

Certificate of Conformity No.: 28716196

Manufacturer: Rotork Controls, Inc.
675 Mile Crossing Blvd.
Rochester, NY 14624
United States of America

Specifications: IEC 61508-1÷7:2010

Product: Pneumatic linear spring return actuator

Type: Series LP/S

RESULT:

As per the TÜV Rheinland Italia Report No. FS 28716196 Rev. 0, we declare that the product meets the below requirements:

IEC 61508: 2010, part 1 to 7

Functional Safety of electrical/electronic/programmable electronic safety related systems; Type A, Low Demand Mode, HFT=0

Model	Safety Action	λ_D [1/h]	$\lambda_{DD(PS)}$ [1/h]	Systematic Capability
LP/SD	Stem extended (Spring down)	1,55E-08	1,41E-08	3
LP/SU	Stem retracted (Spring up)	1,57E-08	1,43E-08	3

The above values are compatible with SIL 3.

The requirements of minimum hardware fault tolerance (HFT) according to par. 11.4.3 of IEC 61511-1 have to be observed.

The product can be used up to SIL 2 without external diagnostics.

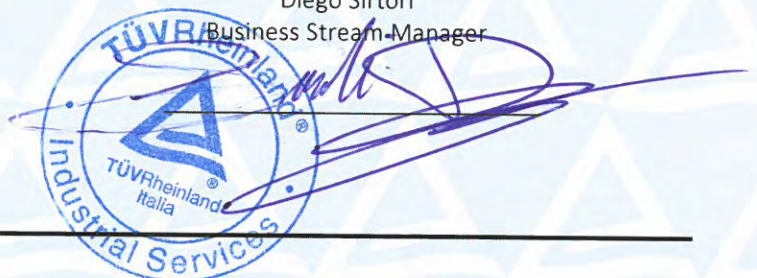
For further details, see what written in the Safety Manual.

Expiry date: 2019-03-31

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Location **Milan**
Date **2016-07-08**

Diego Sirtori
Business Stream-Manager



Attachment 1 to
Certificate of Conformity No.: 28716196

Manufacturer: Rotork Controls, Inc.
 675 Mile Crossing Blvd.
 Rochester, NY 14624
 United States of America

Specifications: IEC 61508-1÷7:2010

Product: Pneumatic linear spring return actuator

Type: Series LP/S – Model LP/SD

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	8,86E-06	1,22E-05	1,90E-05	2,58E-05	3,26E-05
	2	1,39E-05	1,73E-05	2,41E-05	3,09E-05	3,77E-05
	3	1,90E-05	2,24E-05	2,92E-05	3,60E-05	4,28E-05
	6		3,77E-05	4,45E-05	5,13E-05	5,81E-05
	9				6,65E-05	
	12			7,50E-05	8,18E-05	8,86E-05

PFD_{AVG} values according to IEC 61508 for different values of TI and TI_{PS}

Test Interval Frequency (months)				
6	12	24	36	48
3,43E-05	6,82E-05	1,36E-04	2,04E-04	2,72E-04

PFD_{AVG} values according to IEC 61508 for different values of TI (no Partial Stroke Test)

NOTES:

- The above values of PFD_{AVG} are calculated for MRT=24 h and Proof Test Coverage=100%. For other values of MRT, TI, TI_{PS} and/or non-perfect Proof Test, the PFD_{AVG} values must be re-calculated.
- The PFD_{AVG} values including Partial Stroke Test are calculated considering the use of a commercial automatic Partial Stroking Test System: for further details, see the Safety Manual.

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Attachment 2 to
 Certificate of Conformity No.: 28716196



Manufacturer: Rotork Controls, Inc.
 675 Mile Crossing Blvd.
 Rochester, NY 14624
 United States of America

Specifications: IEC 61508-1÷7:2010

Product: Pneumatic linear spring return actuator

Type: Series LP/S – Model LP/SU

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	8,96E-06	1,24E-05	1,93E-05	2,61E-05	3,30E-05
	2	1,41E-05	1,76E-05	2,44E-05	3,13E-05	3,82E-05
	3	1,93E-05	2,27E-05	2,96E-05	3,64E-05	4,33E-05
	6		3,82E-05	4,50E-05	5,19E-05	5,88E-05
	9				6,74E-05	
	12			7,59E-05	8,28E-05	8,97E-05

PFD_{AVG} values according to IEC 61508 for different values of TI and TI_{PS}

Test Interval Frequency (months)				
6	12	24	36	48
3,47E-05	6,91E-05	1,38E-04	2,06E-04	2,75E-04

PFD_{AVG} values according to IEC 61508 for different values of TI (no Partial Stroke Test)

NOTES:

- The above values of PFD_{AVG} are calculated for MRT=24 h and Proof Test Coverage=100%. For other values of MRT, TI, TI_{PS} and/or non-perfect Proof Test, the PFD_{AVG} values must be re-calculated.
- The PFD_{AVG} values including Partial Stroke Test are calculated considering the use of a commercial automatic Partial Stroking Test System: for further details, see the Safety Manual.

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