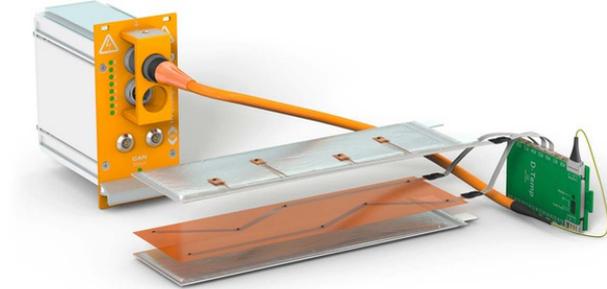


## Temperature measurement in high-voltage batteries

**CSM (Germany) introduced the HV DTemp system. It acquires temperatures at up to 512 points and provides the values via CAN. The system is designed for development of high-voltage (HV) batteries used e.g. in electric vehicles.**



*HV DTemp system overview (from left to right): central unit, sensor modules, and controller module (Source: CSM)*

To verify operation temperature behavior of a HV battery prototype and to provide a temperature profile at the cell level, accurate temperature measurements at several points between battery cells are necessary. Such measurements detect hot and cold spots caused by design geometry, mechanical stress, cooling system, etc.

Up to four IC (integrated circuit) temperature sensors are connected to an HV DTemp-4 sensor module. The maximum measurement range is up to +125 °C. The resolution of a measured value is 16-bit. Up to 16 sensor modules (i.e. 64 sensors) may be connected to a HV DTemp-M64 controller module. The latter fulfills addressing and power supply of the sensors. The controller module also transmits the temperature values

to the HV DTemp-P central unit. Up to eight controller modules may be cascaded. This allows to use up to 512 temperature sensors enabling a thorough understanding of the battery thermal behavior. The controller modules (48 mm × 87 mm × 0,75 mm) may be installed inside the HV battery housing to save space.

The controller modules are connected to the HV DTemp-P central unit, which is located outside the HV battery. The central unit has two galvanically-isolated inputs. Thus, temperatures from two different high-voltage environments may be acquired. The 512 measured values collected via controller modules may be divided between the two inputs of the central unit. The central unit provides all measured temperature data via a CAN interface. An external measurement computer uses CAN for configuration of the measurement system and for data acquisition. For each temperature sensor (measurement point) a CAN-Identifier is assigned. This is documented in a DBC (data base CAN) description file.

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