



Italia

COMPLIANCE

with IEC EN 61511

Certificate No.: C – IS – 236198 – 02 Rev.1

CERTIFICATE OWNER: G.M. International s.r.l.
Via G. Mameli, 53-55
I-20852 Villasanta (MB) – ITALY

WE HEREWITH CONFIRM THAT
THE MODULES IN THE TABLE ENCLOSED TO THE PRESENT DOCUMENT
MEET THE REQUIREMENTS OF IEC EN 61511
ACCORDING TO PROVEN-IN-USE ASSESSMENT
(LOW DEMAND MODE OF OPERATION)

Examination result: The above described Modules were found to meet the standard defined requirements of the safety levels detailed in the following table (T-IS-236198-02) according to IEC EN 61511, under fulfillment of the conditions listed in the related Reports, mentioned in the same table, in their currently valid version, on which this Certificate is based

Examination parameters: Functional characteristics, reliability and availability parameters, experience by field application

Official Summary Table No.: T-IS-236198-02

IT IS TO BE INTENDED THAT THE ABOVE OFFICIAL SUMMARY TABLE IS AN INTEGRAL PART OF THIS DOCUMENT
THE PRESENT DOCUMENT SUBSTITUTES AND REPEATS THE DOCUMENT C-IS-236198-02

Reference Standard IEC EN 61511 Part 1

Sesto San Giovanni, June, 08th 2016

TÜV ITALIA Srl



TÜV ITALIA Srl
Industry Service Division
Director

Paolo Marcone



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**SUMMARY TABLE
T-IS-236198-02**

	ITEM NAME HARDWARE	ITEM NAME SOFTWARE	REPORT CODE	FINAL RESULTS				
				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL
1.	D1072S	PRG005C into PIC16F505 microprocessor +	R-IS-236198-11 Rev.1	Type B	6.70E-4	2 years	NA	SIL2*
					1.68E-3	5 years		SIL2**
					3.35E-3	10 years		SIL2**
2.	D1072D	PRG024F into 68HC711E9 microprocessor	R-IS-236198-11 Rev.1	Type B	7.48E-4	2 years	NA	SIL2*
					1.87E-3	5 years		SIL2**
					3.74E-3	10 years		SIL2**

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
D1072S	0.00 FIT	0.00 FIT	242.35 FIT	76.01 FIT	76.12 %	154.04 FIT	31.40 FIT
D1072D	0.00 FIT	0.00 FIT	274.16 FIT	84.66 FIT	76.40 %	248.18 FIT	145.60 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.



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	ITEM NAME HARDWARE	ITEM NAME SOFTWARE	REPORT CODE	FINAL RESULTS								
				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL				
3.	D1073S	PRG005C into PIC16F505 microprocessor + PRG024F into 68HC711E9 microprocessor	R-IS-236198-11 Rev.1	Type B	6.70E-4	2 years	Analog current output	SIL2*				
					1.68E-3	5 years		SIL2**				
					3.35E-3	10 years		SIL2**				
									8.58E-4	3 years	Alarm trip amplifiers with relay outputs	SIL2*
								1.70E-3	6 years	SIL2**		
								2.86E-3	10 years	SIL2**		

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
Analog current output	0.00 FIT	0.00 FIT	242.35 FIT	76.01 FIT	76.12 %	154.04 FIT	107.60 FIT
Alarm trip amplifiers with relay outputs	0.00 FIT	304.97 FIT	0.00 FIT	65.13 FIT	82.40 %	204.10 FIT	145.80 FIT

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

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	ITEM NAME HARDWARE	ITEM NAME SOFTWARE	REPORT CODE	FINAL RESULTS				
				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL
4.	D1054S	PRG016C into 68HC711E9 microprocessor	R-IS-236198-14 Rev.1	Type B	8.08E-4	4 years	Analog current output Active input	SIL2*
					1.82E-3	9 years		SIL2**
					2.02E-3	10 years		SIL2**
					8.52E-4	4 years	Analog current output Passive input	SIL2*
					1.92E-3	9 years		SIL2**
					2.13E-3	10 years		SIL2**
					8.82E-4	6 years	Alarm trip amplifiers with relay outputs Active input	SIL2*
					1.47E-3	10 years		SIL2**
					9.48E-4	6 years	Alarm trip amplifiers with relay outputs Passive input	SIL2*
1.58E-3	10 years	SIL2**						

Configuration	Safe Detected Failure λ _{SD}	Safe Undetected Failure λ _{SU}	Dangerous Detected Failure λ _{DD}	Dangerous Undetected Failure λ _{DU}	Safe Failure Fraction SFF	No Effect Failure λ _{NE}	Not Part Failure λ _{NP}
Analog current output Active input	0.00 FIT	0.00 FIT	229.70 FIT	45.52 FIT	83.46 %	174.18 FIT	127.80 FIT
Analog current output Passive input	0.00 FIT	0.00 FIT	261.05 FIT	48.00 FIT	84.47 %	193.95 FIT	74.20 FIT
Alarm trip amplifiers with relay outputs Active input	0.00 FIT	268.80 FIT	0.00 FIT	33.46 FIT	88.93 %	185.54 FIT	225.40 FIT
Alarm trip amplifiers with relay outputs Passive input	0.00 FIT	301.45 FIT	0.00 FIT	35.94 FIT	89.35 %	229.01 FIT	146.80 FIT

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	ITEM NAME HARDWARE	ITEM NAME SOFTWARE	REPORT CODE	FINAL RESULTS								
				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL				
5.	D5072S	PRG041C into ADUC7061 microprocessor + PRG040C into LM3S3749 microprocessor	R-IS-248304-03 Rev.1	Type B	9.46E-4	3 years	NA	SIL2*				
					1.89E-3	6 years		SIL2**				
					3.15E-3	10 years		SIL2**				
					6.31E-3	20 years		SIL1*				
6.	D5072D				PRG041C into ADUC7061 microprocessor + PRG040C into LM3S3749 microprocessor	R-IS-248304-03 Rev.1		Type B	9.47E-4	3 years	NA	SIL2*
									1.89E-3	6 years		SIL2**
									3.16E-3	10 years		SIL2**
									6.31E-3	20 years		SIL1*

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
D5072S	0.00 FIT	0.00 FIT	240.26 FIT	71.43 FIT	77.08 %	190.31 FIT	94.30 FIT
D5072D	0.00 FIT	0.00 FIT	283.52 FIT	71.43 FIT	79.88 %	279.05 FIT	191.20 FIT

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	ITEM NAME HARDWARE	ITEM NAME SOFTWARE	REPORT CODE	FINAL RESULTS				
				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL
7.	D5273S	PRG041C into ADUC7061 microprocessor + PRG040C into LM3S3749 microprocessor	R-IS-248304-03 Rev.1	Type B	9.46E-4	3 years	Analog current output	SIL2*
					1.89E-3	6 years		SIL2**
					3.15E-3	10 years		SIL2**
					6.31E-3	20 years		SIL1*
					7.52E-4	2 years	Alarm trip amplifiers with relay outputs	SIL2*
					1.88E-3	5 years		SIL2**
					3.76E-3	10 years		SIL2**
					7.52E-3	20 years		SIL1*

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
Analog current output	0.00 FIT	0.00 FIT	240.26 FIT	71.43 FIT	77.08 %	190.31 FIT	229.50 FIT
Alarm trip amplifiers with relay outputs	0.00 FIT	256.38 FIT	0.00 FIT	85.70 FIT	74.95 %	202.52 FIT	186.90 FIT

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				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL
8.	D5231E	PRG042A into LM3S3749 microprocessor + PRG043A into PIC16F690 microprocessor	R-IS-248304-06 Rev.1	Type B	8.88E-4	3 years	NA	SIL2*
					1.78E-3	6 years		SIL2**
					2.96E-3	10 years		SIL2**
					5.92E-3	20 years		SIL1*

Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
0.00 FIT	191.00 FIT	0.00 FIT	67.44 FIT	73.90 %	212.26 FIT	390.30 FIT

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	ITEM NAME HARDWARE	ITEM NAME SOFTWARE	REPORT CODE	FINAL RESULTS				
				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL
9.	D5293S	PRG036B into ADUC7061 microprocessor + PRG038B into LM3S3749 microprocessor	R-IS-257035-03 Rev.1	Type B	8.98E-4	4 years	With diagnostic ModBus output	SIL2*
					1.80E-3	8 years		SIL2**
					2.25E-3	10 years		SIL2**
					4.49E-3	20 years		SIL2**
					8.52E-4	2 years	With diagnostic relay output	SIL2*
					1.70E-3	4 years		SIL2**
					4.26E-3	10 years		SIL2**
					8.52E-3	20 years		SIL1*

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
With diagnostic ModBus output	0.00 FIT	101.83 FIT	42.42 FIT	51.10 FIT	73.84 %	114.65 FIT	558.50 FIT
With diagnostic relay output	0.00 FIT	216.93 FIT	0.00 FIT	97.12 FIT	69.07 %	117.75 FIT	436.70 FIT

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	ITEM NAME HARDWARE	ITEM NAME SOFTWARE	REPORT CODE	FINAL RESULTS							
				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL			
10.	D5294S	PRG036B into ADUC7061 microprocessor + PRG038B into LM3S3749 microprocessor	R-IS-257035-03 Rev.1	Type B	7.70E-4	2 years	With diagnostic ModBus output	SIL2*			
					1.92E-3	5 years		SIL2**			
					3.85E-3	10 years		SIL2**			
								7.70E-3	20 years	With diagnostic relay output	SIL1*
							5.86E-4	1 years	SIL2*		
							1.76E-3	3 years	SIL2**		
							2.93E-3	5 years	SIL2**		
							9.96E-3	17 years	SIL1*		
							1.17E-2	20 years	SIL1**		

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
With diagnostic ModBus output	0.00 FIT	118.83 FIT	127.75 FIT	87.46 FIT	73.82 %	212.65 FIT	681.50 FIT
With diagnostic relay output	0.00 FIT	319.66 FIT	0.00 FIT	133.49 FIT	70.54 %	215.35 FIT	559.70 FIT

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	ITEM NAME HARDWARE	ITEM NAME SOFTWARE	REPORT CODE	FINAL RESULTS				
				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL
11.	D5295S	PRG036B into ADUC7061 microprocessor + PRG038B into LM3S3749 microprocessor	R-IS-257035-03 Rev.1	Type B	7.70E-4	2 years	With diagnostic ModBus output	SIL2*
					1.92E-3	5 years		SIL2**
					3.85E-3	10 years		SIL2**
					7.70E-3	20 years		SIL1*
					5.86E-4	1 years	With diagnostic relay output	SIL2*
					1.76E-3	3 years		SIL2**
					2.93E-3	5 years		SIL2**
					9.96E-3	17 years		SIL1*
					1.17E-2	20 years		SIL1**

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
With diagnostic ModBus output	0.00 FIT	118.83 FIT	127.75 FIT	87.46 FIT	73.82 %	215.65 FIT	681.50 FIT
With diagnostic relay output	0.00 FIT	319.66 FIT	0.00 FIT	133.49 FIT	70.54 %	218.35 FIT	559.70 FIT

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	ITEM NAME HARDWARE	ITEM NAME SOFTWARE	REPORT CODE	FINAL RESULTS				
				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL
12.	D1030S	PRG032A into PIC16F505 microprocessor + PRG033A into PIC16F716 microprocessor	R-IS-264209-03 Rev.1	Type B	9.76E-4	3 years	NA	SIL2*
					1.95E-3	6 years		SIL2**
					3.25E-3	10 years		SIL2**
13.	D1030D	PRG032A into PIC16F505 microprocessor + PRG035A into PIC16F716 microprocessor			9.76E-4	3 years		SIL2*
					1.95E-3	6 years		SIL2**
					3.25E-3	10 years		SIL2**

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
D1030S	0.00 FIT	170.47 FIT	0.00 FIT	74.17 FIT	69.68 %	97.26 FIT	111.30 FIT
D1030D	0.00 FIT	170.47 FIT	0.00 FIT	74.17 FIT	69.68 %	97.26 FIT	117.90 FIT

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	ITEM NAME HARDWARE	ITEM NAME SOFTWARE	REPORT CODE	FINAL RESULTS				
				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL
14.	D1130S	PRG032A into PIC16F505 microprocessor + PRG033A into PIC16F716 microprocessor	R-IS-264209-03 Rev.1	Type B	7.21E-4	2 years	NA	SIL2*
					1.80E-3	5 years		SIL2**
					3.60E-3	10 years		SIL2**
15.	D1130D	PRG032A into PIC16F505 microprocessor + PRG035A into PIC16F716 microprocessor			7.21E-4	2 years		SIL2*
					1.80E-3	5 years		SIL2**
					3.60E-3	10 years		SIL2**

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
D1130S	0.00 FIT	203.81 FIT	0.00 FIT	82.13 FIT	71.28 %	107.03 FIT	105.30 FIT
D1130D	0.00 FIT	203.81 FIT	0.00 FIT	82.13 FIT	71.28 %	107.03 FIT	111.90 FIT

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	ITEM NAME HARDWARE	ITEM NAME SOFTWARE	REPORT CODE	FINAL RESULTS				
				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL
16.	D1031D	PRG032A into PIC16F505 microprocessor + PRG034A into PIC16F716 microprocessor	R-IS-264209-03 Rev.1	Type B	8.65E-4	4 years	NA	SIL2*
					1.95E-3	9 years		SIL2**
					2.16E-3	10 years		SIL2**
17.	D1031Q	PRG032A into PIC16F505 microprocessor + PRG035A into PIC16F716 microprocessor			8.65E-4	4 years		SIL2*
					1.95E-3	9 years		SIL2**
					2.16E-3	10 years		SIL2**

Configuration	Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
D1031D	0.00 FIT	125.82 FIT	0.00 FIT	49.29 FIT	71.85 %	95.89 FIT	112.00 FIT
D1031Q	0.00 FIT	125.82 FIT	0.00 FIT	49.29 FIT	71.85 %	95.89 FIT	125.20 FIT

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				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL
18.	D1064S	PRG027A on PIC16F505 processor + PRG028A on MS9S12E64CFU processor	R-IS-277072-03 Rev.1	Type B	8.62E-4	2 years	with 4-20 mA current source (or sink) output configuration	SIL2*
					4.31E-3	10 years		SIL2**

Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
0.00 FIT	0.00 FIT	242.35 FIT	97.73 FIT	71.26 %	165.42 FIT	36.40 FIT

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 Please, for more Functional Safety information see Safety Manual ISM0312_r0.





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				System type	PFD _{avg}	T _{Proof}	Configuration	Allowed SIL
19.	D5072S-087	PRG041C into ADUC7061 microprocessor + PRG040C into LM3S3749 microprocessor	R-IS-722117761-03 Rev.1	Type B	9.09E-4	3 years	NA	SIL2*
					3.03E-3	10 years		SIL2**
					6.06E-3	20 years		SIL1*

Safe Detected Failure λ_{SD}	Safe Undetected Failure λ_{SU}	Dangerous Detected Failure λ_{DD}	Dangerous Undetected Failure λ_{DU}	Safe Failure Fraction SFF	No Effect Failure λ_{NE}	Not Part Failure λ_{NP}
0.00 FIT	0.00 FIT	238.28 FIT	68.63 FIT	77.64 %	176.09 FIT	61.70 FIT

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Please, for more Functional Safety information see Safety Manual ISM0360_r0.



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