

Widex sets climate protection standards with CO₂-neutral company headquarters

Embedded PCs form the basis for innovative building automation



The new company headquarters of the Danish hearing aid manufacturer Widex A/S is impressive not only due to its unusual architecture. The innovative concept of an energy supply based on renewable sources is worthy of wide recognition. To this end Widex has installed a geothermal system for heat storage as well as the company's own wind turbine and solar cells on the façade of the building. Intelligent building automation ensures efficient use of the energy. Over 10,000 data points distributed throughout the entire building are controlled by 58 total CX1020 Embedded PCs from Beckhoff.

The Danish company Widex A/S has been developing and producing hearing aids since 1956 and is today one of the world's leading companies in this field. The company and its 600 employees moved into the new company building in Allerød, Denmark near Copenhagen in 2010. For Widex it was crucial that the architectural appearance should reflect the corporate culture and the company's innovative expertise. True to the motto "high-tech for the good of man," Widex wanted to set an example with the concept of a CO₂-neutral building to show that responsibility for the environment lies within the scope of the technically feasible.

Unique combination of green technologies

Various energy-saving and environmentally friendly facilities based on both new and tried-and-tested methods contribute to the uniqueness of the building. The geothermal system, with which the groundwater serves as a heat reservoir, is first of its kind in Denmark. The system uses the groundwater as a heat res-

ervoir, in which surplus heat is stored in summer and withdrawn again in winter when required. The use of geothermal energy reduces CO₂ emissions by 70 %, which corresponds to a load of 700 tons of CO₂ per year, or the emissions of 250 gas-heated detached houses.

Individual control of lighting and air conditioning

The building's various technical installations are controlled by 58 total CX1020 Embedded PCs from Beckhoff. The technical installations in the various floor sections are each controlled by a CX1020, which is connected via Ethernet to 12 decentralized I/O terminal stations. The 600 Bus Terminals distributed throughout the entire building control 10,643 data points.

The scope of control covers the following functions: ventilation and air conditioning, burglar alarm and light control. Temperature, CO₂, light and motion sensors were installed in the rooms. The lighting, with different lighting scenarios, is controlled by the

Consistent implementation of the “Green Building” concept

In order to cover the electricity requirements of the 36,600 m² company building, a 100 m high wind turbine was erected on the company site. The wind turbine produces an annual 3.4 million kWh of electricity and saves nearly 1,900 tons of CO₂ per year, which corresponds to the electricity consumption of 650 detached houses (without heating). The wind turbine supplies more electricity than Widex can use in total. The surplus power is fed into the local grid and thus makes a contribution to an environmentally friendly region. 20,000 solar cells on the south facade of the building produce approximately 34,000 kWh of additional electricity.



Widex Project Manager Allan Ebert Skotte (left), responsible for all technical building installations, and Claus Clausen, Managing Director of Beckhoff Denmark

CX1020 Embedded PCs via a DALI bus system. “A total of 4,000 DALI slaves are distributed throughout the building,” reports Project Manager Allan Ebert Skotte from Widex A/S, who is responsible for the building’s entire technical installation.

Radio technology reduces cabling

The light switches in the building are integrated via EnOcean radio technology. The Beckhoff EnOcean-Bus Terminals convert the received signals and forward them to the Embedded PC. The application of radio switches offers Widex full flexibility in terms of space utilization and reduces the lifecycle costs of the building. Future changes in space utilization do not require time-consuming recabling, only software modifications.

Light control in the space is based on motion sensors that monitor movements during the working day. Light sensors monitor insolation through the windows: if this is bright enough, the lights near the windows are either dimmed or completely switched off.

Automatic activation of the burglar alarm

In the evening, when all employees have left the building, the motion sensors switch over to burglar alarm mode: after the last employee has left a building section, a loudspeaker announcement is made 10 minutes later informing that the alarm will be activated after a further 10 minutes. In addition, the entire electricity supply to the section concerned is switched off after this time has elapsed. Only the power supply to refrigerators and the like is maintained, so that the energy consumption of the building is limited to a minimum during the night.

All rooms have their own ventilation

For comfortable ventilation, the exchange and circulation of air in each room is controlled individually and, if necessary, via a CO₂ sensor connected to the CX1020. There are no supply air anemostats in the rooms as is otherwise usual; instead, the air is fed outside via a ceiling grille and is cooled or heated by a separate ventilation device. This ventilation unit, also referred to as fancoil, is installed in the suspended ceiling. The air is also exhausted again through it and is slowly distributed throughout the room so that draughts are minimized.

Scada system allows clear operation and monitoring

All building functions as well as the wind turbine, the photovoltaic system, the compressed air compressors, the geothermal heating and cooling system and the HVAC system (Beckhoff PCs) can be controlled and monitored by the works personnel with the aid of a Scada system. The time clocks for recording working hours are also connected to it. “This way it is possible to see which employees are in the building at any time,” concludes Allan Ebert Skotte.