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HVAC ELECTRONIC CONTROL-CS

**UNIFIED
COMMUNICATION
ARCHITECTURE**

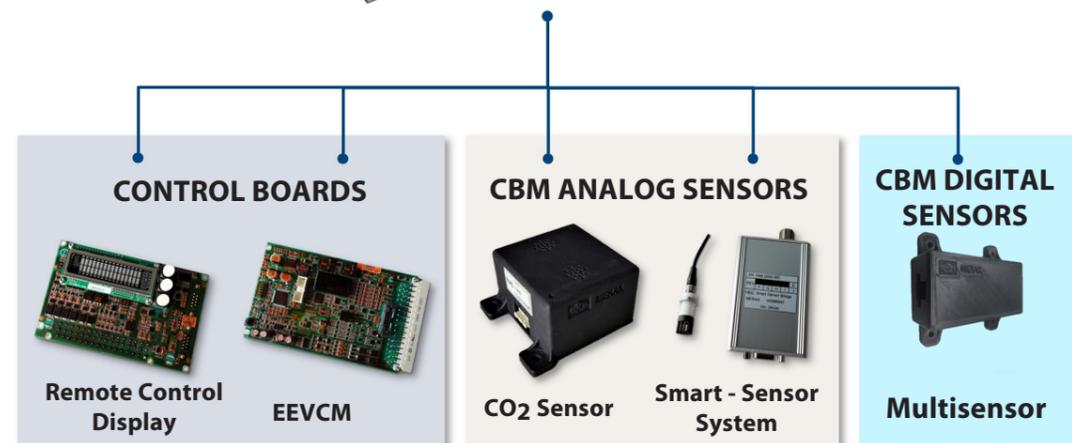
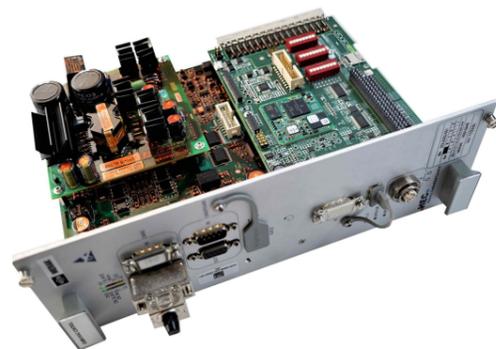


HEC-CS (HVAC Electronic Control)

HEC is a state-of-the-art embedded controller designed for railway HVAC applications.

Customer benefits

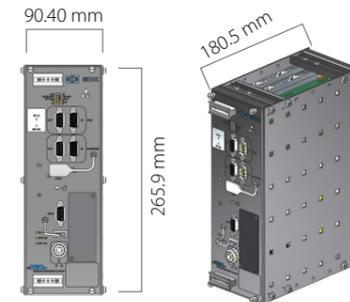
- State-of-the-art data integrity and protection support for communication networks
- Possibilities for a seamless integration of digital services into our products
- Strong focus on service reliability and robustness
- Comfort improvement by means of specialized peripheral product
- Backward compatibility with previous control family
- Easy setup
- High level encryption
- Compliant: EN62443 / EN 50121-3-2:2016 / EN 50155
- Maximum network security



HEC Communication Protocols

- Analog Signal: 4-20mA, 0-10V, 0-5V
- Data BUS: MODBUS, CAN, RS485, RS232, ETHERNET

HEC-CS - Main control



- Designed according to international railway standards, incl. EN, GOST and STM
- Compliant with cutting-edge protocols (i.e. TRDP, IPTCOM and CIP)
- Allows implementation of advance monitoring and condition-based maintenance (CBM) solutions
- Compatible with other Knorr-Bremse Group electronic subsystems

Additional control and sensing technology

EEVCM

- Optimized cooling function
- Used with green refrigerants such as CO₂
- Reduced cost compared to COTS



Remote Control Display

- Integrated HMI and control functions
- Reduced cost → Optimum for Sleeper cars



Smart - Sensor System

- Cabling reduction (Onewire)
- Temperature monitoring in the whole vehicle



CO₂ Sensor

- NDIR CO₂ technology sensor
- Power supply: 24VDC
- Accuracy: 30ppm +/- 30%
- Measurement range: 0-10000ppm
- Operation temperature: 0-50°C



Multisensor

- Measured parameters: Carbon dioxide (CO₂), temperature and relative humidity
- Measurement range CO₂: 0-10000ppm
- Measurement temperature range: - 40 to 125°C
- Measurement relative humidity range: 0-100% RH
- Digital output: MODBUS RTU

