



Lighting perfectly balanced High quality presence detector with constant light control



Presence detectors are just a matter of course in buildings for years as light switches. The quality differences are however, tremendous. For the new construction of a representative and highly-functional building in Lüdenscheid, Germany, detectors were required that did not only offer versatile functions and a high degree of measuring accuracy, but also have an appealing exterior.

DIAL (Deutsches Institut Für Angewandte Lichttechnik GmbH) based in Lüdenscheid, Germany, was founded in 1989 and is a service centre for building technology and light. Its function is as a manufacturer-neutral mediator for innovation and knowledge, planner, service provider and software house. Their offers include seminars, planning/consultation, light measurements on lamps and lights as well as examinations and tests pertaining to EIB/KNX, DALI and BACnet in accredited laboratories. In 2012, DIAL in Lüdenscheid had erected a distinctive new constructions that had set benchmarks by the integral planning of the technical building equipment, the building system design.

Target

- Close interaction of light planning, architecture and light design
- Different lighting levels selectable
- Individual dimming
- Simulating a sunny day
- Control of heating and ventilation
- Detect reliably despite the relatively low height of the entire room
- Detectors must be integrated into the suspended lighting
- Simple design

Solution

- Control using the PlanoCentro KNX presence detector
- Fully or semi-automatic function
- Square detection area (10 m x 10 m at an installation height of 3.5 m)
- Constant light control
- Short presence with reduced run-on time
- HVAC channel with switch-on delay
- Networking via KNX (EIB), remote configuration via ETS
- Award-winning design



Light and transparent: the new construction from DIAL in Lüdenscheid, Germany

Due to the technical and design competence of DIAL, it was clear the planning for the building, building technology and lighting would be taken over under their own direction. Particular emphasis was placed on a close interaction of light planning, architecture and light design. DIAL was the leading hand for the construction until it was completed. About 2,000 m² useful area for office and conference rooms, laboratories as well as foyer, atrium, bistro and catering zone were created over three floors. The building has almost achieved the passive house standard so that it can do without conventional heaters as it only uses heat pumps. It goes without saying that DIAL wanted more than a faceless functional building. Moreover, one strived for a „good building“ as formulated by the deputy managing director, Dipl.-Ing. Dipl.-Wirt.-Ing. Andreas Bossow (graduate engineer/master of business and engineering). „A good building comprises a well considered interaction of architecture, technology, efficiency and individuality“, was his motto.

Summer days, even in November

Needless to say that DIAL had also placed respectively high demands on the lighting. But what does that mean specifically? Are the standards and guidelines for workplace lighting insufficient? A remark from Andreas Bossow: „Light is a source of nourishment for us. According to opinions from a growing number of experts, with regard to health aspects, 500 lux is not enough for office activities.“ He was addressing a long-familiar problem with this. Employees were constantly complaining about poor lighting - usually without success. Complaints were rejected by using a luxmeter on the work surface and by referring to the fulfillment of the standards. Andreas Bossow is a different opinion: „We do not want to fulfil

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Andreas Bossow
deputy managing director DIAL GmbH

any minimum standards, we want to do something good“, which is a clear statement of the DIAL philosophy, „In our opinion, even under the aspect of energy efficiency it is better to use more electric energy to maintain the health and performance of the people.“ This is why up to 2,000 Lux flood the offices in Lüdenscheid, but not permanently. Moreover, the lighting follows the course of a sunny day. An indirect lighting using dimmable highly-efficient fluorescent tubes ensure for the blue sky, LED spotlights simulate the sun rays and thus dab warm accents in the more or less cold atmosphere.

Smartphone instead of light switch

Naturally, the employees must be able to influence the lighting. The use of dimmers or even switches can however, no longer exhaust the offer of light scenarios in a reasonable manner. As a consequence, these have been left out. The operation is mainly carried out per application on a computer or smartphone. The employees can choose between three different lighting levels that are run automatically throughout the day. As an option, they can also dim individually. Next to the control of the light quality, the application also offers

access to the ventilation and temperature. As the smartphones are used as telecommunication devices and for access checks, DIAL could do without a conventional telecommunication system completely.

Test bench for presence detector

Despite the sophisticated software, a high degree of energy efficiency and comfort cannot be achieved by a computer and smartphone alone. Which employees think about reducing the heating and lighting when they leave the room and who wants to call up an application in the dark to turn on the light? That is provided by presence detectors that, in the case of DIAL, naturally also have to fulfil the demanding specifications for technology and aesthetic according to the building system design. In this way, there are not suspended ceilings in the offices, only a reduced ceiling installation is intended for the lighting and fire alarm systems. The reason for this is in the thermal requirements of a passive house: the painted raw concrete ceilings are included in the climate concept. Being so-called passive concrete core activation, they are a climate buffer for heat and cold.

In order to keep the ceiling as free as possible, the detectors must be integrated into the suspended lighting that the Danish manufacturer Rigens has designed exclusively for DIAL. For this reason, the detectors should be adapted to the design of the light that has been kept very simple on purpose. At the same time, they should detect reliably despite the relatively low height of the entire room. In order to ensure for this, a reference room has been created according to the plans, and equipped with detectors from different manufacturers. This allowed the respective detector sensitivity to be tested under similar conditions.



The PlanoCentro presence detector is inconspicuously integrated into the housing for the indirect main lighting. An additional LED spotlight sets the accents.

Andreas Bossow: „We wanted devices with a high detection quality and wide detection area. The PlanoCentro from Theben was one of the best. The final push was thanks to the design. At this time, it was the only one available with the required detection area in combination with a completely flat and level design. That was important to us for design reasons.“ The manufacturer Rigenz was provided with a special version without frame as a sample detector that they could use to adapt the cut-out in the housing flush to the surface. Thanks to a lens curved inwards, the housing of the detector is so low that it does not protrude out of the light. For this concept that could be integrated harmonically into ever architecture, PlanoCentro was presented the “iF Award 2010”.

Multi-functional detector

The PlanoCentro detectors installed in the 30 offices must take over many tasks. Initially there is the constant light control according to the three different daylight flows low, medium and high. In doing so, the nominal value is moved permanently in order to simulate a wonderful sunny day. The detector controls a mixed light measurement to allow it to compensate the daylight in the room. This reduces the artificial light share that, on the other hand, has a positive effect on the lighting costs and the CO₂ effect. When the employee leaves the room, the lighting and ventilation are switched off. And this is why the detector must operate accurately. Here the PlanoCentro scores with a quadratic detection area. On the one hand it also detects the corners of the room and on the other hand, prevents faulty switching as it does „look into the corridor“ through the open door as with a detector with round detection area. The detection area depends on the installation height. With a 2.5 m detection area, it is 6 m x 6 m for persons sitting, or 8 m x 8 m for people walking. It is suitable for all conventional illuminants, such as fluorescent lamps, compact fluorescent lamps, halogen / incandescent lamps as well as



The PlanoCentro presence detector is one of the flattest cubic detectors on the market. It has been presented with the iF Award 2010 for its design.

LEDs. In doing so, the brightness can control over a range of 5-2,000 Lux.

The detector as networking device

For the integration into the building services engineering, the PlanoCentro is equipped with a KNX interface. This was also a decisive advantage for the DIAL project, as Andreas Bossow explained: „With regard to inter-interoparability, KNX is one of the best bus systems for building services engineering. Moreover, there are also many KNX compatible components on the market. In our new construction, in addition to using this bus in the presence detectors, we are also using it for recording the temperature in the ventilation ducts and for controlling via the visualisation application.“ A total of five systems are used in the DIAL building: next to the mentioned KNX, these are DALI for dimming the highly efficient fluorescent tubes, the MP bus for volume flow control in the ventilation system, LON for the ventilation system and SMI for the swit-

ching. The latter permits a highly precise positioning of the blinds. In summer, the so-called Cut-Off-Position can be reduced with this despite the maximum outdoor brightness access of the heat load. However, Andreas Bossow places great emphasis that the new construction is not operated as an exhibition: „We have represented the teaching of the Building System Design - the requirement-orientated approach: what does the user need and how can this be solved most economically“, which is his conclusion to the cleverly designed concept, and he adds „More and more functions are being mentioned in conjunction with building services engineering. These are necessary, but the aesthetic is also important. This will be considered even more in modern building engineering. The PlanoCentro with its flat design is a very good example for this. It was particularly well integrated into the cubic design of our new construction.“

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