

MH50C – Modular Train Control System (MTCS) Controller for Rolling Stock

- **SIL 4 Modular Train Control System MTCS**
- **Certified safe CPU board with 3 CPUs**
- **Certified safe I/O boards**
- **QNX® safe operating system available**
- **Certification packages available**
- **Extensible by distributed safe I/O boxes connected via real-time Ethernet**
- **Optional MVB interface, RS232, RS422, RS485, CAN, GPS**
- **Compact 19" application-ready system**
- **Rack-mounted or wall-mounted**
- **Fanless operation or forced-air cooling**



MH50C is the central controller of the Modular Train Control System MTCS. It is a modular system platform usable for safety-critical train applications like train control, automatic train operation (ATO) and automatic train protection (ATP) up to SIL 4.

Modular, built-to-order I/O configuration:
Being based on modular half-19" CompactPCI®, the system is always configured with a **safe system CPU**, a real-time Ethernet card, a power supply unit and a shelf controller. Other cards are added as built-to-order (BTO) options or by the user. The safe I/O cards support the common I/O requirements requested in trains.

The composition of safe CPU card, safe train I/Os and interfaces, such as MVB, CAN or serial interfaces to connect to legacy train equipment makes the controller ideal for use in safety-critical rolling stock applications.

Application-ready, open platform:
The MH50C is an application-ready, open platform. This means that the user adds his application based on the basic operating system and driver software.

Part of the Modular Train Control System MTCS:
MTCS is a modular SIL 4 certifiable family of CompactPCI®-based standard products usable for every

kind of safety-critical railway application - from a single function to the main control system of the train. It can be configured to control anything in the train that requires **functional safety** - under SIL 4, SIL 3 or SIL 2 requirements.

MTCS communicates via standard real-time Ethernet and interfaces to any type of consist fieldbus network like MVB, CANopen, Profinet etc. This makes it easy to integrate into a TCN network as well as into regionally different Train Control Systems like ETCS, CTCS, ATCS or Klub-U. The high level of flexibility of MTCS results in significant cost and time savings during computerization of the train.

Certification and standards compliance included:
MTCS components come with certification packages and complete support for the safe operating system QNX® (PikeOS on request), including safe protocols, CST layer, I/O transfer layer etc. and is ready to work with the Flexisafe PLC software, again saving cost and time for implementation and for certification of the final system.

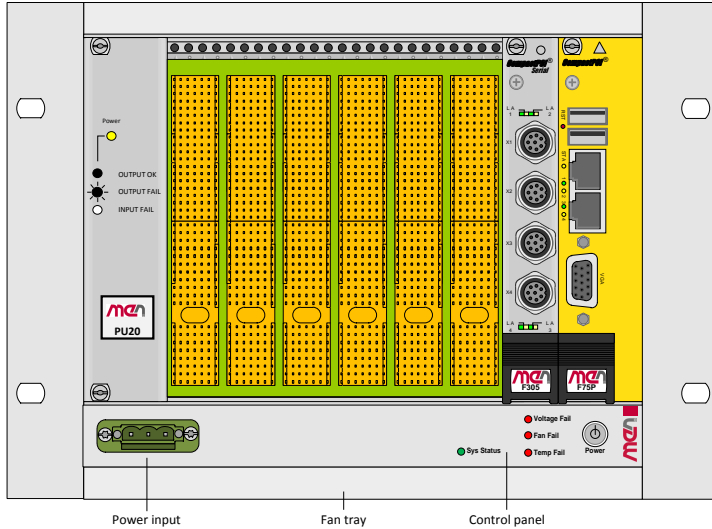
MTCS is developed according to EN 50128 and EN 50129 standards and complies with all environmental requirements of EN 50155: temperature class Tx, shock, vibration, humidity, dust, isolation, PSU hold-up times, EMC regulations etc.

Mounting and cooling options:
The system can be wall or rack-mounted, and can be cooled by natural convection or using an additional fan tray at the bottom of the system. Cooling is independent of the mounting position.



Diagram

Slot	1	2	3	4	5	6	7	8	9	10	11
HP	1	5	9	13	17	21	25	29	33	37	41



MH50C Barebone Configuration

Safe CPU card F75P

- 40 to +85°C
- 3 Intel Atom processors
- 2 RJ45 (general purpose Ethernet)
- mSATA 8 GB, -40...+85°C

Real-time Ethernet interface card

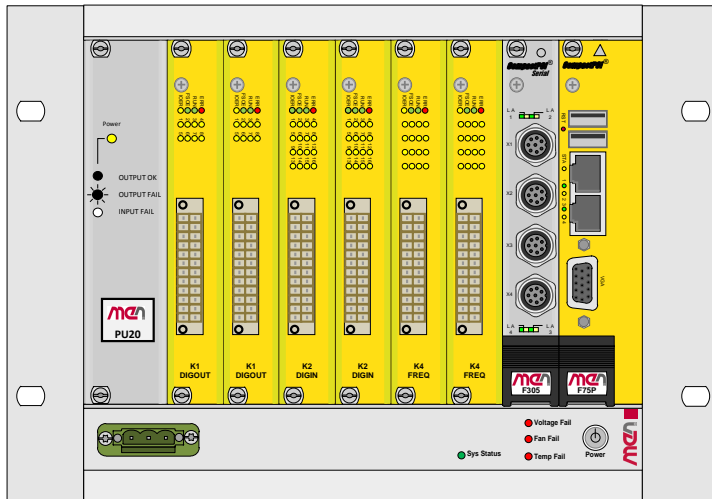
- 4 M12, connects distributed safe I/O

Wide DC range power supply

System supervision: temp, fan, power
Fanless or forced-air cooling

Option slots for

- Safe digital inputs/outputs
- Safe frequency inputs
- MVB ESD+ Device/Bus Administrator
- MVB EMD Device/Bus Administrator
- General-purpose interfaces (RS422/RS485, RS232, CAN, GPS)

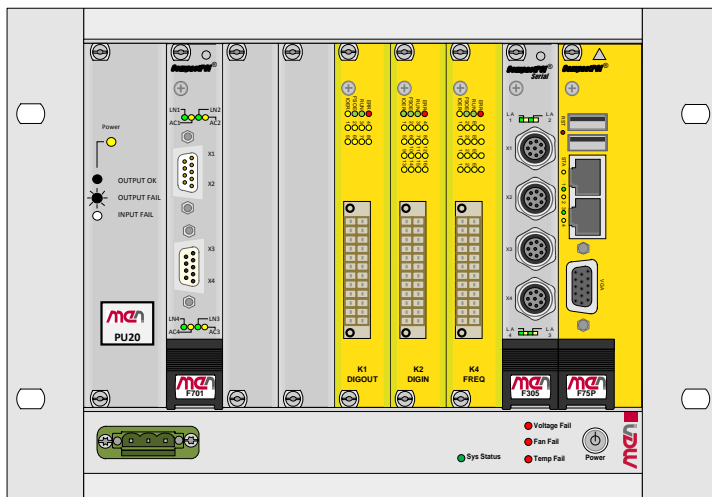


MH50C Configuration Example 1

Option slots populated with safe I/O

- 8 digital outputs, SIL 4 (each using 2 pins)
- 16 digital inputs, SIL 4 (each using 2 pins)
- 8 frequency input channels, SIL 4

Safe CPU, RT Ethernet card etc. as in barebone configuration



MH50C Configuration Example 2

Option slots populated with safe I/O

- 8 digital outputs, SIL 2
- 16 digital inputs, SIL 2
- 4 frequency input channels, SIL 2
- MVB master
- 2 slots reserved for future use

Safe CPU, RT Ethernet card etc. as in barebone configuration

This configuration targets SIL 2 safe I/O applications: each safe I/O card is only assembled once.

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