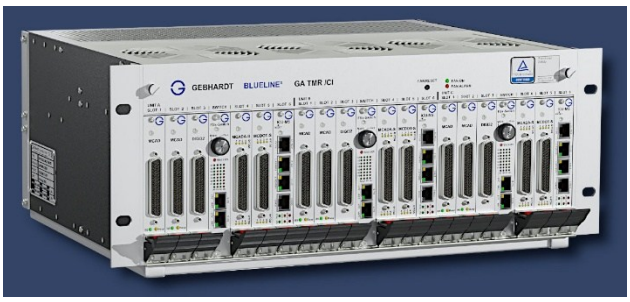
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TMR /CI BlueLine³

triple modular redundant control and safety system



Functional Safety
TÜVRheinland CERTIFIED
www.tuv.com ID 0600000000

SIL3

The triple-modular-redundant system consists of three units, each with 6 + 1 slots. 6 slots are usable for GA CPU and I/O cards and one slot is usable for the FS1 switch card in each unit. All three units are housed in a 19-inch 4U rack and internally coupled via redundant Ethernet. When equipped with suitable safety cards, the TMR /CI system can achieve Safety Integrity Levels SIL 1 to SIL 3 in accordance with IEC 61508 for both control and safety tasks. Certification by TÜV Rheinland has been completed.

Hardware Output Voting
Failure-degradation sequence: 3-2-0
HFT = 1, β = 2%, SFF > 99%, DC > 99%
After the first fault, the remaining system is still suitable for SIL3 in accordance with IEC 61508

Software Output Voting
Possible failure-degradation sequence: 3-2-1-0
HFT = 1, β = 2%, SFF > 99%, DC > 99%
After the first and second faults, the remaining system is still suitable for SIL3 in accordance with IEC 61508

Voting for inputs and internal values
The firmware supports configurable voting and degradation behaviour in the event of a failure. Typical voting configurations are 3oo3D, 2oo3D and 1oo3D. Supported degradation sequences are 3-2-1-0, 3-2-0 and 3-0.

Technical data

- 19-inch rack, 4U high
  WxHxD = 483 x 191 x 425 mm

- FS1 data bus with 6 + 1 slots per unit, parallel data bus plus with integrated redundant Ethernet
- One FS1 switch card per unit equipped with a key switch for operating mode selection
- Insertable central processor cards: MPU-M1, ICU-M5 or ICU-M4. An optional hot-standby configuration with two processor cards per unit is available.
- MCxxx-S safety I/O cards
- Standard non-safety I/O cards

- Single or redundant power supplies for each unit: 24 V DC or 100 to 240 V AC or mixed

- Max. number of I/Os in each unit: approx. 100
- Hot-swappable fan with fan monitoring
- Hot-swappable air filter, removable from the rear
- Overvoltage and overcurrent protection
- Voltage monitoring
- EMC-compatible construction, chromate-coated surface
- Swing-frame mountable
- Operating temperature range: 0 °C to +60 °C

The TMR /CI system complies with current standards:

- EN ISO 13849-1: 2023
- IEC / EN 61508 Part 1 – 7: 2010,
- IEC / EN 61131-2: 2007
- IEC / EN 61131-6: 2012
- IEC / EN 61326-3-1: 2017
- EN 61000-6-7: 2015
- EN IEC 62061: 2021 + A1:2024
- EN 50156-1: 2024
- EN 60204-1: 2018 + A1: 2025
- EN 50155: 2021 (only temperature tests)
- EN 61373: 2010 + AC 2017
- EN 61010-1: 2010 + A1:2019 + A1:2019/AC:2019
- EN IEC 61010-2-201: 2024

DATASHEET