

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

Micropilot FMR5x

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 conformity is exclusively valid for the listed products and accessories in delivery status.

Maulburg, December 2, 2022
Endress+Hauser SE+Co. KG

i. V.



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General			
Device designation and permissible types ¹⁾	Micropilot FMR5x ** A,B,C,K * * * ** *** + [LA]		
	x = 0, 1, 2, 3, 4, 6, 7		
Safety-related output signal	4...20 mA		
Fault signal	≤ 3.6 mA / ≥ 21 mA		
Process variable/function	Level measurement		
Safety function(s)	MIN / MAX / RANGE		
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 checked="" type="checkbox"/> High Demand Mode	
Valid hardware version	Manufacturing date after Dec. 17,2012		
Valid software version	01.00.zz (zz: any number)		
Safety manual	FY01097F		
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 968/EL 882		
Test documents	Development documents	Test reports	Data sheets
SIL – Integrity			
Systematic safety integrity		<input type="checkbox"/> SC 2	<input checked="" type="checkbox"/> SC 3
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 type="checkbox"/> SIL 2 capable	<input checked="" type="checkbox"/> SIL 3 capable
FMEDA			
Safety function	MIN	MAX	RANGE
$\lambda_{DU}^{2),3)}$	243 FIT	243 FIT	243 FIT
$\lambda_{DD}^{2),3)}$	2652 FIT	2652 FIT	2652 FIT
$\lambda_S^{2),3)}$	768 FIT	768 FIT	768 FIT
SFF	93%	93%	93%
$PFD_{avg} (T_1 = 1 \text{ year})^{3)}$ (single channel architecture)	$1.09 \cdot 10^{-3}$	$1.09 \cdot 10^{-3}$	$1.09 \cdot 10^{-3}$
PFH	$2.43 \cdot 10^{-7} \text{ 1/h}$	$2.43 \cdot 10^{-7} \text{ 1/h}$	$2.43 \cdot 10^{-7} \text{ 1/h}$
PTC ⁴⁾ A / B / C / D	99% / 99% / 56% / 93%	99% / 99% / 56% / 93%	99% / 99% / 56% / 93%
Diagnostic test interval ⁵⁾	≤ 30 min	≤ 30 min	≤ 30 min
Fault reaction time ⁶⁾	≤ 30 s	≤ 30 s	≤ 30 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⁾ Valid order codes and order code exclusions are maintained in the E+H ordering system

²⁾ FIT = Failure In Time, number of failures per 10⁹ h

³⁾ 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 2.1 should be applied

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