Failure Rate	λ_D	5.68 E-07 / h	**568 FIT**
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	2.49 E-03	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	2.56 E-04	

To move on reverse direction of force Spring

Dangerous Failure Rate	λ_D	9.65 E-07 / h	**965 FIT**
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	4.23 E-03	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	4.44 E-04	

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

Double Acting

Acting (to move) on demand

Dangerous Failure Rate	λ_D	6.42 E-07 / h	**642 FIT**
Average Probability of Failure on Demand 1oo1	$PFD_{avg}(T_1)$	2.81 E-03	
Average Probability of Failure on Demand 1oo2	$PFD_{avg}(T_1)$	2.91 E-04	

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

Origin of values

The stated values are the results of a FMEDA for the design and manufacturing process.
Random and systematic failures which are in 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.