

Declaration of Compliance



C-IS-722238330 Rev.2

Manufacturer*Business Name***G.M. International s.r.l.***Address***Via G. Mameli, 53-55****I-20852 Villasanta (MB) - ITALY****Object***Type / Model***Modules series D1000****Applicable Standards****IEC 61508:2010****Official Summary Table No.:****T-IS-722238330****Place:****Milan****Expiry date:****January, 18th 2027****Date****January, 19th 2024***BLM Functional Safety***Francesco Zadra***Signature*

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**SUMMARY TABLE
T-IS-722238330**

	ITEM NAME HARDWARE	ITEM NAME SOFTWARE	REPORT CODE	FINAL RESULTS					
				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL
1.	D1072S	PRG024F into 68HC711E9 processor +	R-IS-722238330-03 Rev.1	Type B	8.14E-04	3 years	For each channel with analog current source output	SIL2*	SIL2
		2.71E-03			10 years	SIL2**			
2.	D1072D	PRG005C into PIC16F505 processor			8.31E-04	3 years		SIL2*	
					2.77E-03	10 years		SIL2**	

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Diagnostic Coverage DC	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
D1072S	0.00 FIT	76.76 FIT	162.32 FIT	61.57 FIT	72.50 %	79.52 %	173.75 FIT	32.60 FIT
D1072D	0.00 FIT	82.10 FIT	180.43 FIT	62.77 FIT	74.19 %	80.70 %	247.90 FIT	185.40 FIT

(*)Considering the products not contribute more than 10% of total SIF dangerous failure.

(**)Considering the products contribute more than 10% of total SIF dangerous failure.
Low demand mode of operation has only been considered in this analysis.

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				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL
3.	D1073S	PRG024F into 68HC711E9 processor + PRG005C into PIC16F505 processor	R-IS-722238330-03 Rev.1	Type B	8.14E-04	3 years	Analog current source output	SIL2*	SIL2
					2.71E-03	10 years		SIL2**	
					8.71E-04	4 years	1oo2 architecture of alarm trip amplifiers with relay outputs	SIL2*	
					2.18E-03	10 years		SIL2**	

Configuration	Safe Detected Failure λ _{SD}	Safe Undetected Failure λ _{SU}	Dangerous Detected Failure λ _{DD}	Dangerous Undetected Failure λ _{DU}	Diagnostic Coverage DC	Safe Failure Fraction SFF	No Effect Failure λ _{NE}	Not Part Failure λ _{NP}
Analog current output	0.00 FIT	76.76 FIT	162.32 FIT	61.57 FIT	72.50 %	79.52 %	173.75 FIT	248.80 FIT
1oo2 alarm trip amplifiers	0.00 FIT	209.75 FIT	99.70 FIT	49.42 FIT	66.86 %	86.23 %	222.53 FIT	141.80 FIT

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				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL
4	D1054S	PRG016C into 68HC711E9 processor	R-IS-722238330-06 Rev.1	Type B	9.40E-04	5 years	Active input and analog current output	SIL2*	SIL2
					1.88E-03	10 years		SIL2**	
					9.95E-04	5 years	Passive input and analog current output	SIL2*	
					1.99E-03	10 years		SIL2**	

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Diagnostic Coverage DC	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
Active input and analog current output	0.00 FIT	112.15 FIT	105.54 FIT	42.58 FIT	71.25 %	83.64 %	195.43 FIT	269.40 FIT
Passive input and analog current output	0.00 FIT	112.01 FIT	125.61 FIT	45.02 FIT	73.62 %	84.07 %	212.86 FIT	229.60 FIT

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				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL
4	D1054S	PRG016C into 68HC711E9 processor	R-IS-722238330-06 Rev.1	Type B	9.67E-04	7 years	Active input and 1oo2 alarm trip amplifiers	SIL2*	SIL2
					1.38E-03	10 years		SIL2**	
					8.94E-04	6 years	Passive input and 1oo2 alarm trip amplifiers	SIL2*	
					1.49E-03	10 years		SIL2**	

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Diagnostic Coverage DC	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
Active input and 1oo2 alarm trip amplifiers	0.00 FIT	212.94 FIT	65.62 FIT	31.35 FIT	67.67 %	89.88 %	239.39 FIT	175.80 FIT
Passive input and 1oo2 alarm trip amplifiers	0.00 FIT	212.80 FIT	85.69 FIT	33.79 FIT	71.72 %	89.83 %	256.82 FIT	136.00 FIT

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				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL
5	D1064S	PRG027A into PIC16F505 processor + PRG028A into MS9S12E64CFU processor	R-IS-722238330-09 Rev.1	Type B	7.18E-04	2 years	4-20 mA current source (or sink) output	SIL2*	SIL2
					3.59E-03	10 years		SIL2**	

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Diagnostic Coverage DC	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
4-20 mA current source (or sink) output	0.00 FIT	77.98 FIT	155.71 FIT	81.53 FIT	65.63 %	74.14 %	196.48 FIT	31.40 FIT

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				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL
6	D1030S	PRG032A into PIC16F505 processor + PRG033A into PIC16F716 processor	R-IS-722238330-12 Rev.1	Type B	8.70E-04	5 years	Single Channel	SIL2*	SIL2
					1.74E-03	10 years		SIL2**	

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Diagnostic Coverage DC	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
Single Channel	0.00 FIT	78.94 FIT	73.09 FIT	39.44 FIT	64.95 %	79.40 %	115.90 FIT	65.92 FIT

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				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL
7	D1030D	PRG032A into PIC16F505 processor + PRG035A into PIC16F716 processor	R-IS-722238330-12 Rev.1	Type B	8.70E-04	5 years	For each channel of module	SIL2*	SIL2
					1.74E-03	10 years		SIL2**	

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Diagnostic Coverage DC	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
For each channel of module	0.00 FIT	78.94 FIT	73.09 FIT	39.44 FIT	64.95 %	79.40 %	115.90 FIT	72.52 FIT

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				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL
8	D1130S	PRG032A into PIC16F505 processor + PRG033A into PIC16F716 processor	R-IS-722238330-12 Rev.1	Type B	9.12E-04	5 years	Single Channel	SIL2*	SIL2
					1.82E-03	10 years		SIL2**	

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Diagnostic Coverage DC	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
Single Channel	0.00 FIT	115.87 FIT	73.09 FIT	41.42 FIT	63.83 %	82.02 %	128.09 FIT	60.52 FIT

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9	D1130D	PRG032A into PIC16F505 processor + PRG035A into PIC16F716 processor	R-IS-722238330-12 Rev.1	Type B	9.12E-04	5 years	For each channel of module	SIL2*	SIL2
					1.82E-03	10 years		SIL2**	

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Diagnostic Coverage DC	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
For each channel of module	0.00 FIT	115.87 FIT	73.09 FIT	41.42 FIT	63.83 %	82.02 %	128.09 FIT	67.12 FIT

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				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL
10	D1031D	PRG032A into PIC16F505 processor + PRG034A into PIC16F716 processor	R-IS-722238330-12 Rev.1	Type B	9.17E-04	7 years	For each channel of module	SIL2*	SIL2
					1.31E-03	10 years		SIL2**	

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Diagnostic Coverage DC	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
For each channel of module	0.00 FIT	58.71 FIT	73.09 FIT	29.61 FIT	71.17 %	81.66 %	115.00 FIT	107.80 FIT

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11	D1031Q	PRG032A into PIC16F505 processor + PRG035A into PIC16F716 processor	R-IS-722238330-12 Rev.1	Type B	9.17E-04	7 years	For each channel of module	SIL2*	SIL2
					1.31E-03	10 years		SIL2**	

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Diagnostic Coverage DC	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
For each channel of module	0.00 FIT	58.71 FIT	73.09 FIT	29.61 FIT	71.17 %	81.66 %	115.00 FIT	121.00 FIT

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FUNCTIONAL SAFETY ASSESSMENTS		
	REPORT CODE	FINAL RESULT
1	R TUV IT 22 SIL 0087	Compliant to the standard for the following parts: <ul style="list-style-type: none">- Documentation (IEC EN 61508:2010 Part 1 Chapter 5)- Management of functional safety (IEC EN 61508:2010 Part 1 Chapter 6)- Functional safety assessment (IEC EN 61508:2010 Part 1 Chapter 8)- Realization: E/E/PES safety lifecycle from 10.1 to 10.6 (IEC EN 61508:2010 Part 2) for all safety related modules object of this certificate.

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Gap analysis D1000 Type B products

Referring to the Gap analysis for D1000 Type B products reported in the document CRR0287_R00 issued by G.M. International S.r.l., it has been showed that the modifications do not have any impact on Functional Safety. Therefore, the following documentation already mentioned in the present document is still valid:

- For D1072S, D1072D, D1073S:
 - Validation Report R-IS-722238330-03 Rev.1
- For D1054S:
 - Validation Report R-IS-722238330-06 Rev.1
- For D1064S:
 - Validation Report R-IS-722238330-09 Rev.1
- For D1030S, D1030D, D1031D, D1031Q, D1130S, D1130D:
 - Validation Report R-IS-722238330-12 Rev.1

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