Endress+Hauser **EH**

People for Process Automation

Declaration of Conformity

Functional Safety according to IEC 61508
Based on NE 130 Form B.1

Endress+Hauser SE+Co. KG, Hauptstraße 1, 79689 Maulburg

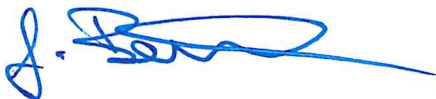being the manufacturer, declares that the product

Liquiphant M/S with electronic insert FEL57
(+ Nivotester FTL325P)

is suitable for the use in safety-instrumented systems according to IEC 61508. The instructions of the corresponding functional safety manual must be followed.

This declaration of compliance is exclusively valid for the customer listed in the cover letter of the respective Endress+Hauser sales center and for the listed products and accessories in delivery status.

Maulburg, December 15th, 2020
Endress+Hauser SE+Co. KG

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Endress+Hauser 🔲
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General

Device designation and permissible types	Liquiphant M/S with electronic insert FEL57 (+ Nivotester FTL325P)
	FTL5*/7*-******7**** (+FTL325P-y****; y = G, H, N, P, T, W, 2)
Safety-related output signal	Relay
Fault signal	-
Process variable/function	Level switch for liquids
Safety function(s)	Overfill protection or operating maximum/minimum detection

Device type acc. to IEC 61508-2	☐ Type A	☒ Type B	
Operating mode	☒ Low Demand Mode	☐ High Demand Mode	☐ Continuous Mode

Valid hardware version	FEL57 as of 01.01, FTL325P as of 02.00
Valid software version	FEL57 as of 01.00.01, FTL325P without SW
Safety manual	SD01508F

Type of evaluation (check only one box)	☒	Complete HW/SW evaluation parallel to development incl. FMEDA and change request acc. to IEC 61508-2, 3
	☐	Evaluation of "proven in use" performance for HW/SW incl. FMEDA and change request acc. to IEC 61508-2, 3
	☐	Evaluation of HW/SW field data to verify „prior use" acc. to IEC 61511
	☐	Evaluation by FMEDA acc. to IEC 61508-2 for devices w/o software

Evaluation through – report/certificate no.	TÜV Rheinland, Report No. 968/FSP 1148.01/20		
Test documents	Development documents	Test reports	Data sheets

SIL - Integrity

Systematic safety integrity		☐ SIL 2 capable	☒ SIL 3 capable
Hardware safety integrity	Single channel use (HFT = 0)	☒ SIL 2 capable	☐ SIL 3 capable
	Multi channel use (HFT ≥ 1)	☒ SIL 2 capable	☒ SIL 3 capable

FMEDA

Safety function	MIN	MAX
λ_{DU} [1],[2],[3]	88 FIT	74 FIT
λ_{DD} [1],[2],[3]	1 FIT	2 FIT
λ_{SU} [1],[2],[3]	652 FIT	751 FIT
λ_{SD} [1],[2],[3]	118 FIT	138 FIT
SFF [3]	90 %	92 %
PFD_{avg} (T_1 = 1 year) [2],[3] (single channel architecture)	$3,84 \times 10^{-4}$	$3,22 \times 10^{-4}$
PTC *[4]	48...93 %	57...93 %
λ_{total} [1],[2],[3]	859 FIT	965 FIT
Diagnostic test interval [5]	≤ 60 s	
Fault reaction time [6]	≤ 3 s	

Comments

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Declaration

☒	Our internal company quality management system ensures information on safety-related systematic faults which become evident in the future

[1] FIT = Failure In Time, number of failures per 10^9 h
[2] According to Siemens SN29500 (average temperature of the electronic +40°C).
   For average temperatures up to 50°C (122°F), a correction factor of 1.3 must be applied.
[3] This information is based on the Variant II in the Safety Manual
[4] PTC = Proof Test Coverage
[5] All diagnostic functions are performed at least once per diagnostic test interval
[6] Maximum time between error recognition and error response