Declaration of Compliance



C-IS-722238330 Rev.2

Manufacturer

Business Name

Address

G.M. International s.r.l.

Via G. Mameli, 53-55

I-20852 Villasanta (MB) - ITALY

Object

Type / Model

Modules series D1000

Witalia Srl Industrie Service

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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 $\text{T\"UV}^{^{\circledR}}$



SUMMARY TABLE T-IS-722238330

	ITEM NAME	ITEM NAME		FINAL RESULTS								
	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL			
1.	D1072S	PRG024F into 68HC711E9			8.14E-04	3 years		SIL2*				
	D1072S	processor +	R-IS-722238330-03 Rev.1	Type B	2.71E-03	10 years	For each channel with	SIL2**	SIL2			
2	PRG005C into 2. D1072D PIC16F505 processor	11.10 / 2220000 00 110111	1,700 5	8.31E-04	3 years	analog current source output	SIL2*	SILZ				
2.					2.77E-03	10 years		SIL2**				

Configuration	Safe Detected	Safe Undetected	Dangerous Detected	Dangerous Undetected	Diagnostic Coverage	Safe Failure Fraction	No Effect	Not Part
Comiguration	Failure λ _{SD}	Failure λ _{SU}	Failure λ _{DD}	Failure λ _{DU}	DC	SFF	Failure λ _{NE}	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.





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	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL			
		PRG024F into 68HC711E9	R-IS-722238330-03 Rev.1 T		8.14E-04	3 years	Analog current source output	SIL2*				
3.	3. D1073S	processor +		Туре В	2.71E-03	10 years		SIL2**	SIL2			
	210100	PRG005C into	1012220000 00 10111		8.71E-04	4 years	1002 architecture of alarm trip	SIL2*	SILZ			
		PIC16F505 processor			2.18E-03	10 years	amplifiers with relay outputs	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
1002 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

(*)Considering the products do 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.





	ITEM NAME	ITEM NAME		FINAL RESULTS								
	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL			
			R-IS-722238330-06 Rev.1	Туре В	9.40E-04	5 years	Active input and analog	SIL2*				
4	4 D1054S	PRG016C into 68HC711E9 processor			1.88E-03	10 years	current output Passive input and analog	SIL2**	011.0			
	D10040				9.95E-04	5 years		SIL2*	SIL2			
					1.99E-03	10 years	current output	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

(*)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.





	ITEM NAME	ITEM NAME		FINAL RESULTS							
	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL		
		PRG016C into 68HC711E9 processor	E9 R-IS-722238330-06 Rev.1	Туре В	9.67E-04	7 years	Active input and 1oo2 alarm	SIL2*			
4	D1054S				1.38E-03	10 years	trip amplifiers	SIL2**	CII O		
	D10040				8.94E-04	6 years	Passive input and 1oo2 alarm	SIL2*	SIL2		
					1.49E-03	10 years	trip amplifiers	SIL2**			

Configuration	Safe Detected	Safe Undetected	Dangerous Detected	Dangerous Undetected	Diagnostic Coverage	Safe Failure Fraction	No Effect	Not Part
Comiguration	Failure λ _{SD}	Failure λ _{SU}	Failure λ _{DD}	Failure λ _{DU}	DC	SFF	Failure λ _{NE}	Failure λ _{NP}
Active input								
and 1002	0.00 FIT	212.94 FIT	65.62 FIT	31.35 FIT	67.67 %	89.88 %	239.39 FIT	175.80 FIT
alarm trip	0.00 FII	212.94 FII	03.02 FII	31.33 FH	07.07 76	09.00 %	239.39 FII	175.00 FII
amplifiers								
Passive input								
and 1002	0.00 FIT	212.80 FIT	85.69 FIT	33.79 FIT	71.72 %	89.83 %	256.82 FIT	136.00 FIT
alarm trip	0.00 FTT	212.00 F11	65.09 FTT	33.79 FII	71.72 /0	09.03 //	250.02 FTT	130.00 F11
amplifiers								

(*)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.





	ITEM NAME	ITEM NAME			FINAL RESULTS							
	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL			
5	D1064S	PRG027A into PIC16F505 processor +	R-IS-722238330-09 Rev.1	Rev.1 Type B	7.18E-04	2 years	4-20 mA current source (or sink) output	SIL2*	- SIL2			
	2.3040	D1064S + PRG028A into MS9S12E64CFU processor	1. 15 72225550 05 Nov.1	.,,,,,	3.59E-03	10 years		SIL2**				

Configuration	Safe Detected	Safe Undetected	Dangerous Detected	Dangerous Undetected	Diagnostic Coverage	Safe Failure Fraction	No Effect	Not Part
Comiguration	Failure λ _{SD}	Failure λ _{SU}	Failure λ _{DD}	Failure λ _{DU}	DC	SFF	Failure λ _{NE}	Failure λ _{NP}
4-20 mA								
current source	0.00 FIT	77.98 FIT	155.71 FIT	81.53 FIT	65.63 %	74.14 %	196.48 FIT	31.40 FIT
(or sink)	0.00 F11	77.90 FII	155.71 FII	01.55 F11	03.03 %	74.14 70	190.40 F11	31.40 FII
output								





	ITEM NAME	ITEM NAME				FINA	L RESULTS		
	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL
6	D1030S	PRG032A into PIC16F505 processor +	R-IS-722238330-12 Rev.1	Type B _	8.70E-04	5 years	Single Channel	SIL2*	SIL2
	213333	PRG033A into PIC16F716 processor			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



	ITEM NAME	ITEM NAME				FINA	L RESULTS		
	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL
7	D1030D	PRG032A into PIC16F505 processor	R-IS-722238330-12 Rev.1		8.70E-04	5 years	For each channel	SIL2*	OH O
,	510005	PRG035A into PIC16F716 processor	10 72220000 12 Nov.1	Type B	1.74E-03	10 years	of module	SIL2**	SIL2

Configuration	Safe Detected	Safe Undetected	Dangerous Detected	Dangerous Undetected	Diagnostic Coverage	Safe Failure Fraction	No Effect	Not Part
Configuration	Failure λ _{SD}	Failure λ _{SU}	Failure λ _{DD}	Failure λ _{DU}	DC	SFF	Failure λ _{NE}	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





	ITEM NAME	ITEM NAME			FINAL RESULTS						
	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL		
8	D1130S	PRG032A into PIC16F505 processor +	R-IS-722238330-12 Rev.1	Type B	9.12E-04	5 years	Single Channel	SIL2*	OH O		
	311835	PRG033A into PIC16F716 processor	11.10 / 2220000 12 110111	1,760 5	1.82E-03	10 years		SIL2**	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





	ITEM NAME	ITEM NAME		FINAL RESULTS						
	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL	
9	D1130D	PRG032A into PIC16F505 processor	R-IS-722238330-12 Rev.1		9.12E-04	5 years	For each channel	SIL2*	OH O	
	511005	PRG035A into PIC16F716 processor	1. 10 / 2220000 12 Nov.1	Type B	1.82E-03	10 years	of module	SIL2**	SIL2	

Configuration	Safe Detected	Safe Undetected	Dangerous Detected	Dangerous Undetected	Diagnostic Coverage	Safe Failure Fraction	No Effect	Not Part
Comiguration	Failure λ _{SD}	Failure λ _{SU}	Failure λ _{DD}	Failure λ _{DU}	DC	SFF	Failure λ _{NE}	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





	ITEM NAME	ITEM NAME			FINAL RESULTS						
	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL		
10	D1031D	PRG032A into PIC16F505 processor	R-IS-722238330-12 Rev.1		9.17E-04	7 years	For each channel	SIL2*	CH 2		
	510015	PRG034A into PIC16F716 processor	10 72220000 12 Nov.1	Type B	1.31E-03	10 years	of module	SIL2**	SIL2		

Cantinunation	Safe Detected	Safe Undetected	Dangerous Detected	Dangerous Undetected	Diagnostic Coverage	Safe Failure Fraction	No Effect	Not Part
Configuration	Failure λ _{SD}	Failure λ _{SU}	Failure λ _{DD}	Failure λ _{DU}	DC	SFF	Failure λ _{NE}	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





	ITEM NAME	ITEM NAME				FINA	L RESULTS		
	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL
11	D1031Q	PRG032A into PIC16F505 processor +	R-IS-722238330-12 Rev.1	Type B	9.17E-04	7 years	For each channel	SIL2*	CII O
	D1001Q	PRG035A into PIC16F716 processor	10 72220000 12 Nov.1	Турс Б	1.31E-03	10 years	of module	SIL2**	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





	FUNCTIONAL SAFETY ASSESSMENTS							
	REPORT CODE	FINAL RESULT						
1	R TUV IT 22 SIL 0087	Compliant to the standard for the following parts: - 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.						





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.I., 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

