

Certificate of Conformity No.: 28716341

Manufacturer: Biffi Italia S.r.l.
Loc. Caselle S. Pietro
I-29017 Fiorenzuola d'Arda (PC)

Specifications: IEC 61508-1÷7:2010

Product: Quarter turn spring return hydraulic actuator

Type: Series THS / THS-QA

RESULT:

As per the TÜV Rheinland Italia Report No. FS 28716341 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
THS	Close / Open	5,54E-08	5,04E-08	3
THS-QA	Close / Open	6,04E-08	5,50E-08	3

The values in the above table 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: 2019-12-31

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Location **Milan**
Date **2016-12-28**

Diego Sirtori
Business Stream Manager



Attachment 1 to
 Certificate of Conformity No.: 28716341



Manufacturer: Biffi Italia S.r.l.
 Loc. Caselle S. Pietro
 I-29017 Fiorenzuola d'Arda (PC)

Specifications: IEC 61508-1÷7:2010

Product: Quarter turn spring return hydraulic actuator

Type: Series THS

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	3,06E-05	4,16E-05	6,34E-05	8,52E-05	1,07E-04
	2	4,90E-05	6,00E-05	8,18E-05	1,04E-04	1,25E-04
	3	6,74E-05	7,84E-05	1,00E-04	1,22E-04	1,44E-04
	6		1,34E-04	1,55E-04	1,77E-04	1,99E-04
	9				2,32E-04	
	12			2,66E-04	2,88E-04	3,09E-04

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

Test Interval Frequency (months)				
6	12	24	36	48
1,23E-04	2,44E-04	4,87E-04	7,29E-04	9,72E-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.: 28716341



Manufacturer: Biffi Italia S.r.l.
 Loc. Caselle S. Pietro
 I-29017 Fiorenzuola d'Arda (PC)

Specifications: IEC 61508-1÷7:2010

Product: Quarter turn spring return hydraulic actuator

Type: Series THS-QA

		Test Interval Frequency (months)				
		6	12	24	36	48
Partial Stroke frequency (months)	1	3,34E-05	4,53E-05	6,91E-05	9,29E-05	1,17E-04
	2	5,35E-05	6,54E-05	8,92E-05	1,13E-04	1,37E-04
	3	7,35E-05	8,54E-05	1,09E-04	1,33E-04	1,57E-04
	6		1,46E-04	1,69E-04	1,93E-04	2,17E-04
	9				2,53E-04	
	12			2,90E-04	3,14E-04	3,37E-04

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

Test Interval Frequency (months)				
6	12	24	36	48
1,34E-04	2,66E-04	5,30E-04	7,95E-04	1,06E-03

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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