Declaration of Compliance



C-IS-722238330

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

Applicable Standards

IEC 61508:2010

Official Summary Table No.:

T-IS-722238330

Place: Sesto San Giovanni (MI)

Expiry date: December, 17th 2023

Date

December, 18th 2020

BLM Functional Safety

Alberto Macchi

Signature

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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	R-IS-722238330-03 Rev.1	Type B	8.14E-04	3 years		SIL2*				
	. D1072S	processor +			2.71E-03	10 years	analog current source output	SIL2**	SIL2			
2	2. D1072D PIG	PRG005C into			8.31E-04	3 years		SIL2*	SILZ			
		PIC16F505 processor			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.





	ITEM NAME	ITEM NAME			FINAL RESULTS								
	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL				
		PRG024F into 68HC711E9			8.14E-04	3 years	Analog current source output	SIL2*	Oyelemano CI2				
3	3. D1073S + R-IS-722238330-03 Rev.1 PRG005C into	Type B	2.71E-03	10 years	7 maiog carront course catput	SIL2**	CII O						
O.		PRG005C into	K-13-722236330-03 KeV.1	1,500	8.71E-04	4 years	1002 architecture of alarm trip	SIL2*	SIL2				
		PIC16F505 processor			2.18E-03	10 years	amplifiers with relay outputs	SIL2**	1				

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.

T-IS-722238330

NOTE: The present table is integral part of the Document: C-IS-722238330

Date: August, 03rd 2021





	ITEM NAME	ITEM NAME			FINAL RESULTS							
	HARDWARE	SOFTWARE	REPORT CODE	System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL	Allowed Systematic SIL			
					9.40E-04	5 years	Active input and analog	SIL2*				
4	D1054S	PRG016C into 68HC711E9	R-IS-722238330-06 Rev.1	Туре В	1.88E-03	10 years	current output	SIL2**	CII O			
	210010	processor	1X-10-72223030-00 1XeV.1		9.95E-04	5 years	Passive input and analog	SIL2*	SIL2			
					1.99E-03	10 years	current output	SIL2**	1			

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 D1054S 68HC711E9 processor	E9 R-IS-722238330-06 Rev.1	Туре В	9.67E-04	7 years	Active input and 1oo2 alarm	SIL2*			
4	A D40540				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	09 Rev.1 Type B	7.18E-04	2 years	4-20 mA current source (or sink) output	SIL2*	SIL2			
	2.3040	PRG028A into MS9S12E64CFU processor	1. 15 12225550 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
Configuration	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			FINAL 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			
	213000	+ 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		FINAL 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	Type B	8.70E-04	5 years	For each channel	SIL2*	CH 2	
,	D1000D	PRG035A into PIC16F716 processor	10 72220000 12 Nov.1	Туро	1.74E-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	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	
	2.1000	PRG033A into PIC16F716 processor		, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	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*	CH 2		
	511305	PRG035A into PIC16F716 processor	10 72220000 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
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	115.87 FIT	73.09 FIT	41.42 FIT	63.83 %	82.02 %	128.09 FIT	67.12 FIT





	ITEM NAME	ITEM NAME	REPORT CODE			FINA	L RESULTS		
	HARDWARE	SOFTWARE		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*	OH O
	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		9.17E-04	7 years	For each channel	SIL2*	CH 2
	21001 q	PRG035A into PIC16F716 processor	10 72220000 12 100.1	Type B	1.31E-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	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-IS-722189296 Rev.3	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 the all safety related modules object of this certificate.						

