KNX Award 2008
Category: National
Winner: Kuhlmann Elektrochnik (Germany)

The Sauerland Pyramids amaze and astound – KNX flexibly satisfies all requirements for comfort and energy efficiency

The Sauerland Pyramids combine unusual design with a wide range of possible applications and a unique atmosphere. Kuhlmann Elektrotechnik met the owner's requirements for a high level of integration and sustainability by designing a flexible, fully-integrated, energy-efficient KNX system, for which it won the KNX Award 2008, category: National (Germany).

The project, in Lennestadt-Meggen, Germany, consists of three pyramids of different sizes, with a total useful area of 1,844 m2. They are used for a diverse variety of activities: administration, production, storage, classrooms for alternative practicioners, events, exhibitions, and therapy applications. The focus during the development of the project was on sustainability, creating a sense of well-being, and ensuring flexibility and ease of operation. A heat pump, which is used for both heating and cooling, maintains a comfortable temperature in the buildings. Particularly impressively, all of the thermal energy for the buildings is drawn from geothermy. A pleasant indoor climate is created by ventilation systems with heat recovery. During the project, Kuhlmann Elektrotechnik cooperated with the other trades to implement an astonishing array of different features.

The 3 pyramids

The first building – the main pyramid – is a striking pyramidal building serving a variety of purposes. It covers an area of 400 m². This pyramid houses the management, production department and warehouse of the company Rayonex Schwingungstechnik GmbH. The building has 4 floors which can be reached via a lift. Automatic doors are installed. All of the windows are fitted with electronic shading and electric opening systems. Installation of the entire IT and telephone systems was methodically defined, structured and implemented. Shielded cables are used in the building in order to minimise electrical fields. There is also an alarm system with access control which, when disarmed, triggers the time-regulated opening of the windows in order to ventilate the rooms, and a video surveillance system.

The second building in the project is the "event pyramid", which covers an area of 160 m². It houses the training rooms of a well-known traditional practitioners' school. The interior of this pyramid can be quickly rearranged to accommodate various exhibitions and events, which attract large numbers of visitors from all over Germany. The basic lighting in this building is mainly indirect. Highlights are created by low-voltage spots, which are activated via KNX output modules. A variety of video projection and large-scale projection technologies are used. The building also has automatic doors, an alarm system and access control. Network cameras are integrated into the structured cabling. In this building too, the use of shielded cables serves to minimise electrical fields.

KNX Association cvba • Bessenveldstraat 5 • B-1831 • Brussels-Diegem • Belgium
Tel.: +32 (0) 2 775 85 90 • Fax: +32 (0) 2 675 50 28
VAT: BE 0441 460 064
info@knx.org • www.knx.org

The third pyramid – the therapy centre – has two floors and also covers an area of 160 m². On both floors are comfortably-equipped therapy areas, where bioresonance units can be used. There are 10 therapy stations in total. A personal paging system has also been installed via KNX, to allow clients to contact therapists directly from their therapy stations. There is a public address system in all of the rooms, via which relaxing, meditative music can be played during therapy. This is installed in all rooms but can be individually activated or deactivated as required. This, together with high-quality interior architecture and a harmonious interior design, makes every room of the pyramid into a small but perfectly-formed uplifting oasis of calm. In this pyramid, too, the power cables are fully shielded.

Energy-efficient comfort

There are no switches installed in any of the buildings. All light fixtures are switched on and off via the alarm system's motion sensors. Thanks to the connection to each PC, employees can switch their lighting to "permanently ON" or "permanently OFF" from their workstations. This function is centrally deactivated in the evening. The entire lighting system is automatically switched on or off or blocked depending on the outdoor light level. The lighting controller can be switched on or off and controlled via the local network or via the Internet, for example if the video surveillance reveals to an employee at home that a light has been left on.

All windows can be operated both locally and centrally. They are fitted with electrical shading devices, which are operated entirely via KNX modules. A number of automatic functions have also been set up, for example closing and locking of the windows in case of rain. The information required for this is provided by a central weather station. Ventilation in the morning is also automatic. For example, when the alarm system is disarmed for the start of production at 5.45 a.m., the windows can be set to open for 10 minutes.

For each room there is an individual room controller for the heating and cooling system, in some cases with an LCD display and local operation. All target values can be defined from any PC in the network, with the help of visualisation. The temperature curve and switching-on times are visualised in diagrams and in a database. The alarm system's window contacts automatically switch the heating to frost protection mode if required. The heat pump automatically switches to cooling mode depending on the outdoor and indoor temperatures.

Integrated monitoring and alarm systems

The ABB L208 alarm system has a KNX interface. All of the system's modes and functions can be viewed and modified via the central display or via the KNX visualisation, on a touch screen. All actions are logged and displayed. Specific actions can be set to take place when the alarm system is armed: for example, the lighting can be set to revert to motion sensor mode; the heating to standby; the ventilation to level 1; the shading devices can be opened and all of the windows closed.

The access control system from the company Winkhaus functions self-sufficiently. The alarm system is armed with the help of an access transponder and code, via KNX. Important doors are fitted with electrical lock cylinders. The entire building is

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equipped with fire detectors. When triggered, these also activate various functions via KNX, for example notifying the fire brigade, security service and management, and switching on all lights. The system also includes 16 cameras. In the case of an attempted break-in, for example, the digital image data received from these can be digitally assessed. Outdoors there is a webcam controlled via KNX which can swivel, tilt and zoom.

Decentralised KNX technology, an IP network and central intelligence – the ideal combination

In order to meet the owner's requirements – namely that the building should be sustainable and healthy, should offer rational operation and be adaptable to individual needs, as well as being flexible and catering to a very wide range of possible applications – all trades were fully integrated into the overall building system. The entire building services engineering is networked via KNX in combination with an IP network (for multimedia applications) and a central server, which allows the KNX data to be accessed via the Internet. Thanks to the Web-based visualisation, all functions can be operated and monitored via a central touch panel, via any PC in the building, or via any other computer with an Internet connection. Weather data for e.g. wind, precipitation and light are collected and used to determine the settings for the shading devices, the windows and the lighting system. In this way this building automation system offers an exemplary combination of energy efficiency, comfort, safety, security and rational management.

Parties involved:

Owner: Wolfgang Schmidt e.K., D-57368 Lennestadt, Germany
Architect: Architekturbüro Margrit Sczuka & Harry Lechler Gbr, D-99438 Bad Berka, Germany
Installer of heating, ventilation, air conditioning and sanitary systems: Hartmut Börger Heating and Sanitary, D-57368 Lennestadt, Germany
Electrical design and system integrator: Kuhlmann Elektrotechnik, D-57368 Lennestadt, Germany

Info:

Kuhlmann Elektrotechnik, D-57368 Lennestadt, Germany, www.kuhlmann-elektrotechnik.de

Box 1

Use of KNX in this project

- Optimised energy consumption thanks to networking of all trades via KNX
- Increased comfort thanks to e.g. optimum temperature and air quality, automatic switching-on of lighting, individual adjustment from workstation PC
- Less working time wasted thanks to automation and communications
- Networked security and automation: motion sensors activate lighting and detect unauthorised persons

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Box 2

Technical highlights of this project

- Room temperature can be set as required from any PC, as the KNX system is linked to a Web-based server.
- No light switches: lights are switched on and off by the alarm system motion sensors; this function can be overridden from any PC.
- Various functions can be set to become active when the alarm system is armed: for example, the lighting might be set to motion sensor mode; the heating to standby; the ventilation to level 1; the shading devices opened and all windows closed.

Photos:

Figure 1. The Sauerland Pyramids at dusk. Source: Kuhlmann

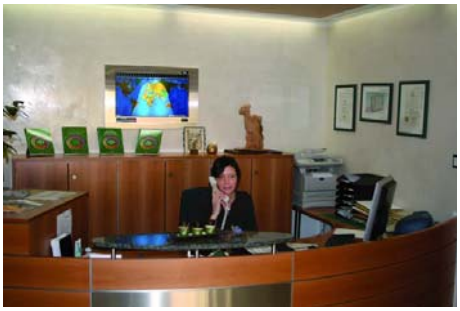

Figure 2. Reception with the central touch panel providing access to all systems. Source: Kuhlmann

Figure 3. All windows have electric shading devices, electric openers and window contacts, thus they are fully integrated into the network. Source: Kuhlmann

Figure 4. The entrance to the third pyramid – the therapy centre. Source: Kuhlmann

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Figure 5. Lighting, shading, window ventilation and heating can all be operated from any workplace PC. Source: Kuhlmann

Figure 6. The operating interface for room automation communicates with the KNX system via Web technology. Source: Kuhlmann

KNX Association is the creator and owner of the **KNX** technology – the worldwide STANDARD for all applications in home and building control, ranging from lighting and shutter control to various security systems, heating, ventilation, air conditioning, monitoring, alarming, water control, energy management, metering as well as household appliances, audio and lots more. **KNX** is the worldwide STANDARD for home and building control with a single, manufacturer independent design and commissioning tool (ETS), with a complete set of supported communication media (TP, PL, RF and IP) as well as a complete set of supported configuration modes (system and easy modes). **KNX** is approved as a European (CENELEC EN 50090 and CEN EN 13321-1) and an International standard (ISO/IEC 14543-3). This standard is based upon more than 15 years of experience in the market including its predecessors, EIB, EHS and BatiBUS. Over 140 member companies worldwide from different application domains have almost 7000 **KNX** certified product groups in their catalogues. The **KNX** Association has partnership agreements with more than 30,000 installer companies in 80 countries.

www.knx.org

For more information / material please contact:
heinz.lux@knx.org

Pictures can be downloaded at:
http://www.knx.org/knx/knx-projects/knx-award-projects/

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