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TMR /CMD BlueLine³

triple modular redundant system, distributed



The **TMR /CMD** consists of three independent racks referred as units: A, B and C which holds two sub-systems each. These units are connected via redundant Ethernet network. Within one rack two independent systems: one with 6 + 1 slots and the other with 12 + 2 slots for CPU and I/O-cards are integrated similar to a BASIC /CM system.
For input and output values, as well as for intermediate results different voting strategies can be selected (2oo3D, 1oo3D, 3oo3D).

Hardware Output Voting TMR
failure-degradation sequences: 3-2-0
HFT = 1, ß = 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 TMR
failure-degradation sequences: 3-2-1-0
HFT = 2, ß = 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 TMR
Configurable voting and degradation behavior in the event of a failure are supported by the firmware. Typical voting configurations are 3oo3D, 2oo3D, 1oo3D for voting and failure degradations of 3-2-1-0, 3-2-0 or 3-0.

Technical data of each rack

- 19-inch rack, 4U high
  W x H x D = 483 x 191 x 425 mm

- Single or redundant power supplies:
  24 V DC or 100-240 V AC or mixed
- Central processor cards MPU-M1, ICU-M5 or ICU-M4
- MCxxx-S safety I/O cards
- Standard non-safety I/O cards
- 2x key switches for operating mode selection
- Maximum number of I/O points:
  approximately 3x 300

- Front-insertable fan (hot swap), with fan monitoring
- Air filter, removable from the rear (hot swap)
- Overvoltage and overcurrent protection
- Voltage monitoring
- EMC-compatible construction with chromate-treated surfaces
- Suitable for mounting in a swing frame

- Operating temperature range: 0° ... +60°C

The TMR /CMD 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