Four elevators controlled by CANopen Lift

Thor Engineering has supplied the control systems for the elevators in London's Labs house. Two of the four elevators serve ten floors.

The CANopen-based four-elevators group installed in the Labs building uses the Thor-NX-T2 controller. Intelligent Lifts & Escalators was the installing company. Hisselektronik provided the control cabinets. Two out of the four elevators serve ten floors, the other two elevators serve the parking garage floor additionally, resulting in a total of 11 floors. All four lifts are traveling with a maximum velocity of 2 m/s.

The control systems use embedded CANopen networks conforming to the CiA 417 application profile. Unlike CANopen device profiles, CiA 417 describes the complete lift control system, using fixed and pre-defined PDOs and CAN-ID. This minimizes the setup effort. A general approach on how a single-lift's devices are installed is shown in Figure 1.

Usually, the Thor-NX-T2 features two independent CAN interfaces. One is used to connect the devices used for the single lift's general functionality, the second interconnects the lift shafts and other lift group members with each other. The controller is the only device that is connected to both CAN interfaces.

The Labs house project is an example how the different device manufacturers join together, in order to deliver a complete elevator system. All selected devices were compliant with the CiA 417 profile, to ensure a reliable communication and minimize the required work to setup the lift system.

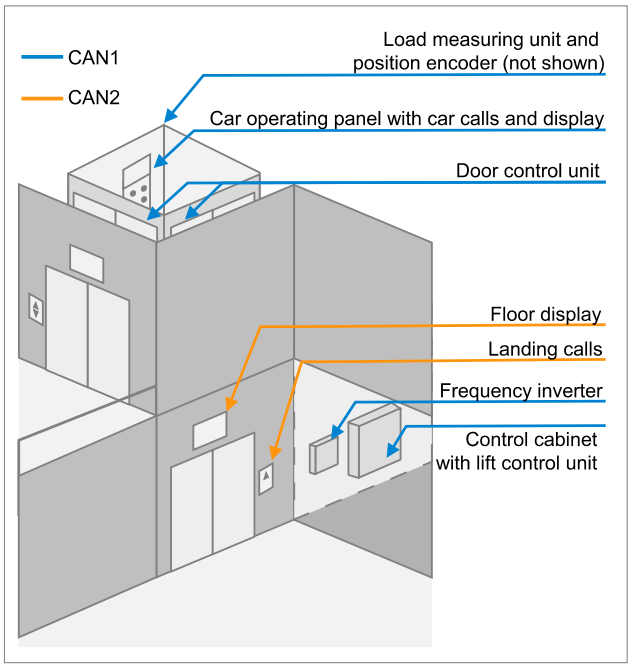

Figure 1: Exemplary usage of CANopen Lift on a single lift controller (Source: Thor Engineering)

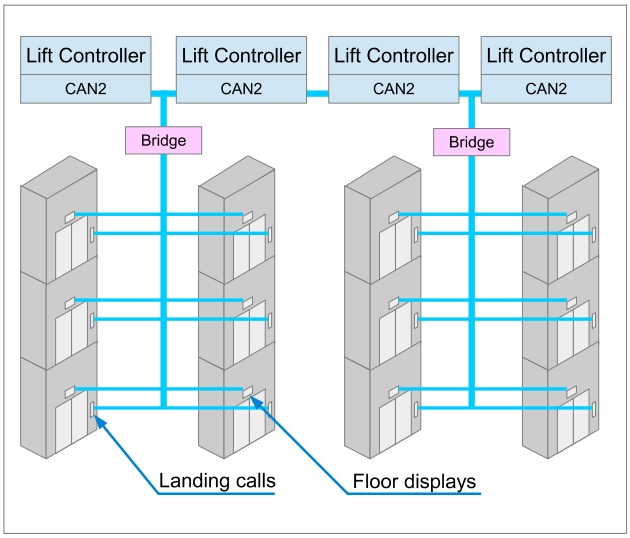

Figure 2: Example of a CANopen Lift system with four elevators (Source: Thor Engineering)

To control the drive and thus the traveling speed, every lift system is equipped with a 4CS drive inverter by Ziehl-Abegg. The Limax sensor by Elgo provides the car position, which is directly connected to an LXC I/O-card by Safeline on top of the cabin. A 10-inch TFT Elfin is used inside the car as display unit. The car-call and the door-control buttons are connected to the IO8-boards by Safeline. The MiDrive door drive unit by Meiller opens and closes the car doors. All these mentioned devices communicate via the same CANopen network segment.

The second CANopen network comprises FD4 units by Safeline, which are used to handle the landing calls and to indicate the lift cars floor position on every floor. To be able to serve separate and parallel landing I/O threads over the hoistway distance, the CSI-01 units by Böhnke + Partner are used as CANopen PDO bridges.

The Labs project demonstrates the capabilities and advantages of using CANopen Lift compatible devices. It is possible to connect devices from a variety of different manufacturers without complicated setup of PDOs and CAN-ID configuration. Each device collects and processes lift data using its manufacturer-specific ▷

implementation, while maintaining compatibility in communication. Doing so, the companies can compete in functionality, but keep the CANopen lift system an off-the-shelf plug-n-play system. Devices can be exchanged, because they are interoperable. This means there is no dependency on a single supplier. ◀

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Interlift 2019

CAN in Automation (CiA) exhibits as usual at the Interlift tradeshow for elevator suppliers in Augsburg (Germany). From October 15 to 18, the organizer expects more than 21 000 visitors and more than 600 exhibitors. This year, CiA presents in hall 2 (Stand 2149) CANopen Lift devices from several members. Additionally, CiA staff is available to discuss in detail with visitors the features of the CiA 417 CANopen application profile for lift control systems. Beginning of this year, CiA 417 version 2.3 has been released, providing some new features and functional improvements.

The benefit of the CiA 417 profile specification for system designers is that you can scale the functionality to the dedicated lift control application. CANopen Lift is suitable for small elevators as well as for complex lift control systems. The specified functional entities comprise controllers and units. Nowadays, most of the available elevator controller systems provide the call controller, the car controller, and the car door controller in the same device. Of course, they could be implemented in separate devices.

The standardized units include input and output panels, car drives, car position sensors, and car doors. Light barrier and load measuring units are further traditional CiA 417 functional entities. In the last couple of years, units for power-measuring, remote data transmission, remote access, monitoring, and position supervision have been added.

The interoperability of these functional entities is tested by means of so-called plugfests. CiA members implementing the CiA 417 profile in their CANopen Lift devices proof jointly that their products interoperate. CiA organizes regularly plugfests.

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