

Declaration of Compliance



Italia

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

TÜV Italia S.r.l. - TÜV SÜD Group
via G. Carducci, 125 pal 23 - 20099 Sesto S. Giovanni (MI)- Italy
T. +39 02 24130 1 F. +39 02 24130 0399
Web: www.tuv.it – @-mail: tuv.is@tuv.it

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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.
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T-IS-722238330

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Date: August, 03rd 2021





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| | ITEM NAME HARDWARE | ITEM NAME SOFTWARE | REPORT CODE | FINAL RESULTS | | | | | |
|----|-----------------------|---|-------------------------|---------------|--------------------|--------------------|--|----------------|---------------------------|
| | | | | 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 |

(*)Considering the products do 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 | 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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| | ITEM NAME HARDWARE | ITEM NAME SOFTWARE | REPORT CODE | FINAL RESULTS | | | | | |
|---|-----------------------|--|-------------------------|---------------|--------------------|--------------------|---|----------------|---------------------------|
| | | | | 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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| | ITEM NAME HARDWARE | ITEM NAME SOFTWARE | REPORT CODE | FINAL RESULTS | | | | | |
|---|-----------------------|--|-------------------------|---------------|--------------------|--------------------|--|----------------|---------------------------|
| | | | | 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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| | ITEM NAME HARDWARE | ITEM NAME SOFTWARE | REPORT CODE | FINAL RESULTS | | | | | |
|---|-----------------------|---|-------------------------|---------------|--------------------|--------------------|----------------|----------------|---------------------------|
| | | | | 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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| | ITEM NAME HARDWARE | ITEM NAME SOFTWARE | REPORT CODE | FINAL RESULTS | | | | | |
|---|-----------------------|---|-------------------------|---------------|--------------------|--------------------|-------------------------------|----------------|---------------------------|
| | | | | 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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| | ITEM NAME HARDWARE | ITEM NAME SOFTWARE | REPORT CODE | FINAL RESULTS | | | | | |
|---|-----------------------|---|-------------------------|---------------|--------------------|--------------------|-------------------------------|----------------|---------------------------|
| | | | | System type | PFD _{avg} | T _{Proof} | Configuration | Allowed SIL | Allowed Systematic SIL |
| 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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| | ITEM NAME HARDWARE | ITEM NAME SOFTWARE | REPORT CODE | FINAL RESULTS | | | | | |
|----|-----------------------|---|-------------------------|---------------|--------------------|--------------------|-------------------------------|----------------|---------------------------|
| | | | | 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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Date: August, 03rd 2021





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| | ITEM NAME HARDWARE | ITEM NAME SOFTWARE | REPORT CODE | FINAL RESULTS | | | | | |
|----|-----------------------|---|-------------------------|---------------|--------------------|--------------------|-------------------------------|----------------|---------------------------|
| | | | | System type | PFD _{avg} | T _{Proof} | Configuration | Allowed SIL | Allowed Systematic SIL |
| 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 |

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

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Italia

| FUNCTIONAL SAFETY ASSESSMENTS | | |
|-------------------------------|----------------------|--|
| | REPORT CODE | FINAL RESULT |
| 1 | R-IS-722189296 Rev.3 | 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 the all safety related modules object of this certificate. |

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