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Industrial battery chargers support CANopen

The Canadian company Delta-Q provides battery chargers dedicated for on-board integration in electrical vehicles. The charging process of lead-acid and lithium battery packs is controlled and monitored via CANopen.

The complete article is published in the [December issue](#) of the CAN Newsletter magazine 2020. This is just an excerpt.

Many OEMs (original equipment manufacturers) of golf cars, lift trucks, aerial work platforms, floor machines, utility vehicles, and scooters, are developing machines that employ lithium batteries. Safety concerns associated with lithium battery usage creates the need for a highly-integrated system using a charger with CANopen-connectivity. For example, the IC650 charger is available in 24-V_{DC}, 36-V_{DC}, and 48-V_{DC} versions and provides 650-W of constant DC (direct count) output power. The company also provides 85-V_{DC} and 120-V_{DC} models to charge batteries with up to 34 cells.

Figure 1: The CANopen-connectable IC650 charger is available in 24-V_{DC}, 36-V_{DC} and 48-V_{DC} versions (Source: Delta-Q Technologies)

Via the CANopen network the information between the charger and other electric-drive vehicle components (e.g. main vehicle controller) is exchanged. The data is used e.g. to operate safety interlocks, to be displayed on panels, or to be collected by custom service tools. The CAN interface is galvanically isolated. CAN cable harnesses can be provided by Delta-Q, or sourced by an OEM customer.

The charger's CANopen interface complies with the CiA 419 CANopen device profile for chargers. The battery module to be charged supports the CiA 418 CANopen device profile. Both profiles were specified by CAN in Automation (CiA) and its member-companies. If a CANopen profile is implemented, the data of the device is accessible via the CANopen network in a standardized manner. The same CANopen interface can be used for all charger variants independent of the charging technique and the power range. Compliant devices may be integrated into CANopen applications from different manufacturers. Delta-Q has also added manufacturer-specific parameters to allow more control and monitoring functionality than specified in the profiles. By default, the CANopen devices use the following settings. The bit-rate is 125 kbit/s. The charger node-ID is set to 10 and the battery node-ID is set to 1. The PDO (process data object) mapping as defined in CiA 418 and CiA 419 is preset. If required, J1939 protocol can also be supported by those chargers.

In the CANopen network the BMS (battery management system) controls the charging process, and monitors individual cell voltages and temperatures. This monitoring and control prevent overcharging and ensures that the battery cells remain balanced.

CANopen device profiles for batteries and chargers

The CiA 418 and CiA 419 CANopen device profiles specify the data to be exchanged between a battery module and a battery charger to perform charging. CiA 418 defines the application data to be implemented on the battery module. A compliant battery provides at least the information about the battery type, capacity, number of cells, maximum permissible charge current, and the battery temperature.

If you would like to read the full article you can [download](#) it free-of-charge or you [download the entire magazine](#).

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