TÜVRheinland®

Certificate of Conformity No.: 28716198

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

Specifications: IEC 61508-1÷7:2010

Product: Hydraulic linear spring return actuator

Type: Series LH/S

RESULT:

As per the TÜV Rheinland Italia Report No. FS 28716198 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
LH/SD	Stem extended (Spring down)	1,26E-08	1,14E-08	3
LH/SU	Stem retracted (Spring up)	1,28E-08	1,16E-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

TÜVRheinland® Industrial Services TÜVRheinland® Italia

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Specifications: IEC 61508-1÷7:2010

Product: Hydraulic linear spring return actuator

Type: Series LH/S – Model LH/SD

Partial Stroke frequency (months)	Test Interval Frequency (months) 6	12	24	36	48
1	7,19E-06	9,95E-06	1,55E-05	2,10E-05	2,65E-05
2	1,13E-05	1,41E-05	1,96E-05	2,51E-05	3,06E-05
3	1,55E-05	1,82E-05	2,37E-05	2,92E-05	3,47E-05
6		3,06E-05	3,61E-05	4,16E-05	4,71E-05
9				5,40E-05	
12			6,09E-05	6,64E-05	7,19E-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
2,79E-05	5,54E-05	1,11E-04	1,66E-04	2,21E-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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Specifications: IEC 61508-1÷7:2010

Product: Hydraulic linear spring return actuator

Type: Series LH/S – Model LH/SU

Partial Stroke frequency (months)	Test Interval Frequency (months) 6	12	24	36	48
1	7,31E-06	1,01E-05	1,57E-05	2,13E-05	2,69E-05
2	1,15E-05	1,43E-05	1,99E-05	2,55E-05	3,11E-05
3	1,57E-05	1,85E-05	2,41E-05	2,97E-05	3,53E-05
6		3,11E-05	3,67E-05	4,23E-05	4,79E-05
9				5,49E-05	
12			6,19E-05	6,75E-05	7,31E-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
2,83E-05	5,63E-05	1,12E-04	1,68E-04	2,24E-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.

--------End certificate