

Certificate of Conformity No.: 28716199

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

Specifications: IEC 61508-1÷7:2010

Product: Hydraulic linear double acting actuator

Type: Series LH/D

RESULT:

As per the TÜV Rheinland Italia Report No. FS 28716199 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/FD	Stem extended	1,41E-08	1,29E-08	3
LH/FU	Stem retracted	1,43E-08	1,30E-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

--- End page

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

Diego Sirtori
 Business Stream Manager



Attachment 1 to
 Certificate of Conformity No.: 28716199



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

Specifications: IEC 61508-1÷7:2010

Product: Hydraulic linear double acting actuator

Type: Series LH/D – Model LH/FD

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	8,08E-06	1,12E-05	1,74E-05	2,36E-05	2,98E-05
	2	1,27E-05	1,58E-05	2,20E-05	2,82E-05	3,44E-05
	3	1,74E-05	2,05E-05	2,67E-05	3,29E-05	3,91E-05
	6		3,44E-05	4,06E-05	4,68E-05	5,30E-05
	9				6,07E-05	
	12			6,85E-05	7,47E-05	8,09E-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
3,13E-05	6,23E-05	1,24E-04	1,86E-04	2,48E-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 page



**Attachment 2 to
Certificate of Conformity No.: 28716199**

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

Specifications: IEC 61508-1÷7:2010

Product: Hydraulic linear double acting actuator

Type: Series LH/D – Model LH/FU

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	8,17E-06	1,13E-05	1,76E-05	2,38E-05	3,01E-05
	2	1,29E-05	1,60E-05	2,23E-05	2,85E-05	3,48E-05
	3	1,76E-05	2,07E-05	2,70E-05	3,32E-05	3,95E-05
	6		3,48E-05	4,11E-05	4,73E-05	5,36E-05
	9				6,14E-05	
	12			6,93E-05	7,55E-05	8,18E-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
3,17E-05	6,30E-05	1,26E-04	1,88E-04	2,51E-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

