



## **A freely programmable electrical controller for large vehicles and mobile machinery**

**AMETEK offers the VIS Intelligent Control Module (ICM-200-24V), a powerful 24V vehicle electric controller for large vehicles such as trucks, buses, and motorhomes, as well as mobile machinery. Thanks to convenient Simulink programming, applications can be modelled, simulated and tested in a user-friendly way. This reduces engineering and testing costs. The ICM-200 is easy to integrate thanks to a large number of interfaces and can also control a variety of sensors and actuators.**

Capacities in programming and application engineering are particularly scarce resources for vehicle and machine manufacturers. Given the growing complexity of vehicle system automation and digitalization, OEMs are using their software experts to implement USP automation functionalities, such as operator assistance systems. Time- and resource-saving solutions are needed for the necessary but less complex programming of vehicle electrics. This is why the ICM from AMETEK can be programmed in a user-friendly way using Simulink.

Simulink enables the vehicle logic to be programmed freely using visual representations. This eliminates the need for time-consuming text-based coding. AMETEK provides a library of Simulink blocks for all the hardware capabilities of the ICM, enabling programmers at machine and vehicle manufacturers to implement customized electrical solutions quickly and easily.

Darrell Martin, Chief Developer at VIS AMETEK, explains: 'Models can range from switching on an output in response to a switch being closed to complex control algorithms that take multiple inputs, levels and operating time into account. Non-volatile memory blocks allow information to be stored beyond the next ignition or battery cycle.'

### **Full control and fast time to market**

Programming ICM controllers in Simulink gives machine and vehicle manufacturers full control over their application development. The user-friendly, visual application engineering enables developers to achieve the desired result without requiring additional support from external experts. This means that all application expertise remains in-house, eliminating the need for external consultants and programmers.

As Simulink models can be tested virtually, the costs of prototyping and testing are reduced. When the Simulink model is built, VEPS definition and parameter files are automatically generated according to the model, further increasing ease of use.

## **Optimizing the wiring harness**

The larger the vehicle, the more challenging it is to implement the wiring harness. Depending on the vehicle's dimensions, kilometers of cable must be laid. This not only requires considerable installation effort but also incurs high material costs. Additionally, the wiring harness can contribute significantly to the vehicle's weight, which can negatively impact fuel consumption and CO2 emissions.

Darrell Martin explains: "One of the leading manufacturers of school buses in the USA uses our ICM-200 to implement decentralized cabling in the vehicle and to increase safety. Several control units are located in the immediate vicinity of the lights and actuators to be controlled. The CAN communication wiring harness only runs from controller to controller, eliminating most of the connections that would be necessary with a centralized wiring harness. This not only makes installation easier, but also maintenance and troubleshooting in the event of a cable break." At the same time, fuse elements and relays are saved. The machine and vehicle manufacturer can design their wiring harness solution as flexibly and individually as required.

ICM-200 controllers allow connection to a variety of vehicle systems and can control motors, lights, solenoid valves, and so on, with either 32 outputs capable of 12 amps or 16 outputs at 20 amps. There are over 32 switchable inputs available. Thanks to their CAN and LIN capabilities, the ICM controllers can monitor and process information from a variety of other vehicle subsystems. Information from physical sensors can also be retrieved via analogue inputs.

## **Reduce machine downtimes to a minimum**

The ICM-200 also helps reduce operating costs. This is because its fully protected outputs can provide a wealth of diagnostic information to help quickly identify maintenance requirements. For example, they indicate whether a circuit is open, short-circuited or overheated. All power supply outputs provide information on the current drawn for advanced diagnostics, e.g. to detect a single failed bulb in a row of lights. As this information can be transmitted via CAN, the ICM can be coupled with telematics and communication modules, enabling remote diagnostic functions to be used as part of fleet management. This enables faults to be detected quickly, allowing service personnel to locate faulty components faster and minimize vehicle and machine downtime. This increases machine availability and productivity while reducing downtime costs.

Darrell Martin concludes: "In combination with Simulink programming and our libraries, the ICM-200 provides OEM customers with maximum flexibility and usability. Time-to-market and development costs are significantly reduced and competitiveness increases. Operating costs are also reduced thanks to the ICM-200, as machine downtimes or long idle times are avoided."

VIS AMETEK offers OEMs complete electronics for the safe operation and user-friendly design of large vehicles, together with the intelligent ADAS cameras and displays from its sister company, Motec.



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