

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

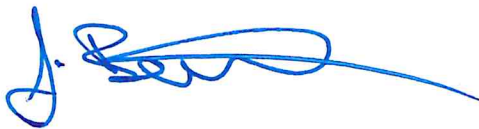
Liquiphant M/S with electronic insert FEL56 (+ Nivotester FTL325N)

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

i. V.



Gerd Bechtel
Dept. Man. R&D Devices Level limit
Research & Development

i. V.



Manfred Hammer
Dept. Man. R&D Quality Management/FSM
Research & Development

General			
Device designation and permissible types	Liquiphant M/S with electronic insert FEL56 (+ Nivotester FTL325N) FTL5*/7*.*****6**** (+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: 2.2 mA ... 2.8 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	<input type="checkbox"/> Type A		<input checked="" type="checkbox"/> Type B
Operating mode	<input checked="" type="checkbox"/> Low Demand Mode	<input type="checkbox"/> High Demand Mode	<input type="checkbox"/> Continuous Mode
Valid hardware version	FEL56 as of version 01.01 / Nivotester FTL325N as of version 02.00		
Valid software version	FEL56 as of version 01.00.01, Nivotester FTL325 without SW		
Safety manual	SD01521F		
Type of evaluation (check only <u>one</u> box)	<input checked="" type="checkbox"/>	Complete HW/SW evaluation parallel to development incl. FMEDA and change request acc. to IEC 61508-2, 3	
	<input type="checkbox"/>	Evaluation of "proven in use" performance for HW/SW incl. FMEDA and change request acc. to IEC 61508-2, 3	
	<input type="checkbox"/>	Evaluation of HW/SW field data to verify „prior use“ acc. to IEC 61511	
	<input type="checkbox"/>	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		<input checked="" type="checkbox"/> SIL 2 capable	<input type="checkbox"/> SIL 3 capable
Hardware safety integrity	Single channel use (HFT = 0)	<input checked="" type="checkbox"/> SIL 2 capable	<input type="checkbox"/> SIL 3 capable
	Multi channel use (HFT ≥ 1)	<input checked="" type="checkbox"/> SIL 2 capable	<input type="checkbox"/> SIL 3 capable
FMEDA			
Safety function	MIN	MAX	
$\lambda_{DU}^{1),2),3)}$	110 FIT	97 FIT	
$\lambda_{DD}^{1),2),3)}$	9 FIT	9 FIT	
$\lambda_{SU}^{1),2),3)}$	541 FIT	542 FIT	
$\lambda_{SD}^{1),2),3)}$	56 FIT	68 FIT	
SFF ³⁾	85 %	86 %	
PFD _{avg} (T ₁ = 1 year) ^{2),3)} (single channel architecture)	4.83×10^{-4}	4.27×10^{-4}	
PTC ⁴⁾	34...88 %	38...88 %	
$\lambda_{total}^{1),2),3)}$	717 FIT	717 FIT	
Diagnostic test interval ⁵⁾	≤ 1 min		
Fault reaction time ⁶⁾	≤ 3 s		
Comments			
-			
Declaration			
<input checked="" type="checkbox"/>	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 10⁹ h

²⁾ Valid for average ambient temperature up to +40 °C (+104 °F)

For continuous operation at ambient temperature close to +60 °C (+140 °F), a factor of 1.3 should 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 within the diagnostic test interval

⁶⁾ Maximum time between error recognition and error response