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

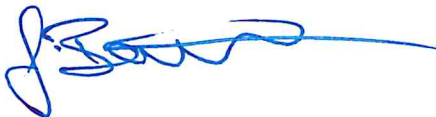being the manufacturer, declares that the product

Liquiphant M/S with electronic insert FEL58
(+ Nivotester FTL325N)

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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General

Device designation and permissible types	Liquiphant M/S with electronic insert FEL58 (+ Nivotester FTL325N)
	FTL5*/7*-******8**** (+FTL325N-y****; y = G, H, N, P, T, W, 2)
Safety-related output signal	Liquiphant: NAMUR-interface according to EN50227 (DIN19234;NAMUR) or IEC60947-5-6 (+ Nivotester FTL325N: Relay)
Fault signal	NAMUR: 0,6 mA ... 1,0 mA Relay: —
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	FEL58 as of 01.01
Valid software version	FEL58 as of 01.00.01
Safety manual	SD01522F
Type of evalulation (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)]	73 FIT	59 FIT
λ_{DD} [1),2),3)]	13 FIT	12 FIT
λ_{SU} [1),2),3)]	85 FIT	87 FIT
λ_{SD} [1),2),3)]	66 FIT	78 FIT
SFF [3)]	69 %	75 %
PFD_{avg} ($T_1 = 1$ year) [2),3)] (single channel architecture)	$3,18 \times 10^{-4}$	$2,59 \times 10^{-4}$
PTC [3),4)]	2...93 %	2...93 %
λ_{total} [1),2),3)]	237 FIT	236 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 I 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