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MAINTENANCE - FREE WIRELESS SWITCHES & SENSORS

2014

ISSUE

1

INTELLIGENT NETWORK

CROSSING STANDARDS

More intelligence in building automation

WAGO

New lighting standard at BMW

SAUTER

Integrated room automation in the new
Palace of Justice in Amsterdam

SCHNEIDER ELECTRIC

SmartStruxure Lite and EnOcean

Frankfurt/Main, March 30–April 4, 2014
light+building
EnOcean Alliance exhibits: Hall 9.0, B40

light+building
30.3.-4.4.2014, Frankfurt
Hall 9.0 / Stand D50

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ROOM OPERATION



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WIRELESS



TEMPERATURE



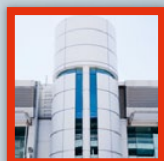
HUMIDITY



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EFFICIENCY and DESIGN

FOR MODERN BUILDINGS



Thermokon Sensortechnik GmbH
Platanenweg 1
35756 Mittenaar, Germany

Tel. +49 (0) 2778 / 6960-0
Fax +49 (0) 2778 / 6960-400
email@thermokon.de


enocean alliance
No Wires. No Batteries. No Limits.



Dear Reader,

The past year ended with great news: the EnOcean Alliance has grown to over 350 members worldwide. We are very happy and proud to welcome industry leaders such as ABB, LIXIL, Schneider Electric, Toshiba and WattStopper. Together with member companies of almost any business size, they build a very strong ecosystem that now offers a huge range of more than 1200 interoperable products based on the EnOcean standard. Within a few years only, it has become one of the largest Alliances in the building sector – a unique success in the industry.

Bringing together global giants of the building industry with mid-sized players as well as small startups, the Alliance combines deep know-how of several hundred thousand building and system integration projects with innovation strength and the courage to pursue new ideas. This joint platform of experience enables the Alliance to continue in setting high-quality standards for sustainable buildings.

In parallel, the Alliance's Technical Working Group works on continuous technical progress by enhancing the comprehensive product certification process and by developing remote commissioning tools for a simplified system set-up.

Companies around the world recognize the unique advantage of energy harvesting wireless sensing solutions, liberating connected devices from the limitations of batteries and cables. The technology achieves amazing growth on international markets, in the US as well as in Asia. This goes along with the public perceiving the substantial effect of building automation on energy efficiency – mirrored, for example, by the United States being the leader in LEED certification and by governmental energy saving regulations such as EnEV 2014.

The beginning of 2014 already showed that the success of the EnOcean Alliance continues: at 20 booths at AHR Expo, visitors could experience the EnOcean standard as a vital part of intelligent and energy-efficient automation solutions.

We will see this again at the Alliance's upcoming big trade shows: Light+Building 2014 in Frankfurt/Main, Lightfair 2014 in Las Vegas and Guangzhou Electrical Building Technology 2014. I hope we'll meet up there or at one of the EnOcean Alliance roadshow events in 2014 around the world.

Yours,

Laurent Giai-Miniet
CEO of EnOcean

CROSSING
STANDARDSMore intelligence in
building automation

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SAUTER

Integrated room automation
in the new Palace of Justice
in Amsterdam

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MASTHEAD

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EnOcean GmbH, Kolpingring 18a,
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Tel: +49.89.67 34 689-0, Fax: +49.89.67 34 689-50,
perpetuum@enocean.com, www.enocean.com

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New lighting standard replaces old standard lighting

WAGO

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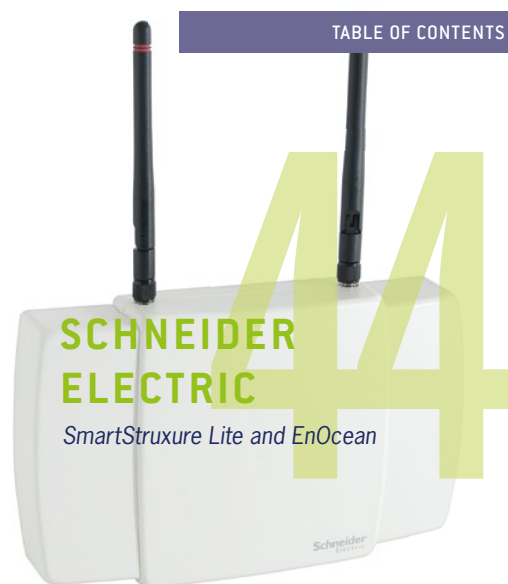


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ELECTRIC**

SmartStruxure Lite and EnOcean

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ENOCEAN – IT'S MAGIC

This is Jack. His hobbies are sleeping, watching TV and lazing about.

And this is Dolphin, Jack's magic friend who helps him with ...

...his magic power when Jack is in trouble.

Jack! You have left the window open again without turning down the heat! Look at our energy bill!!!

Next time, I'll forbid you to watch TV!!

BAMM!!!

Bummer. What am I going to do now ...?

I have got an idea!

Here and here. A window contact and a heating valve!

And what am I going to do with it?

The window contact determines whether a window was opened and wirelessly sends this information to a central control that tells the heater to automatically turn down.

Wow ... That's magic!

No, not magic, but energy harvesting.

A tiny solar-cell uses light as an energy source to wirelessly send information.

Or another energy converter gains energy when you press a button.

Temperature differences are a third energy source, e.g. at the heating.

So it means, you don't need batteries or cables anymore!

Exactly. Isn't this easy to use? You find those little batteryless assistants in office buildings, in schools or individual homes, for example. But there are also energy harvesting wireless devices that control transport containers, servers or forests. These sensors trigger an alarm if something is wrong.

Jack! You have left the window open again! And what about the heating system?

Well, now it all works automatically.

Oh!

www.enocean.com



ENOCEAN ALLIANCE ON THE GROWTH PATH

By Graham Martin, Chairman, EnOcean Alliance

In spring 2008, leading companies across the globe formed the EnOcean Alliance to establish innovative automation solutions for sustainable buildings. From the very beginning, the organization's main target has been to develop interoperable systems for an optimized intelligent control that provides a balance of security, comfort and energy savings based on energy harvesting wireless solutions.

EnOcean-based sensors work without cables and batteries, bringing the sustainable and maintenance-free aspect to each single sensor. Companies around the world recognize the benefits of the batteryless, maintenance-free technology and, at the same time, they get offered a partnership platform and established knowledge-base in the EnOcean ecosystem.

This has resulted in a constant growth of the EnOcean Alliance in recent years. Today, the organization counts over 350 members who offer more than 1200 interoperable EnOcean-based products and systems. Among the new members, there are several industry leaders, including ABB, LIXIL, Schneider Electric and WattStopper. This growing interest of world leading companies shows the strong traction, that energy harvesting wireless standard is gaining worldwide for building automation and smart home systems as well as for consumer appliances.

There are many areas where batteryless wireless components can solve problems while cable- or battery-powered devices reach their limits. Fields of application

can be found in areas where data needs to be collected in places that are difficult to access, or applications with stringent reliability requirements, such as sensor alarm systems.

Another aspect of the Alliance's attractiveness is that members can access new business areas with energy harvesting wireless technology. Furthermore, they can work together proactively within the Alliance Technical Working Group to implement interoperable products based on standardized application specifications, and to benefit from the international networking and Alliance marketing activities – such as joint trade shows, road shows, public relations support, advertising and lobbying.

The Alliance offers three membership classes: Promoters, Participants and Associate Members. The following nine companies are Promoters of the EnOcean Alliance: BSC Computer, EnOcean, MK Electric by Honeywell, Jäger Direkt, Pressac, ROHM, Texas Instruments, Thermokon and Verve Living Systems.

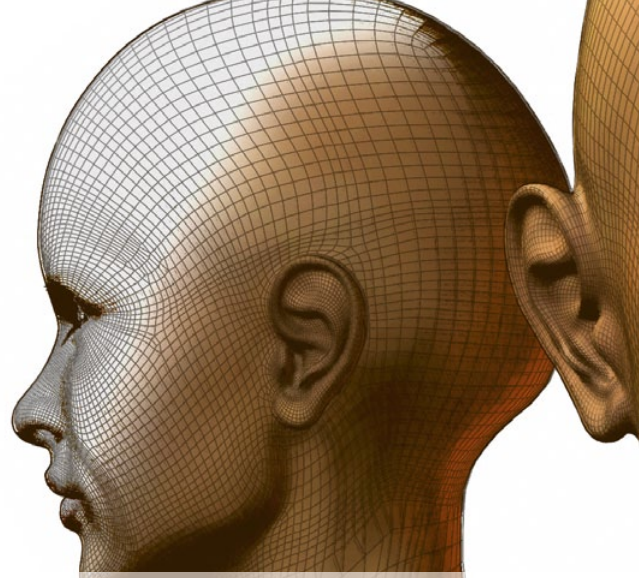
We invite you to join us as a member of the Alliance and to benefit from this fast growing innovative ecosystem and the ever increasing success of the technology:

www.enocean-alliance.org/jp/joinus



enocean alliance
No Wires. No Batteries. No Limits.

MORE INTELLIGENCE THROUGH CROSS-VENDOR STANDARDIZATION



Building automation must meet increasingly stricter demands as more and more disciplines need to be integrated into intelligent control systems. All the necessary technologies already exist. The real challenge today is to combine the partial solutions of different manufacturers and various communication standards. An open network based on standards paves the way for “artificial intelligence.”

By Andreas Schneider, Chief Marketing Officer, EnOcean GmbH

The idea behind building automation is to automate the control of different technical processes, creating solutions that switch the lights on and off energy-efficiently, activate shading according to the weather conditions and adjust the heating, ventilation and air conditioning to the room temperature or occupancy. The individual disciplines have long been viewed as separate areas, with optimized, isolated solutions developed for each one. The goal today, however, is to break down these boundaries and combine the different aspects into one, intelligent overall system. This type of networking is necessary for developers in order to take full advantage of the opportunities for increasing comfort, security and energy efficiency. The goal for automation is to form an integrated system and not just be a sum of different applications.

THE STUMBLING BLOCK FOR BUILDING AUTOMATION

When a system needs to integrate hundreds of sensors and communicating devices into a comprehensive network, a number of specific building automation standards come into play. At the same time, networking should be as easy as possible. However, many solutions today take a proprietary approach aimed at their specialized areas and are difficult to combine with the products of other manufacturers. This limits the selection for building owners and system planners alike and often makes for extremely complex operation, creating a real stumbling block for building automation.

INTERFACES INSTEAD OF ISOLATED SOLUTIONS

The solution lies in open interfaces and specifications with few obstacles to integration. However, this means that existing systems must become more open. Energy harvesting wireless technology shows how this can work. Wireless technology without batteries has been defined as the open, international standard ISO/IEC 14543-3-10 since early 2012, one that is designed for very low energy consumption and energy harvesting. It covers the standardized physical, data link and networking protocol layers. The application layer defines the standard application profiles (EnOcean Equipment Profiles – EEPs) of the EnOcean Alliance. This foundation ensures that the energy harvesting wireless products of different manufacturers can communicate with each other in a single system. The EnOcean Alliance has further developed this interoperability with Generic Profiles, the first generic language for energy harvesting wireless solutions.

OPEN NETWORKING

Self-powered wireless technology is a particularly good choice for transmitting states and measured values from wireless switches, sensors and actuators. However, additional networking is based on standards such as KNX, LON, BACnet and WLAN and not on the energy harvesting wireless technology. Open interfaces that allow gateway and software providers to combine

EnOcean Link middleware interprets all wireless telegrams received via gateways and immediately provides the data for the building automation system.

their standards have been defined to make these different systems work together. In this case, the standardized definitions form a basis for middleware, similar to EnOcean Link, which automatically interprets the values in energy harvesting wireless telegrams and makes them available to applications that further process them.

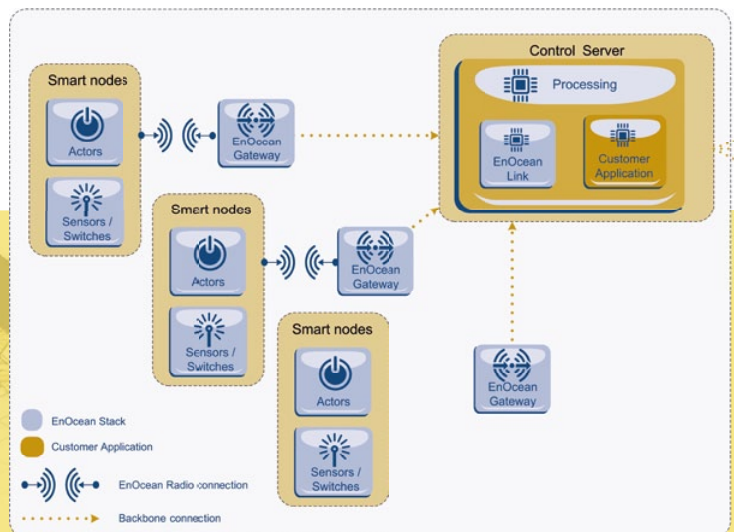
DYNAMIC ADAPTATION

This open network also paves the way for “artificial intelligence” in building automation. Integrating the different technologies more closely means that a system can also access sensor data more directly, regardless of the situation, as well as run calculations on this basis and control actuators intelligently. The networks of sensors, actuators and processors needed to do this can be created and modified dynamically as needed. The data can be stored and processed locally or in a cloud-based infrastructure, so that once it has been collected the data can be used for different applications.

SITUATION-DEPENDENT CONTROL

As a self-learning system, the automation technology can adapt to the behavior of a building’s users or employees while also taking into account external influences and the latest situations. The first solutions incor-

porate not only weather data and a room’s frequent use into the heating control system, for example, but also the number of people. In the future, they will also interpret statements such as “it’s too hot in here.” Intelligent LED luminaires communicate with each other to optimize office lighting depending on the situation. At the same time, the communicating luminaires, which form part of the wireless building automation system, can be integrated into different energy efficiency measures. For example solar-powered light sensors can let the



luminaires know when the sunlight is bright enough to eliminate the need for artificial lighting in the rooms.

AUTOMATION IN BALANCE

Integrating the individual aspects of building automation into an intelligent system establishes a situation-dependent balance between user comfort and energy savings, for instance. Organizations such as the EnOcean Alliance are building platforms that enable manufacturers to combine solutions that are based on different standards. This approach benefits building owners and system planners alike, who are no longer tied to a particular system when choosing the building automation technology but can integrate different disciplines both flexibly and cost-effectively. The search for a single standard therefore really means finding suitable interfaces between the existing technologies.

www.enocean.com





AN ENOCEAN MODULE EMERGES

For the production of its modules, EnOcean works together with one of the biggest service providers for electronic manufacturing (EMS) in Germany: Katek GmbH in Grassau, a Kathrein Group company. The EMS specialist produces the whole EnOcean module product range in its Hungarian plant. In doing so, Katek fulfills the highest quality standards for the emands, from the first component to logistics.

By Andreas Kreckl, Director of Application Engineering, EnOcean GmbH

Even for high heels, strips for protection against electrostatic discharges exist. These strips are compulsory for anyone who wants to enter the long production halls of Katek Hungary kft in Győr, Hungary, a subsidiary of Katek GmbH. There, highly delicate electronic components are created in three modern SMT lines (Surface Mounted Technology). “A fourth line is already being planned,” says Christian Fuchsberger, CEO of Katek Hungary kft and of Katek Austria GmbH. “The assembly is specialized in small and medium quantities with high complexity and variant diversity.” A perfect fit for EnOcean, the biggest customer on this site. Every month, 75 different module variants leave these halls.

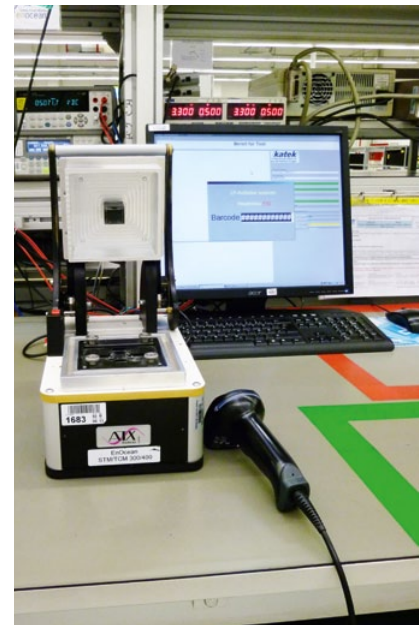
INDIVIDUAL PART IDENTITY

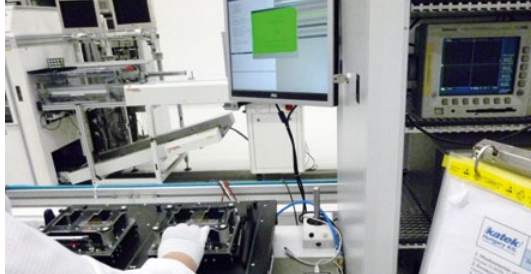
The production process at Katek is focused on high quality standards, complete backwards traceability and continuous monitoring from beginning to end. Experience in over 30 years of production for automotive, satellite, television and medical technology certainly helps. The complete logistics are based on one central ERP system. Every component, which has passed incoming goods control, has its basic information recorded on a bar- or QR-code and stored. If parts go into production, warehouse staff can find the exact location via scan through the ERP data. Due to the gapless documentation, it becomes immediately evident which components are older and need to be used first. That way, Katek auto-

matically complies with maximum storage times for electronic parts.

ON ONE LINE

The production line in Győr covers SMT as well as THT (Through Hole Technology) lines. The EnOcean modules are produced in the SMT line. In a first step, the paste print takes place, during which soldering paste is spread on the PC boards in a μm range. Afterwards, the AOI (Automatic Optical Inspection) checks if the paste has been spread regularly and cleanly on the surface. Only then does the automatic mounting of the circuit board take place. The machine takes the individual parts from a role, which looks like a film reel, in seconds, and places them on the right location on the board. “This production step is highly sensitive. All the components lie loosely on the board, and every touch or vibration would change the optimum position,” Fuchsberger explains. Then it gets hot: in the reflow oven, the parts are soldered at a temperature of





up to 240 °C. Afterwards, another AOI checks if all parts are at the right place.

THE GOODS GO INTO THE POT

If the module passes the AOI's "critical look," a comprehensive test phase commences. "No module leaves production before a member of staff has tested it. We believe in two established test methods for electronic components," says Fuchsberger. At first, the in-circuit test tries to find possible defect components or mounting/soldering mistakes via electric procedures. Afterwards, the performance test detects if all switching components work correctly. Tiny needles push each contact, so that connected measuring instruments can show if the function values are within acceptable limits. The test equipment used was developed by Katek's engineering department with one of EnOcean's predefined individual test concepts. That way, they are tailored for the specific functions and requirements of the different EnOcean wireless modules.

Directly after testing procedures, the modules, depending on type, receive their antennae or energy storage device. Furthermore, the mechanical energy converter ECO 200 complete with bottom plate, circuit board and cover is mounted in the switch module PTM 210 housing.

GAPLESS TRACEABILITY

In this production phase too, Katek employees record all data and every step in the ERP system with help from the so-called Data Matrix Codes. In addition to product identification, these contain the individual serial number and the hardware/software code. The system links this data with the information which parts came from which role, and the different test results. That way, the finished module's complete life cycle is stored in the database and allows for gapless traceability for every single



component as well as all production and testing steps. The shipping scan at the end checks if the module has passed through all steps successfully. Only then does it go to packaging and is delivered by the logistic experts in Grassau worldwide.

"Thanks to short paths, clear labeling, and good organization, our production is able to fulfill very specific client demands. This applies not only to our SMT line, on which EnOcean modules are created, but also to our THT processes for other circuit boards. Here, the production process adjusts to the product, not the other way around. This flexibility combined with high quality management marks the production at Katek," Fuchsberger explains – with some pride.

www.katek.de



ENOCEAN PRODUCTS



MODULES ARE AVAILABLE FOR 868, 315, 902 AND 928 MHz

Modules with 868 MHz frequency are suitable for Europe and other countries adopting the R&TTE specification.

Modules with 315 MHz frequency are suitable for North America and other countries adopting the FCC specification.

Modules with 902 MHz frequency are suitable for North America adopting the FCC specification.

Modules with 928 MHz frequency are suitable for Japan adopting ARIB specification.



Wireless Standard
ISO/IEC 14543-3-10

ENERGY HARVESTING WIRELESS SENSOR MODULES

868 MHz

315 MHz

902 MHz

928 MHz



PTM 210/PTM 215 (868 MHz)

PTM 200C (315 MHz)

PTM 210U (902 MHz)

PTM 210J (928 MHz)

Ideal for energy harvesting wireless switches. The PTM 215 variant contains also rolling code functionality

868 MHz

315 MHz

902 MHz

928 MHz



ECO 200 & PTM 330/PTM 335 (868 MHz)

ECO 200 & PTM 430J (928 MHz)

The perfect combination for unique switch applications. The PTM 335 variant also contains advanced security functionality

868 MHz

315 MHz

902 MHz

928 MHz



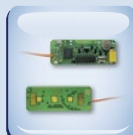
STM 300

STM 400J (928 MHz)

Ideal for bidirectional energy harvesting wireless sensors and innovative actuators

868 MHz

315 MHz



STM 312

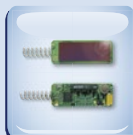
Energy harvesting wireless sensor module – with whip antenna but without solar cell

868 MHz

315 MHz

902 MHz

928 MHz



STM 320/STM 325 (868 MHz)

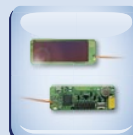
STM 429J (928 MHz)

Energy harvesting magnet contact transmitter module with helical antenna. The STM 325 variant also contains advanced security functionality

868 MHz

315 MHz

902 MHz



STM 330/STM 335 (868 MHz)

STM 310C/STM 330C (315 MHz)

STM 332U (902 MHz)

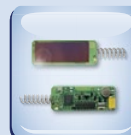
Energy harvesting wireless temperature sensor module with solar cell and whip antenna. The STM 335 variant also contains advanced security functionality

868 MHz

315 MHz

902 MHz

928 MHz



STM 331 (868 MHz)

STM 311C (315 MHz)

STM 333U (902 MHz)

STM 431J (928 MHz)

Energy harvesting wireless temperature sensor module with solar cell and helical antenna

ENERGY CONVERTERS

ECO 200



Mechanical

Harvests linear motion for use in wireless switches

**ECS 300/
ECS 310**



Solar

Harvests indoor light for energy harvesting wireless sensors and actuators

ECT 310



Thermo-electric

Harvests temperature differentials for energy harvesting

WIRELESS TRANSCIVER MODULES

868 MHz

315 MHz

902 MHz

928 MHz



TCM 300

Transceiver module for programmable system components

TCM 310

TCM 410J (928 MHz)

Transceiver module for gateways

868 MHz

315 MHz

902 MHz



TCM 320

Transceiver module for programmable system components

ENOCEAN SOFTWARE

**EnOcean Link**

Linux-based library for EnOcean radio stack (e.g. ESP3, EEP)

**EnOcean Decoding Gateway**

TCM 300-compatible firmware for decoding of EnOcean telegram with rolling code

**DolphinAPI**

For fast and simple development of custom specific applications (in "C")

DEVELOPMENT TOOLS

**DolphinStudio**

For simple configuration and flash programming of Dolphin modules

**DolphinSuite**

(for 928 MHz modules)

For simple configuration and flash programming of Dolphin modules

**DolphinView**

EnOcean DolphinView visualizes wireless communication for starters in EnOcean technology. Variants: DolphinView Basic, DolphinView Advanced

**EnOceanVisualization**

For visualization of wireless communication for switches and temperatur sensors

KITS

868 MHz
315 MHz
902 MHz
928 MHz

**ESK 300/ESK 400J (928 MHz) Starter Kit**

The ideal entry to EnOcean technology

**EOP 350 Programmer Board**

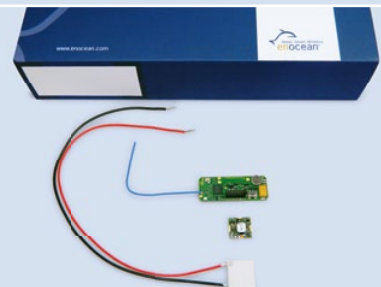
For programming and configuring EnOcean radio modules

868 MHz
315 MHz
902 MHz
928 MHz

**EDK 350/EDK 400J (928 MHz) Developer Kit**

Developer kit for energy harvesting wireless sensor solutions

868 MHz

**EDK 352 Thermo Developer Kit**

Extension of Developer Kit EDK 350 with a thermo harvester for STM 312 sensor module

FINISHED WHITE LABEL PRODUCTS FOR OEM CUSTOMERS

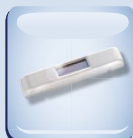
ENERGY HARVESTING WIRELESS SWITCHES AND SENSORS*

868 MHz
Q2/14: 928 MHz

**PTM 250**

Universal switch insert – EnOcean easyfit

868 MHz
Q2/14: 928 MHz

**STM 250**

Window contact

868 MHz
902 MHz

**EDRP/ESRP**

Wireless switch

868 MHz
902 MHz

**EKCS**

Key card switch

902 MHz

**EDWS**

Door and window contact

868 MHz
902 MHz
Q2/14: 928 MHz

**EOSW**

Wall mounted wireless occupancy sensor

868 MHz
902 MHz
Q2/14: 928 MHz

**EOSC**

Ceiling mounted wireless occupancy sensor

TRANSCIVER PRODUCTS

868 MHz

**RCM 250**

Universal single-channel switch actuator – 230 V

868 MHz
315 MHz
902 MHz
928 MHz

**USB 300/USB 400J** (928 MHz)

USB gateway

902 MHz

**EPSM**

Plug-in switch module

902 MHz

**EISM**

In-line switch module

902 MHz

**EHSM**

HVAC setback module

ACCESSORIES

868 MHz
315 MHz

**EPM 300**

Field-intensity meter

*) further frequencies on request

SUPPORT

Further support materials can be found here:

www.enocean.com/support

www.enocean.com/product-finder

CONTACT

Our value-added distributors provide customers with application support and technical expertise.

www.enocean.com/distributor

928 MHZ: ENOCEAN BRINGS BATTERYLESS SOLUTIONS TO THE JAPANESE MARKET

The first frequency for energy harvesting wireless communication that is particularly suited for Japan offers new flexibility for building automation, smart home systems, ambient assisted living and industrial monitoring. OEMs benefit from the full product range in 928 MHz and seamless product integration.

By Marian Hönsch, Product Marketing – Software Architect, EnOcean GmbH, and Kazuyoshi Itagaki, Sales Manager Japan, EnOcean GmbH

The additional frequency is the fourth in EnOcean's portfolio of energy harvesting wireless solutions and contributes to the demands of the Japanese market. 928 MHz is a license-free band and meets regional legal regulation requirements. At the same time, it offers a robust performance, an effective radio range and a strong resistance to interference. With the 928 MHz module series, EnOcean strengthens its international market position and the worldwide use of energy harvesting wireless communication.

The new modules add to EnOcean's existing 868 MHz, 315 MHz and 902 MHz portfolio and exploit the benefits of the next ASIC Chip platform Dolphin V4. The portfolio includes a self-powered wireless switch module (PTM 210J), a transmitter module for unique switch applications (PTM 430J; combined with ECO 200), a solar powered wireless sensor module (STM 400J), a solar-powered magnet contact transmitter module (429J), a solar-powered temperature sensor module (STM 431J) as well as a transceiver module for gateways (TCM 410J) and a USB gateway (USB 400J). The module series is complemented by the EnOcean ESK 400J starter kit, the EDK 400J developer kit and the software DolphinSuite V4 for simple configuration and flash programming of Dolphin V4 modules.

HIGH MARKET DEMAND

In Japan, the market demand for energy harvesting wireless solutions is very high. The flexible, maintenance-free products perfectly meet several require-

ments of the Japanese economic and social development. The fields of application range from energy efficiency measures in buildings and industry to assistance systems for an aging society, more safety and comfort in homes and monitoring of precious resources. In all scenarios, batteryless solutions provide the necessary data and control intelligence.

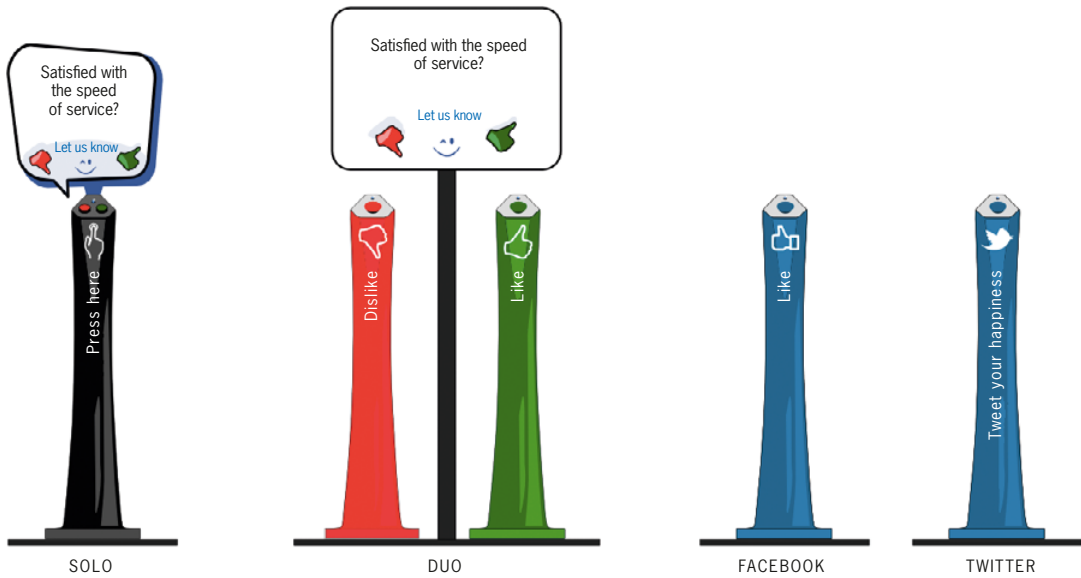
The range of energy harvesting wireless 928 MHz sensors is about 300 meters in an open field and up to 30 meters inside buildings. In addition, the 928 MHz frequency is highly robust against interference from co-located devices. This makes the effective, high-performance wireless platform ideally suited for applications in the building automation sector, for smart home solutions, health care products, as well as consumer appliances or machine-to-machine communication.

WHITE LABEL FINISHED OEM PRODUCTS

In addition to the new modules series, EnOcean also offers a first base line of white label 928 MHz finished products. This supports OEM customers in bringing EnOcean-based product portfolios to the Japanese market quickly and cost-effectively. The white label offering consists of occupancy sensors, a window contact, and light switches based on EnOcean's energy harvesting wireless technology.

www.enocean.com/en/enOcean_modules_928mhz





EVERY OPINION COUNTS

The French start-up Agora Energy, specialized in sensor solutions for smart cities, has developed a special survey station that quickly and easily measures the degree of customer satisfaction: agora opinion®. Part of this is EnOcean's mechanical energy converter ECO 200.

By Samuel Jouzel, Business Developer, Agora Energy

In order to improve a service offer, the provider needs to know the customers' opinion: Are they satisfied with the service, with the food? How would they evaluate the speed of the waitress? Would they recommend the service to friends? Agora has been looking for a way to cover all these questions, but without the effort of using questionnaires, touch screens or staff for the survey at the same time.

EASIER VOTING

The solution is called agora opinion®. It is a kind of survey pillar that can easily and quickly record answers to a question, without any follow-up: one question, two options, voted in two seconds...

100 TIMES MORE VOTES

Particularly, this short voting time is revolutionary and allows capturing 100 times more votes than with a classical survey. The technological innovation adds to this: due to the mechanical energy converter ECO 200 from EnOcean, the system operates self-powered. Pressing the button on the pillar is sufficient to send the information to an Internet-enabled receiving device.

Therefore, agora opinion® works maintenance-free without cables and batteries. In addition, this eases the device's installation. Currently, the system is tested in several locations: in fast food restaurants, in collective catering, shopping malls and supermarkets.

www.agoraopinion.com



ARTIFICIAL INTELLIGENCE REVOLUTION

hemis® is an artificial intelligence-based solution that exercises autonomous control of lighting, heating, air conditioning, ventilation and ventilation openings to constantly strike the right balance between a building's energy efficiency and the well-being of its occupants.

By François Demares, Marketing Communication, Ubiant™

A SOLUTION DRIVEN BY OCCUPANTS' PERCEIVED COMFORT

Unlike conventional market systems, controlled by centralized settings, hemis® responds to what the occupants are actually feeling. Different individuals in the same room can, independently, signal their impressions to the system: "it's really hot in here", "it's too bright", "it's humid", etc. The system then calculates in real time the best-fit scenario to maximize everyone's comfort, while respecting the pre-defined energy consumption target.

The adding batteryless wireless peripherals, equipped with quickmove® technology, can be instantaneously installed, moved, or removed with a NFC mobile phone or tablet. This operation can be performed in a matter of seconds by a non-expert.

A WIDE RANGE OF POSSIBILITIES

hemis® consists of a smart OS integrated into a computer module, quickmove® compatible peripherals (sensors, viewers and actuators) and numerous applications. The solution can also interconnect with existing IoT products (Internet of Things), so that the ecosystem can be enriched with smart objects that interact throughout the building. With a "distributed regulation" functionality built in as native, hemis® also contributes to the overall balance of the power grid. It can be hooked up to a range of local off-grid renewable energy generation and/or storage systems. hemis® is a solution developed by the ubiant™ company.

www.ubiant.com



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ELECTRONIC
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Your manufacturing specialist for radio and energy harvesting

www.vicos.at





ENERGY-AUTONOMOUS THERMOSTATIC RADIATOR VALVE ACES THE FIELD TEST

The thermostatic radiator valve equipped with a Micropelt thermogenerator and EnOcean wireless technology confirms its high performance in a long-term test.

By Peter Kauf, Head of the Systems Business Unit, Micropelt GmbH

In the spring of 2013, Micropelt presented a fully batteryless and wireless, motor-driven thermostatic radiator valve with EnOcean wireless technology at ISH, the world's leading trade show for heating technology and sanitation products. The valve has now passed the final test required for mass production. In an extensive field trial lasting several weeks, it was thoroughly tested during operation of a heating system in a duplex. The test was aimed at demonstrating the valve's unlimited functionality and performance in a real-life environment. Special attention was paid to typical, low inlet temperatures during the transitional period in autumn.

A gas-fired condensing boiler (23 KW nominal power) heats all rooms (200 m²) in the duplex, built in the 1950s, using panel radiators that are equipped for single room temperature control with battery-operated wireless TRVs (thermostatic radiator valves). Communication with the bidirectional EnOcean wireless protocol makes it possible to confirm the valve position, which is used to control the inlet temperature, depending on the actual demand for heat in the rooms. Compared to conventional outdoor temperature-driven or reference room-driven controllers, this approach permits more efficient operation with optimized burner times.

TESTING THE ENERGY-AUTONOMOUS THERMOSTATIC RADIATOR VALVE IN A DUPLEX WITH INSULATED WALLS

For the field test, a battery-driven thermostatic radiator valve was replaced by a new valve with a Micropelt thermogenerator, which generates electrical energy from the difference between the inlet temperature and the room temperature. A commercial PC with myHome-Control software manages the individual room functions within the system. This software controls all EnOcean sensors and actuators and records all relevant data.

EVEN SMALL TEMPERATURE DIFFERENCES DURING THE TRANSITIONAL PERIOD YIELD SUFFICIENT ENERGY

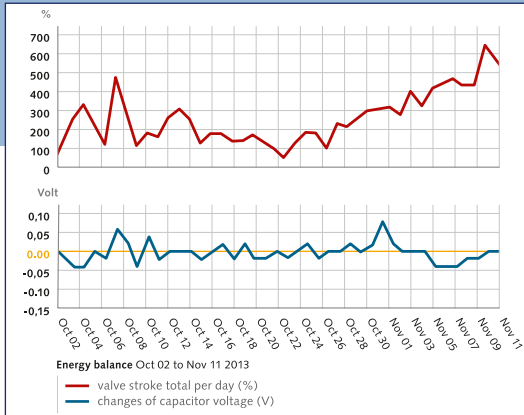
The energy-autonomous valve had to meet strict standards, since demand-driven control results in a heavily fluctuating inlet temperature that is lower on average. The phases in which the thermogenerator can generate the required electrical energy become shorter. In addition, the night economy setting was activated. The field trial took place in October and November, when outdoor temperatures exceeded 10 °C on many days, causing the maximum inlet temperature to rise to only slightly above 40 °C. In principle, the question was whether the thermogenerator could generate enough energy to power the motor as well as provide activation and wire-



Graphs in clockwise direction, starting right: Course of a day (Nov. 9)

Bottom right: Number of actuating movements, Nov. 9

Bottom left: Energy balance from Oct. 2 to Nov. 3, 2013



less communication. After all, flawless operation without sacrificing comfort or control functionality under stringent conditions is necessary to ensure that the new technology is suitable for general deployment.

Diagram: Energy balance from Oct. 2 to Nov. 3

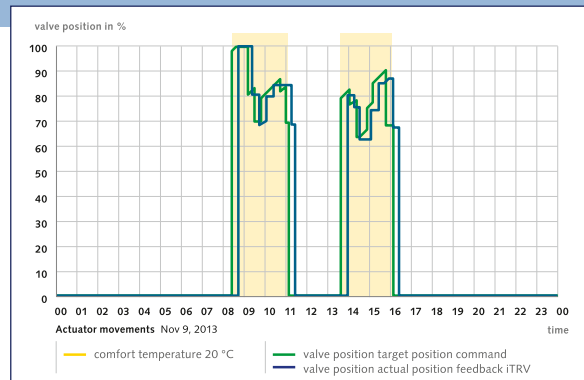
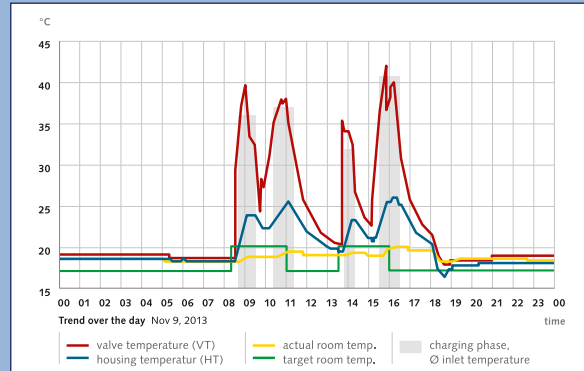
THE BATTERY-FREE ITRV (INTELLIGENT THERMOSTATIC RADIATOR VALVE) OPERATES RELIABLY EVEN UNDER STRINGENT CONDITIONS

During the test period, the capacitor voltage, which was detected once a day, moved constantly between 3.02 V and 3.16 V, which means that the energy generated and consumed reached a more or less equal balance. The average daily inlet temperature fluctuated between 24 °C and 33 °C at a comfortable temperature of 20 °C during the day and a setback temperature of 17 °C. The phases with inlet temperatures above 32 °C suitable for energy harvesting lasted between 0.5 and 5 hours. The energy consumed by the motor and wireless electronics, which were activated constantly every 10 minutes, had to be generated and stored during this period.

Diagram: Trend over the course of a day (Nov. 9, 13)

ENERGY-AUTONOMOUS VALVE HANDLES UP TO 40 ACTUATING MOVEMENTS PER DAY

In total, the motor had to execute between 10 and 40 actuating movements per day and cover a valve stroke



distance of 1.5 mm one to seven times. The majority of the movements (72 %) involved a relative travel distance between 0 % and 10 %, constituting only small corrections of the controller. Greater distances had to be covered only with reference travel and at temperature set-point changes in the morning and evening.

Due to the not particularly low outdoor temperatures and the outer wall insulation, the controller response was relatively sluggish and the room temperature targets were easily reached.

Diagram: Number of actuating movements + distance covered per day

In summary, the field test shows that the energy-autonomous thermostatic radiator valve performs reliably even under the most stringent conditions – a relatively low and fluctuating inlet temperature typical for modern heating systems, a well-insulated house and the relatively warm outdoor temperatures in the transitional autumn months – and is fully equal to the battery-driven valves when it comes to convenient control.

SELF-POWERING THE IOT

An interview with ...

... Laurent Gaii-Miniet, CEO, EnOcean GmbH

IDTechEx predicts that the global market for energy harvesting devices will reach \$2.6 billion by 2024. In what kinds of applications are you seeing the fastest-growing demand for this technology?

Laurent Gaii-Miniet: Today, a broad range of self-powered wireless sensors is already very well established in the commercial building automation sector and has already marked a significant footprint in the smart home market. The high demand in these sectors continues due to a fast increasing need for energy-efficient, sustainable and comfortable buildings. But we also see self-powered solutions entering new fields, such as consumer application.

Building and home automation is by no means where energy harvesting wireless ends. It is the technology powering the Internet of Things. According to the analyst house Gartner analysts, by 2020, three billion wireless sensor nodes installed will already be self-powered. This figure shows the amazing range of possibilities opened up by batteryless energy generation. Therefore, the Internet of Things is one of the fastest growing markets and the most important trend in energy harvesting.

Internet of Things, IoT, is a very commonly used term. What is your perception of IoT?

L. G.-M.: Generally speaking, IoT or the Internet of Everything, IoE, means that billions of devices can communicate with each other and the Internet – to make our life easier and safer. This restriction is compulsory. Because it's not just about acoustic and visual information from thousands of sensors, from our household appliances or the street lighting. In other words, it's not just a talking refrigerator but a refrigerator that gives us useful information only when and if needed.

So, the IoT is only useful if it makes our lives easier and gives a balance of comfort, security and energy savings. The unique advantage of batteryless operated sensor nodes will make it easy to bring communication to places where needed – even when they are very difficult to reach. Energy harvesting wireless sensors can provide the data for GSM or WiFi networks, for example for


monitoring cold chain systems in supermarkets, the temperature in data centers, as well as integrating intelligent building and consumer controllers into the smart grid. If we manage to focus on the useful things, the IoE can make our world a better place.

How so?

L. G.-M.: Well, just think of your own daily life – you'll find many scenarios where technical, maintenance-free assistance would make things easier and safer. For example, self-powered emergency buttons not only in your home but also in the city that call for help whenever needed. Light and temperature that adapts to your physical well-being, systems that let you know that your grandparents don't drink enough. This brings us to ambient assisted living which enables our seniors to independently live in their homes for a longer time.

Besides our personal living environment, there are scenarios where data can make our lives safer and protect our resources even when we don't notice them. These include sensors preventing bridges from break-down, automatically ordering food in supermarkets, street lights adapting illumination to traffic, or monitoring of water quality and quantity.

So an IoT including energy harvesting technologies also has a big environmental impact?

L. G.-M.: Absolutely, but not only when controlling the consumption of our resources. In this context, I would apply the character "useful" more widely. The process of enabling billion of things to communicate should focus on a sustainable character of the technology itself. Why? Well, it's not only the immediate effect but the long-term impact which should be considered. This includes the operation and disposal at the end of a solution's lifetime. From this angle, energy harvesting is the only responsible choice to power IoT sensors. Building automation shows us the resource saving ability: With more than 250000 buildings worldwide equipped with EnOcean-based components, we have saved 15500 miles of cables, 1000 tons of copper and 2500 tons of PVC. At a typical expected device lifetime of 25 years, the batteryless solutions installed save 50 million batteries. 



GENERIC LANGUAGE FOR ENOCEAN NETWORKS

With Generic Profiles, the EnOcean Alliance has further developed the standardized interoperable communication of energy harvesting wireless solutions. It allows multi-functional products that flexibly adapt to a variety of applications.

By Marian Hönsch, Generic Profiles Team Leader, Technical Working Group, EnOcean Alliance

The variety of energy harvesting wireless products and applications has continuously increased. That's why the Technical Working Group (TWG) has developed Generic Profiles, an addition to the EnOcean Equipment Profiles (EEP). It is the first generic language for the communication of energy harvesting wireless solutions. EnOcean Equipment Profiles and Generic Profiles both describe the data communication of products utilizing the EnOcean radio protocol to enable manufacturers to develop interoperable products. The key strength of Generic Profiles is to allow devices to have self-described dynamic communication. OEMs can integrate specific EEPs, Generic Profiles or both as networks can combine EEP-based devices with products using Generic Profiles.

Generic Profiles define the grammatical rules for all options of data encoding for ultra-low power and energy harvesting radio communication. Due to this generic language, the same product can be mapped dynamically to different applications.

COVERING ALL PARAMETERS

The data sent over the air is generally the result of an analog-to-digital conversion, the state of a counter in the transmitting device or similar information. To conserve energy, these raw measurements are transmitted directly, using only as many bits as the native conversion produces. To determine the actual value, it is necessary to have a set of parameters to transform the pure digital values into physical units. Declaring this set of parameters will enable the receiver to convert the originally measured value into meaningful values as a preparation for further processing.

Generic Profiles include a language definition with a parameter selection that covers every possible measured value to be transmitted. Therefore, the approach not only defines parameters for the value calculation algorithm but also includes specific signal definitions (e.g. physical units).

SELF-DESCRIPTION OF COMMUNICATION

For every measured channel, the set of parameters has to be transmitted during the teach-in process. Here, devices exchange for one-time information about how to interpret data which will be exchanged in the data communication. Using this process, the device describes its future communication itself and allows it to connect to different radio partners. The teach-in process has a bidirectional character so that bidirectional devices can negotiate the accepted channels in a dialog.

FUTURE-PROOF INTEROPERABILITY

Automated processing of digital data is only possible if all information about the acquisition type of the received data is available. Through this classification, a value can be combined with its physical unit. Therefore, three different main parameters (channel type, signal type, value type) have to be communicated. The interpretation of received data messages is based on two conditions: first, the message has to be accepted. So it has to carry a valid EnOcean ID known by the receiver or it can address the receiver's EnOcean ID. Secondly, the receiver has to be aware of the used data structure. As this structure is almost infinitely variable due to the generic approach, the transmitter has to transmit its channel characteristics before the data communication in the teach-in process. Following the guidelines of the defined communication layers and Generic Profiles, every generic EnOcean device can exchange data with compatible devices.

www.enocean-alliance.org/en/enocean_standard



OVERVIEW OF ENOCEAN ALLIANCE MEMBERS

www.enocean-alliance.org/products



PROMOTERS				
				

PARTICIPANTS									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									

... AND MORE THAN 200 ASSOCIATE MEMBERS



SHANGHAI'S SKY-HIGH PRICED LUXURIOUS VILLA WITH ENOCEAN TECHNOLOGY UNVEILED

Tomson Riviera is the one and only villa-size international residence in the Central Business District of Lujiazui, Shanghai, with a panoramic view of the best sides. The whole estate consists of four high-rise buildings in a simple and lasting design style. Here, Thermokon has successfully upgraded the automation system, integrating EnOcean-based wireless control to the existing EIB/KNX solution.

By Marketing Department, Thermokon Automation Equipment Co. Ltd.

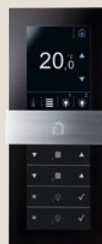
Tomson Riviera – a top luxurious housing block – is conveniently located in the center of Pudong's Lujiazui CBD, opposite the historic Bund area, with breathtaking views of the Oriental Pearl Tower, the Shanghai World Finance Centre and Shanghai Tower.

Tomson Riviera builds apartments in the size of villa. The full floor apartments range from 430 to 1200 m² and feature large balconies and spacious living rooms. Residents are greeted by sweeping views of the Huangpu River and the colonial buildings on the Bund.

HIGHEST STANDARDS

As one of China's most high-end real estate, Tomson Riviera undoubtedly has the highest standards, not only the best location in Shanghai but also an exclusive interior decoration. Thermokon's EnOcean-based products are favored by the project parties for its special design, perfect function and energy-saving concepts.

The demonstration/show apartments have been finished now and the users can experience the flexibility and strong functions of the products. The perfect combination of technology and design makes Thermokon products the best alternative for the luxury villas.



THANOS AND EASYSSENS FOR MODERN DESIGN

The room operating touch panel Thanos is for temperature and humidity detection as well as for integrated operation of HVAC, lighting and blinds for single room control. The one-click occupied/unoccupied function is particularly convenient for such a large villa. By means of high-graded optics, the device is especially ideal for design-oriented applications. The operating functions are flexibly adapted to the widest range of room layouts.

To realize smart control of lighting and shading in the places without existing wiring and to interoperate with pre-installed EIB/KNX system, EnOcean-based EasySens switches are definitely the best choice, without wiring, batteries or any maintenance.

www.thermokon.com





INTEGRATED ROOM AUTOMATION IN THE NEW PALACE OF JUSTICE, AMSTERDAM

In the new Palace of Justice in Amsterdam, an energy-efficient, productive and comfortable working environment has been created for around 700 employees. The ecos 5 integrated room automation system from SAUTER combines the management of the room climate with the daylight-dependent lighting control. SAUTER modulo 5, based on BACnet/IP, ensures the seamless integration of the room automation, building automation and building management systems.

By Wietse Hut, Manager Branch Office Meppel, SAUTER Building Control Nederland B.V.



The new building replaces the historical Palace of Justice, which was bursting at the seams. The impressive external architecture and the internal design, with its clear structures and bright marble surfaces, emphasize the ambition of the courthouse. It is timeless, and designed so that it can be used for generations to come. Maximum flexibility of room division and very low energy consumption were called for. The energy concept is based on using the heat from water supplied by a heat pump. The Palace of Justice was certified with the Environmental Assessment Method of the Building Research Establishment organisation (BREEAM).

AN INTEGRATED SOLUTION

For the building and room automation, SAUTER turned to the EY-modulo 5 family of systems: for the building automation system, the modu525 automation station was used, and for the room automation, room automation stations of the ecos 5 type with EnOcean wireless technology. SAUTER novaPro Open was chosen as the building management system for monitoring and controlling the entire installation.

FULL FLEXIBILITY FOR FLEXIBLE ROOM UTILIZATION

Almost the entire building is designed as an open space area with rooms organized flexibly by means of glass partitions. The integrated room automation with SAUTER ecos 5 is based on individual room segments with all the functions of the room climate and the lighting. In the building management system, these segments are individually grouped into rooms. Reprogramming or even rewiring when changing the room division is now a thing of the past. Grouping segments into rooms means, for example, that a light switch controls the entire lighting of the room, and a setpoint for the room temperature selected on the room control unit affects all the heated/chilled beams in the room. Therefore, the ecos 5 system provides a perfect solution for intelligent, flexible rooms.

SAUTER Nederland implemented this challenging project and was once again able to reap the benefits of the open BACnet/IP bus protocol.

UNIQUE BI-DIRECTIONAL ENOCEAN TECHNOLOGY

Open Space architecture, with partitions made of glass and accordingly flexible room division, also imposes particular demands with regard to the selection of the room control unit: wireless technology, no batteries, easy addition of operating points when the room division is changed, and the feedback of operating activities on the local LCD display. The SAUTER ecoUnit 1 room control unit fulfills these requirements superbly by means of the EnOcean standard, with energy harvested via the integrated solar panel. Therefore, the operating points can be retrofitted at any time by means of a teach-in on the radio receiver, and an adhesive pad is provided for installing these on glass. This room control unit is remarkable for its unique bi-directional communication. The room temperature and operating activities, such as dimming/switching lights on and off, are transferred to the room automation station, and conversely, the users can read the target room temperature and information on the heating and cooling from the display of the room control unit at any time. Therefore, users have more information, and this contributes to the energy optimization of the rooms.

The sustainability of this building is reflected in the building automation technology through the open, flexible SAUTER modulo 5 system, which is ideally equipped for future requirements for the utilisation of the building.

www.sauter-controls.com



Image above: The impressive Palace of Justice in Amsterdam was built on the IJDock artificial peninsula.

Image below: Over eleven storeys and 34 000 m², SAUTER provides a comfortable room climate for approx. 700 employees.



NEW LIGHTING STANDARD REPLACES OLD STANDARD LIGHTING

continuously working on programs for active energy optimization.

BUILDING LIGHTING UNDER SCRUTINY

A measure such as this also put the existing lighting technology in the production facilities under closer scrutiny, even though substantial optimization had already been achieved in this sector in the recent past using a new central I&C system. The next logical step was then to modernize the hardware at the automation level. And this had to be done by implementing a solution that can be used both in newly constructed production facilities, which are equipped in the field with DALI and EnOcean, and in retrofit projects in which the existing, conventional technology is to be retained. The fact that the two technologies, i.e., old and new, could be easily combined was a reason for Jörg Tratzl, the responsible electrical systems planner, ultimately deciding on components from WAGO. Another reason was the particularly user-friendly handling that WAGO developed for BMW for controlling I&C operating devices.

USER-FRIENDLY AND AREA-ORIENTED CONCEPT

The new lighting distribution connector concept is not only up-to-date from a technical standpoint; it also puts special focus on the needs of the end customer: in contrast to the lighting distribution connectors used up to



Environmentally responsible action is only really effective when both sides of the coin are taken into account: the product itself, along with its entire development process. As BMW is an automotive manufacturer that places priority on ecological and social aspects, the company has been a permanent member of the "Dow Jones Sustainability Group Index" since 1999. And to ensure that it will continue to be part of the stock index for companies exercising sustainable business practices in the future, the Munich-based company is



Image: Ethernet controller of the WAGO-I/O-SYSTEM 750

Image left below: The Ethernet controller of the WAGO-I/O-SYSTEM 750 and all necessary I/O modules are accommodated in the local control cabinets in the production facilities.

For decades, BMW has been a household name among car and motorcycle enthusiasts alike, and now the same holds true for building and automation engineering experts. While the first group associates the brand with innovative motors and vehicles, the latter thinks of a new lighting control system, which lowers the energy costs of the popular Munich-based company by around 30 %. BMW is gradually expanding this solution based on WAGO components to make it a company-wide standard as part of its sustainability strategy.

By Jürgen Pfeifer, System Advisor for Industrial Automation, WAGO Kontakttechnik GmbH & Co. KG

now, the electrical installation specialist does not have to perform complicated programming, neither during commissioning, nor during his everyday work. Instead, the area-oriented software can be adapted to individual needs using only the parameter settings – and this via the graphic user interface with any Internet browser. This saves time on the one hand and also eliminates the need for additional know-how; with two-fold positive results; energy costs and the expenses associated with engineering can both be markedly reduced. The basis for this is the WAGO-I/O-SYSTEM 750 Ethernet controllers, which are installed in the local control cabinets in the production facilities with I/O modules for DALI, EnOcean and standard analog and digital inputs and outputs, where they exercise control over each and every electronic ballast.

This allows the lighting to be automatically dimmed in accordance with the defined lighting planning, yielding noticeable energy savings while fulfilling the strict operational requirements at the same time. A further advantage is also achieved using DALI: Instead of having to activate entire circuits, so-called short addresses are used to control each individual light. The individual control nature achieved with this system can be used to combine short addresses into groups, enabling virtual rooms to be illustrated on screen via WAGO Web visualization which can then be controlled individually, in the same manner as physical rooms. For BMW production

facilities this means that lighting can be optimally adapted for construction work or building re-assignment with only a few clicks of the mouse.

AUTOMATED AND INTEGRATED WORKFLOWS

The lighting distribution connectors standardized by BMW have proven themselves in more than 100 installations at a wide range of locations within the corporate group. Simple configuration of the WAGO control system via an Internet browser has reduced the commissioning time for each lighting distribution connector from several days to only a few seconds. Relays can be installed and removed with just a few turns of the hand using pluggable sockets. "This of course also reduces costs during ongoing operation, as the maintenance work can be performed much more quickly," explains Jörg Tratzl.

Replacement of the hardware is, however, the only activity that still needs to be performed manually at BMW, stresses the electrical systems planner: "Since the WAGO Ethernet controllers communicate directly with the plant management software, this enabled us to nearly perfect this workflow: the exact position of defective lighting is reported, operating hours counters are reset after replacement of the components and the brightness levels are adjusted automatically."

www.wago.com





VOSSLÖH-SCHWABE SHANGHAI OFFICE ILLUMINATES WITH ENOCEAN

The Vossloh-Schwabe Shanghai Office has adopted wireless batteryless EnOcean technology to its own lighting intelligent control system – LiCS Indoor – with the DALI protocol for the first time. The benefits reveal themselves through the perfect interoperability of the two systems and the resulting energy-saving immediately after installation.

By Sean Yang, General Manager, Vossloh-Schwabe Electrical Appliances Trading (Shanghai) Co., Ltd.

Vossloh-Schwabe Germany, one of the leading lighting components and LED solutions providers recommends an easy and simple lighting intelligent control system, which is based on EnOcean technology and will be introduced to the market shortly. The value and benefits are demonstrated by the test application installed in the Vossloh-Schwabe Shanghai Office, which has been up and running since July 2013.

AN INTEGRATED APPLICATION

The entire retrofit office application structure clearly demonstrates the adoption of the EnOcean wireless remote control switch in VS LiCS DALI systems. It is easy and simple: easy meaning that no wall reconstruction is required, and at the same time, simple meaning that only two DALI wires connect all the DALI devices in the luminaires, for instance, DALI LED panels, DALI FL T5 grilles, DALI LED spots and DALI sensors, for instance. After the connection and configuration, the entire system works seamlessly with conventional wall mains switches previously installed in on the wall box.

LUMINAIRES UNDER CONTROL

In the application, four two-gang EnOcean switches from an EnOcean Alliance member Lutuo are used in the 160 m² office, which function for different purposes as either a single luminaire control or scene controls. These four switches can be placed anywhere desired, for

example, on the table or the wall. One of the two-gang switches is designed as four push buttons (top left, top right, bottom left and bottom right) working as four remote control channels.

In the working space, six 4xT5 grille luminaires are grouped into three rows according to staff's desk location, and each grouped row can be controlled separately by members of staff sitting directly under the luminaire. The grouped luminaires can be dimmed up or down simultaneously, according to the actual need, simply by holding down the EnOcean switch, on which the channel is predefined.





The EnOcean-based switches can control single luminaires or several lighting scenes. Thereby, they can be flexibly positioned, for example, as a mobile handheld on the table.



SCENES FOR EACH SITUATION

In the meeting room, six dimmable LED panels are configured into four scenes: an ECO-scene, room cleaning scene, projector scene and meeting scene, individually controlled by four channels on one two-gang switch. The switch is simply placed on the table for control convenience.

With the aim of further energy savings, two DALI multi-sensors integrated with light and motion detection are installed on the ceiling of the General Manager's room and the office entrance, which work together with the EnOcean push buttons. The light output and the time

delay of the connected luminaires can be adjusted by both the DALI sensors and the EnOcean switches. Furthermore, the lights can switch off automatically if the natural sunlight level is sufficient for the room. In terms of the entire system's functioning, the EnOcean signal is transmitted from the push button and received by the antenna of VS LiCS intelligent controller.

NUMEROUS POSSIBILITIES WITH NOTICEABLE EFFECT

Easy configuration ensures the outstanding functionality of the VS LiCS controller, as a result of which EnOcean controls offer numerous possibilities for office lighting, school lighting, hotel lighting and workshop lighting to name a few. The energy-saving effect of this application is clearly visible after four months of use, which is proven by the electricity bill lower by 30 %, compared to the one for the office-before-retrofit scenario.

www.vossloh-schwabe.com



In terms of the system's functionality, the switch transmits the EnOcean signal which is received by the antenna of the intelligent VS LiCS controller.



MAINTAINING A CONSISTENT TEMPERATURE ALSO WITH FLOOR HEATING SYSTEMS

Can a heating system save energy and increase comfort at the same time? HUF-Haus, the European market leader in modern timber-frame architecture made of wood and glass, wanted to find a solution for its customers that would do just that. The company is currently testing the alphaEOS system in one of its model houses – and it will soon use the system everywhere.

By Annika Rehbein, Marketing Manager, alphaEOS AG

HUF-Haus is known as a provider of exclusive and individual prefabricated homes that feature modern timber-frame architecture. Technical building equipment plays a crucial role in the company. In 2009, HUF-Haus formed a subsidiary named redblue energy, which specializes in heating and sanitation installations as well as intelligent building automation. The company has long been interested in weather-driven control of heating systems. Floor heating systems are built into nearly all HUF homes, which are tailored to individual customer needs. However, these systems respond slowly to changes in the weather. This long-standing company went looking for a solution that would give its customers an energy-efficient heating system and increase comfort at the same time.

The choice went to alphaEOS, a system that promises easy installation and can also be added later on. One advantage over other suppliers, HUF-Haus felt, was that the system was independent of heat generators, which makes it less complex. All alphaEOS components com-

municate with each other wirelessly. The EnOcean wireless standard allows the system to be expanded flexibly, which is another advantage.

HUF-Haus has been using alphaEOS as a test system since the fall of 2013. The company plans to add the system to its technical product portfolio and thereby offer its customers an energy-efficient heating solution.

TESTING THE SYSTEM IN THE MODEL HOUSE

The family-run enterprise is using the model house in its Hartenfels location as a reference project. Known as the “Sun House,” it is a two-floor structure with a spacious basement. All rooms on the ground floor have floor heating, which uses the new floor control system.

Floor heating systems contribute to a good room climate and distribute the heat evenly. Their long heating phases are a disadvantage. When temperatures fluctuate, a floor heating system cannot respond quickly enough, and short-term deviations from the desired



alphaEOS is a startup based in Stuttgart and has developed a self-learning heating management system. The system's special feature is an algorithm, which incorporates weather forecasts, resident habits and structural properties into the heat strategy calculation. It learns new things during use and optimizes the heating strategy individually for each room. The company has filed a patent application for this algorithm.

room temperature occur. alphaEOS incorporates local weather forecasts into its heating strategy and prepares the heating system for specific changes in the weather and temperature. The room temperature remains constant, and energy is used only when it's really needed. Predictive control with alphaEOS has optimized the temperature profile in the building. "We detected very little difference between the setpoint and actual temperature after just a short period of use," confirms Manuel Schönwitz, Managing Director of red-blue energy. "We have also already determined that less energy is consumed." By the time the model house opens for viewing by potential buyers, a pleasant temperature of 21 °C prevails as standard. The rest of the time, Manuel Schönwitz uses an app to lower the temperature to 16 °C.

EASY TO INSTALL AND TO OPERATE

HUF-Haus had no trouble installing the system. "We were impressed by how easy it was to install," says Manuel Schönwitz. "And alphaEOS support gave us direct assistance when questions arose."

The system offers end users significant added value through its cost/benefit ratio. The resident enters dates in an app and can spontaneously change the temperature setting as needed. The system is extremely easy to operate and facilitates demand-based heating. The innovative heating control system from alphaEOS has been

available since mid-2013. The components for controlling the floor heating system were brought to market in December 2013.

WIDESPREAD USE PLANNED

Manuel Schönwitz believes in alphaEOS. His assessment: "alphaEOS is a future-viable system that can be used flexibly and supports the current trend toward controlling buildings from a smart phone." HUF-Haus is planning a widespread rollout of the system for the first quarter of 2014, with an initial focus on existing HUF homes that need to modernize their heating systems.

Other smart home components can be added to the alphaEOS system. In the future, HUF-Haus intends to install alphaEOS GUARD in rooms. This smoke detector is still a new module that transmits an alarm to a smart phone in the event of fire, in addition to the loud interval beep. alphaEOS is developing additional smart home components – and HUF-Haus is sure to test them as well.

www.alphaeos.com
www.huf-haus.com





ENERGY-EFFICIENT BUILDING ON TOP LEVEL

Sony Corporations main office building Sony City in Osaki, Tokyo was assigned a “top level office” classification in fiscal year 2011 by the Tokyo Metropolitan Government for having one of the best programs for reducing global warming. The wide range of energy-saving features ensures an outstanding environmental performance, including energy harvesting wireless solutions.

By Dr. Dietmar Loy, CEO, LOYTEC electronics GmbH



Sony's efforts include an evaporative cooling system, a high-efficiency thermal storage system, using solar panels and heat pumps for heating water and the introduction of renewable energy in common areas, including solar power and LED lighting. Another important aspect is the implementation of a web-based automated energy monitoring and operation system which was installed by Network Corporation. The system was implemented with EnOcean-based batteryless wireless switches and sensors as well as with LOYTEC automation servers and routers.

DETAILED MONITORING FOR AUTOMATED CONTROL

With more than 30000 data points, the SCADA system provides detailed energy monitoring and automated demand control. Sensors constantly monitor the buildings lighting, temperature and humidity. Based on the analysis of the monitored data, temperature and lighting

can be automatically adjusted to a comfortable and energy-efficient level. By further analyzing the monitored data, the operation is constantly improved.

MODULAR ZONE CONTROL

The maintenance-free batteryless wireless sensors and switches were implemented inside the 27 floor high building, saving on installation cost and time. The sensors monitor the status of the building and communicate with the controllers, which in turn automatically adjust lights, blinds or heating. Throughout the building, LINX-111 and LINX-110 automation servers were installed throughout the building. They are used as zone controllers for dividing of the building into smaller, modular, and more manageable zones. A total of 93 LINX-11x automation servers and 34 L-P routers network more than 2900 FT-10 LonWorks field devices. The data points are connected to the SCADA system through the L-INX via an IP-852 channel. Each zone's L-INX automation server hosts the scheduler functions for the HVAC system and is connected to the fire protection system to create maximum comfort, efficiency, and security for the building's environment. A centralized SCADA server collates all the data into a single user interface. As the NBIS system is web-browser based, the system can be viewed from any browser-enabled device.

www.loytec.com | www.netcorp.co.jp





EMPOWERHOUSE POWERS COMFORT BY ENERGY HARVESTING WIRELESS TECHNOLOGY

Empowerhouse was designed and engineered by students from Stevens Institute of Technology, Parsons The New School for Design, and Milano School for International Affairs. The result is a house that meets today's highest energy standards combined with architectural design and a comfortable living environment. Part of the innovative concept is an intelligent home automation system integrating energy harvesting wireless technology.

By Laura Briggs, Assistant Professor of Architectural Design, Parsons the New School for Design

From the very beginning, the Empowerhouse project was intended to make a real difference – an energy-efficient and comfortable model house that passes the reality test. It combines passive house construction with low-impact and water-saving features as well as photovoltaic cells. The house is so efficient that it draws no power from the grid. Besides the building envelope and the solar technology, an innovative home automation system provides efficient energy usage and comfort.

INTEGRATED AUTOMATION

The core of the system is a local database combined with a home area network router that connects to the Internet and a universal controller from Schneider Electric (Can2Go). This controller deploys integrated solutions for HVAC, lighting, etc. – quickly and efficiently linking multiple devices based on many standard protocols. In Empowerhouse, it brings together self-powered wireless switches from Leviton, batteryless wireless temperature and occupancy sensors from Thermokon as well as a box from Intesis for integrating the Mitsubishi heat pump into the automated control. All of these peripheral devices communicate via the EnOcean energy harvesting wireless standard. In addition, the devices avoid hazardous battery waste and contribute to the sustainable concept of Empowerhouse.

AUTOMATED FOR ENERGY-EFFICIENCY AND COMFORT

The automation controls the house's light and HVAC depending on the resident's presence and comfort need. In all rooms, the temperature sensors control the temperature and match it with the pre-configured set point. In the case of deviation, the sensor sends a signal to the controller that accordingly adjusts the heating/cooling system. The automated heating also allows control based on preset date and time programs. All functionalities can be visualized by a browser-based device such as a tablet, PC or smartphone.

FROM A PROJECT TO A HOME

Today, the former students' project is a real home for two local families in the D.C. neighborhood of Deanwood and represents the District's first passive house. Habitat and their volunteer builders fully implemented the house designed by the students, adding a second story, and a second unit to make this a two-family home.

<http://parsit.parsons.edu/our-house>

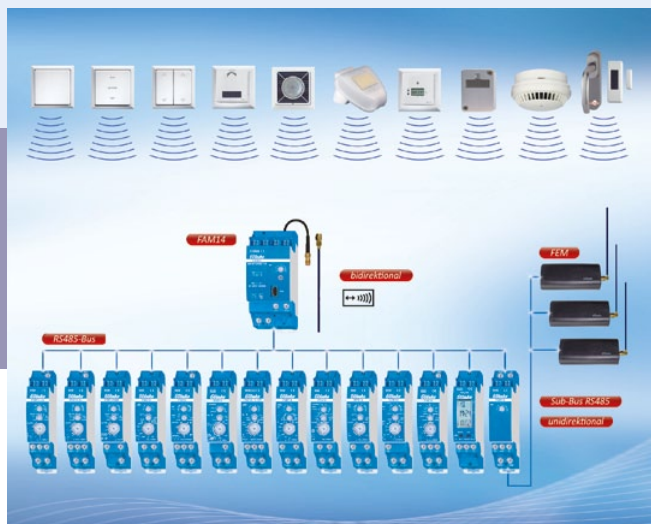




THE NEW GENERATION OF BUILDING CONTROL SYSTEMS

Wireless electrical installation is the key technology for ensuring broad-based success. By successfully combining efficient receivers with partially self-powered sensors, the Eltako wireless building makes it possible to provide flexible and efficient building technology.

By Anja Krombholz, Technical Sales Assistant, Eltako GmbH



The series 14 actuators easily permit central and intelligent installation in a building's distribution system, where the consumers can be controlled from a central point. This approach is based on the Eltako RS485 bus.

The incoming wireless signals from the transmitters reach the RS485 bus and control the equipment via the bidirectional FAM14 antenna module, which has an integrated power unit upstream from the actuators. The actuators respond directly, thanks to the bidirectional functionality. An additional PC tool allows the actuators to be configured with software. This PC tool can be used to store actuators and sensors in a database, together with the desired functions. Not only does this facilitate programming, but it is particularly useful later on if changes are made or if the actuators need to be replaced.

The switching power supply in the FAM14 decouples the electronic components of all connected devices from the 230V power supply. As a result, the devices are not exposed to the increasingly more frequent and more intense voltage peaks and other disturbances in the power supply, which significantly extends their lifespans.

MULTIFUNCTIONAL SOLUTIONS

The system provides a much wider range of automation functions than the current installation. The built-in series

14 wireless devices can be used for all switching, dimming, control and regulating processes in the building. Combined with a wide range of sensors for installation both indoors and outdoors, they provide full wireless coverage for buildings. The intuitive GFVS 3.0 wireless visualization and control software for buildings can be added to the functions as needed.

SECURE SCHOOLS

The Rastatt district administrators have devoted a great deal of attention to security in schools with the goal of improving school security and effectively dealing with problem situations through structural and organizational measures as well as through additional facilities.

They installed a batteryless Eltako switch in the classrooms. Actuating the alarm switch generates a wireless signal





that directly activates the electrical/acoustic system and thereby triggers a panic alarm in every room in the school. The alarm server additionally sends an e-mail to the school administration with information on when and where the alarm was triggered. This information can then be forwarded to the police emergency responders. Only the Erich Kästner School in Gaggenau currently has this system. However, it is expected to be installed in all the 14 remaining district schools.

WEBERHAUS: NEW HAUS 300 IN THE GENERATIONS 5.0 SERIES

WeberHaus, the new show house in the generation5.0 series, once again demonstrates its expertise where energy efficiency is concerned in the Home & Garden Exhibition in Fellbach.

SMART HOME FOR COMFORTABLE LIVING

A contemporary home control system is a new addition to innovative home technology: intelligent EnOcean technology from Eltako controls lights and blinds from a central location in the Fellbach show house. Two 180-degree cameras, which also act as motion sensors, and an intercom installed next to the front door, which can be operated from a smart phone or tablet, provide a reassuring sense of security. Another highlight to make residents feel comfortable in the home is the built-in speaker

in the bedroom, which allows them to enjoy pleasant music from a nearly invisible source.

ASSLAR SENIOR CENTER

The senior center on Backhausplatz in Asslar has taken first place in the "Best Project" category of the 2013 SmartHome Deutschland Award. The total of 46 new assisted-living apartments with accommodations for a maximum of 65 seniors are furnished according to state-of-the-art interior design for assisted living as well as modern technology for energy efficiency, security and comfort. The system with the smart Eltako wireless building technology includes:

- Wireless switches placed in convenient locations in the room
- Individual room control with window contacts for monitoring windows
- Motion-dependent lighting control
- Automatic deactivation of the lights and various devices upon leaving the room
- Weather-dependent control of blinds
- Software-supported control with GFVS-Safe 2, including tablet control by the care-givers

www.eltako.com



TECHNOLOGIES THAT WORK SMOOTHLY TOGETHER

The latest trends in home and building controls are intended to help make life easier, safer and more comfortable. In a society with an aging population, security and comfort in the home are becoming increasingly more important. And yet, until now, extremely expensive complete solutions, many of which must be installed by specialized companies, have generally led the building automation market.

By Jörg B. S. Bomhardt, Marketing/Technical Content Editor, AFRISO-EURO-INDEX GmbH

When leaks occur, the WaterControl 01 unit from AFRISO, combined with EnOcean wireless technology, automatically cuts off the water supply line and thereby prevents any additional unwanted water leakage reliably, quickly and safely.



However, EnOcean's energy harvesting wireless systems have changed this situation dramatically. This unique technology, which is both energy-autonomous and maintenance-free, completely eliminates the unpleasant task of laying cables as well as the nerve-racking noise and grime that goes along with it.

AFRISO, an innovative, medium-sized, family business in Germany's Swabian region that specializes in measuring and control technology and has been producing measuring, control and monitoring equipment for home control systems, industry and environmental protection applications for 145 years, believes in EnOcean's batteryless wireless technology. For one thing, the wireless sensors from EnOcean draw the electricity they need from existing environmental energy sources such as motion, pressure, light and heat and are thus completely independent of location, power supply systems and maintenance work. In addition, all of EnOcean's building automation systems feature outstanding modular expansion capabilities.



ÖWU oil/water alarm unit from AFRISO reports liquid accumulation and can also distinguish between oil alarms and water alarms, displaying the appropriate alarm status. EnOcean wireless technology also enables the alarm unit to be integrated into the building automation system later on.

would be up to the homeowner to take the necessary action and possibly even cancel the vacation. In the future, an AFRISO water sensor equipped with EnOcean wireless technology will be able to report this water leakage to the WaterControl 01 unit, which automatically closes the shutoff valve in the main water line, using an electric motor. This action quickly and safely prevents any more unwanted water from flowing in and avoids the danger of the basement flooding, so that the homeowner can enjoy a worry-free vacation.

A TRADITION OF ALARM UNITS

However, this is only one reason why AFRISO feels that EnOcean wireless sensors and its own products have a promising future together. After all, the company has been offering a wide range of alarm units for home and building control systems for many years. And there's a good reason for this as well: AFRISO has been developing products for the safe storage of petroleum products since the mid-1950s and products for ecologically safe and more economic operation of heating systems since the 1973 oil crisis.

Over the decades, a diverse line of warning units has emerged from this portfolio, devices that are known today as the WATCHDOG series of alarm units. These alarm units monitor liquid accumulation, filling levels, leaks, gas and smoke and report events, threats and emergency situations. The integration of EnOcean's self-powered wireless technology now constitutes a veritable quantum leap forward in building automation and industrial monitoring, since it is now possible to intervene directly into the operating process instead of merely reporting that something has gone wrong.

EXAMPLE: WATER LEAKS

A family is on a skiing vacation in Austria. Back home in Bremen, a long period of freezing weather causes a pipe gasket to leak so that water gets into the laundry room. In the past, this event would be merely reported, and it

ADDED SECURITY IS EASY

With the AFRISOLab system, AFRISO provides easy access to networked environments in both building automation and security systems. The AFRISOLab technology is easy to understand, can be planned individually and has a modular design for later expansion. It is therefore also ideal for renovation projects. At the heart of the system lies a central building controller, which can be connected to all sensors for alarm systems, heating, ventilation and air conditioning equipment, lighting systems, blinds, doors, windows and garage doors, using EnOcean technology.

The building controller collects, stores and processes all sensor and consumption data. Based on this data, the appropriate events, messages, measured values, etc. are forwarded to smart phones or tablets over the Internet or by GSM in order to quickly initiate suitable (counter)measures. In the future, additional home and building control applications and solutions will be continuously added to the AFRISOLab product line, which currently includes CO₂, moisture, temperature, alarm and water sensors as well as a room temperature control system. A new member of the EnOcean Alliance, AFRISO is focused on the goal of making buildings more energy-efficient and economical and, in particular, much more secure.

www.afriso.com



EN:KEY – ENERGY EFFICIENCY IN ROOMS AND BUILDINGS



Cities, regional governments and communities are searching for new ways to lower their heating costs. A good example of this is Prenzlau, which has installed the innovative en:key room control system from Kieback&Peter as well as EnOcean technology throughout the Carl Friedrich Grabow secondary school. The city hopes to cut heating costs by at least 15 % by modernizing the school's technical installations.

By Hans Symanczik, Head of OEM Sales and Marketing, Kieback&Peter GmbH & Co. KG

USER BEHAVIOR IS THE KEY TO REAL ENERGY EFFICIENCY

The self-learning en:key room control system – which consists of an en:key room sensor and an en:key valve controller – determines whether rooms are in use or empty and generates the best possible heating profile for each room automatically and dynamically. It distinguishes between two temperature levels: the desired comfortable temperature set by the user and an efficiency temperature, which is 4 °C lower. When rooms are in use, en:key automatically sets the comfortable temperature. When rooms are not in use, en:key automatically lowers the temperature to the efficiency level. This approach allows the individual rooms to adjust their energy use easily and efficiently on the basis of actual user behavior, which saves energy!

SELF-POWERED WIRELESS COMMUNICATION

All en:key components communicate by wireless radio technology. The robust and proven technology maintains stable transmissions, and the communication is protected against manipulation. The radio communication is based on modern EnOcean technology and generates no harmful e-smog. Respected institutes and environmental associations have confirmed the system's environmental compatibility. Both the room sensor and the valve controller do not need to be connected to a power supply and require no batteries. The en:key system is powered by a high efficiency solar

module, combined with a high quality energy store. Energy is supplied to the valve controller via a thermogenerator, which generates electricity from the thermal energy of the heating water. As a result, the room sensor and valve controller are fully self-powered and require no maintenance.

CONVENIENT AND EFFECTIVE OPERATION

Along with individual room control, the heating control circuits are optimized with the DDC4000 automation system. The key to tapping additional savings potential lies in the ability to connect en:key room control system directly into modern building automation systems. As a result, the system allows for targeted control of the heating circuits, zones and consumers and, in particular, the management of energy consumption in the property as well as the control of the central power generators. The new FBG132-FT system gateway is the key component in the move from self-powered and self-learning individual room control to user-oriented building automation. An integral part of the building automation technology, this gateway feeds data and information from the en:key room control system directly into the central controller and the building management system.

Not only does this approach standardize the configuration and functionality of such comprehensive solutions but it also establishes a new quality in energy efficiency by dynamically integrating the actual user behavior into



Top left:
In 2013, en:key received the SmartHome Award as
"Best Product 2013".



ENOCEAN ALLIANCE | SOLUTIONS

holistic building automation solutions. The central Neutrino-GLT building management system from Kieback&Peter handles all monitoring, operating and optimization functions of the entire building automation system.

TARGETED ENERGY SAVINGS

Modern networks allow all properties to be added from a central point and give Kieback&Peter employees remote

access for support purposes. The en:key room control system provides user-oriented heating in around 100 classrooms and staff rooms at the Carl Friedrich Grabow secondary school in a total of three buildings. Prenzlau will receive initial savings results by the end of the 2013/2014 heating period.

www.kieback-peter.de
www.enkey.de



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THE MODERN FUNCTIONAL BUILDING IS VERSATILE

The demand for multifunctional commercial buildings is fuelling a need for highly flexible automation. For this, seamless communication between bus systems is therefore a must. The mivune open operating system (OS) guarantees intelligent integration of various bus technologies in the interests of sustainable building control.

By Bettina Methner, Marketing Communications, mivune ag

The modern work environment favours open office concepts. Besides the open-plan model, shared offices have become increasingly popular as a platform for temporary use. Constructed on modular principles, these offices can be adapted to user needs at short notice. This calls for similar flexibility in terms of building services and the associated automation technology. Proprietary systems are often counter-productive. Via the open operating system mivune OS, however, all bus technologies are readily integrated and capable of intelligent communication.

For this purpose, the field devices are represented generically in the open data model of the OS, i.e. the operating system takes over the function of the “common denominator” for the bus systems. This intelligent concept also allows easy integration into the building control system, or serves as a basis for multifunctional applications. Moreover, the various services of the mivune OS can be accessed directly.

WIRELESS TECHNOLOGIES FOR FLEXIBLE AUTOMATION

The integration of wireless bus systems makes automation much more flexible – during planning and operation and also for extensions. For example, EnOcean wireless sensor systems can be combined to optimal effect with the web-based digitalSTROM light and shade control solution. The interaction of these technologies offers maximum flexibility coupled with minimal installation costs. The ability of these bus systems to communicate via mivune with HVAC systems or applications such as weather stations, and to be integrated into the building control level, makes them an ideal concept of sustainable automation within the commercial and apartment building segment.

www.mivune.com



HVAC CONTROLLER FACILITATES RETROFITS AND REDUCES ENERGY CONSUMPTION

Retrofitting existing installations while minimizing labor, material and structural damage is resolved with Lutuo's no-neutral wall switch controller that allows fast and cost effective retrofits with minimum effort.

By Tony Berges, General Manager, Lutuo

The user just needs to remove the traditional switch and replace it with Lutuo's no-neutral wall switch controller, stick an occupancy sensor on the ceiling, press the bind buttons and an intelligent lighting system is ready. Although the intelligent lighting system will improve comfort and reduce energy use, the trend to replace energy hungry lights with efficient LEDs reduces the overall energy impact derived from intelligent lighting control.

POSITIVE ENVIRONMENTAL IMPACT

However, the ability to easily retrofit heating, ventilation and air-conditioning systems with EnOcean-enabled no-neutral controllers offers the potential to significantly lower energy use while improving environmental comfort by monitoring and controlling temperature, humidity, CO₂ etc. Not only where the controller is located, but also where control is actually needed by placing remote sensors at critical locations.

INSTALLATION IN LESS THAN 15 MINUTES

As with Lutuo's wall switch, simply replace the existing thermostat with Lutuo's HVAC controller, stick an occupancy sensor in the ceiling, press the bind buttons and an intelligent HVAC system is ready. A new installation can be completed in less than 15 minutes without requiring additional rewiring. Lutuo also offers a battery-powered model for applications that require a stand-alone controller.



www.lutuotech.com



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INTELLIGENT BUILDING GATEWAY

The new Intelligent Building Gateway from ATIM collects and analyzes data from EnOcean-based sensors. The solution offers high reliability, low power consumption and interoperability. The SIGFOX box can connect the devices to other radio systems and can directly receive data on a web interface.

By Matthieu Ruzzin, Sales & Marketing Manager, ATIM Radiocommunications

SIGFOX is the first telecommunication provider that focuses on M2M communication and the Internet of Things. ATIM is an established integrator offering modules compatible with this network for all applications in the field of metering, smart home or the “smart city”.

The functionality of this unique solution is simple: first, it pools all the data received from the EnOcean network and in a second step, it transfers the information to a remote server via the SIGFOX network. Thus, the data can be used on a tablet or a smart phone. If needed,

Wi-Fi and Bluetooth low energy features can also be integrated in order to get the most comprehensive gateway on the market.

The Intelligent Building Gateway is a perfect fit for ambient assisted living or smart home solutions. The Plug&Play system is very easy to implement and its versatility is applicable to remote control of EnOcean-based devices. The only limit is the user's imagination.

www.atim.com



ENOCEAN AND BACNET IN A BOX

Magnum Energy Solutions, a leading manufacturer of wireless, self-powered energy management technology, has released their latest innovation, the eBox.

By Cory Vanderpool, Business Development Director, Magnum Energy Solutions

This device is similar to a traditional gateway, but offers significant advantages at a more competitive cost. The eBox gives facility managers, contractors and OEM manufacturers the ability to easily integrate EnOcean-based wireless solutions into wired building automation systems. The eBox is interoperable with any BACnet

compliant building management system and supports functionalities for HVAC, lighting, plug load applications as well as metering.

www.magnumenergysolutions.com



MORE THAN JUST ANOTHER LIGHTING CONTROL PLATFORM

Helvar's 434 Gateway brings DALI (Digitally Addressable Lighting Interface) lighting controls under the EnOcean umbrella for the first time, and far from a box-ticking exercise to add lighting control, Helvar is working to bring the best of lighting control to integrate with EnOcean, creating better environments for work and study, and lowering energy draw in the process.

By Andrew Glossop, Senior Product Manager, Helvar Ltd.

Lighting, in the commercial building, is often considered the bad-guy, consuming the most energy of all automated building technologies. However, unlike a Hollywood bad-boy, lighting wants its shot at redemption. Lighting wants to be your friend. That is why lighting control companies are working to reduce the cost and energy implications of lighting buildings with increasingly sophisticated lighting control systems.

EVERYTHING'S UNDER CONTROL

The DALI standard for lighting control has been widely enjoyed in commercial applications for many years, providing digital control of fluorescent light sources. As LED has become more prominent in lighting, DALI LED devices have been developed to meet the demand for control of this light source.

ENOCEAN AND HELVAR – ONE VISION

What drew Helvar to EnOcean was the steadfast focus on energy saving. Helvar works on a number of projects where its lighting controls integrate with BMS elements, such as HVAC, blinds, automated-windows and more. This approach renders the greatest energy savings, and combining DALI and EnOcean is the best method for LED lighting control.

In a recent project, Helvar interfaced with the components listed above: as lights dim, blinds open and the building cools. The payback period of the system was two years and the projected savings across the building's life are vast.

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SMARTSTRUXURE LITE AND ENOCEAN



Schneider Electric, the global specialist in energy management, has released a line of EnOcean-based devices that complement to the popular SmartStruxure Lite solution which currently encompasses metering, HVAC and lighting control applications for commercial buildings such as retail stores, schools, offices and hotels.

By Vince Marcovecchio, Product Manager, Schneider Electric

The primary objective of Schneider's EnOcean portfolio is to offer customers a complete set of building automation tools which facilitate the installation and operation of energy efficient HVAC and lighting solutions – making them less invasive and easier to accomplish. By expanding

the company's offering and merging this technology with the powerful network-ready SE8000 temperature control units, Schneider is able to offer a solution that optimizes energy savings while increasing overall system flexibility and user comfort.

BEST-IN-CLASS AT LOWER PRICE

EnOcean solutions allow for simpler integration into new installations or older building retrofit projects. They not only allow for greater wireless control options but also accel-

erate installation time and reduce overall projects costs. The higher costs incurred when running new communication wiring is eliminated due to the integrated wireless functionality dramatically improving the overall cost associated with new and retrofit projects. Schneider can now offer its customers best-in-class devices at a much lower price point. The energy harvesting capabilities of the EnOcean technology provides a greener maintenance-free alternative for room-level control and sensing requirements.

The use of EnOcean Equipment Profiles (EEP) eliminates the need for any additional scripting to be done since preconfigured devices can communicate with each other right out of the box. This represents a quicker set-up time with lower programming costs for the end user.

DETECTION OF SAVINGS

An example of the easy energy-saving potential can be seen with Schneider's EnOcean wireless infrared occupancy sensors which help reduce unnecessary heating, cooling or lighting consumption during down times or when a room is not being used. By accurately detecting when a room is vacant, unnecessary lights can be turned off for additional automatic energy savings benefits. Sensors can be paired with window and door contacts to allow for even more flexibility and accuracy when



detecting room occupancy and ensure further energy savings and a faster return on investment.

SMARTER SUSTAINABILITY

The development of future energy-saving solutions is very bright and the goal at Schneider Electric is to be at the forefront of this exciting evolution. The challenge remains empowering people to behave more sustainably. The right balance between developing new technologies and energy-efficient consumers is the key. Smarter technologies and smarter behaviour will guarantee a sustainable future for all.

<http://smartstruxurelite.buildings.schneider-electric.com>



Schneider Electric includes their EnOcean-based products into an integrated building control via gateways.

WIRELESS AND EASY-TO-FIT

The EnOcean-based wireless current clamp by Pressac is totally maintenance-free, requires no batteries and is straightforward to install by clipping over any single core cable.

*By Edward Mellor, Director of Innovation,
Pressac Communications Limited*

The current clamp measures the electrical current in any single phase cable and transmits the value every 10 or 30 seconds dynamically adjusted depending on the primary current.

EASY INSTALLATION

The device requires no electrical live installation; the unit is simply clipped around the electric cable. Instantaneous electric energy values are transmitted from this device & used to influence a user's behaviour via energy displays or alerts if excessive electricity is being consumed. This sensor can also be provided as an OEM unit.

www.pressacsensing.com



INTEROPERABILITY² – BACNET AND ENOCEAN

Neptronic has introduced EnOcean wireless BACnet Application Specific Controllers (B-ASC) and wireless comfort sensors.

Luis I. Melgares, Regional Sales Manager, Neptronic

The Neptronic EFCB series fan coil controller combines BACnet MS/TP communication (BTL certified) with the EnOcean wireless standard, providing that extra peace of mind when integrating simple or complex projects.

THE BEST OF BOTH WORLDS

The Wireless Comfort Sensors broadcast the room temperature, room humidity, setpoint, accumulate energy levels, and manual override via the EnOcean wireless standard. The EFCB controller can then read and re-broadcast these values via the BACnet MS/TP protocol for maximum interoperability.

POWER FOR 14 DAYS OF DARKNESS

Self-powered using ambient light energy combined with the largest light energy cell surface; the Wireless Comfort Sensors perform energy harvesting and provide operation for up to 14 days without light. No wires and no batteries save time, labour and maintenance.

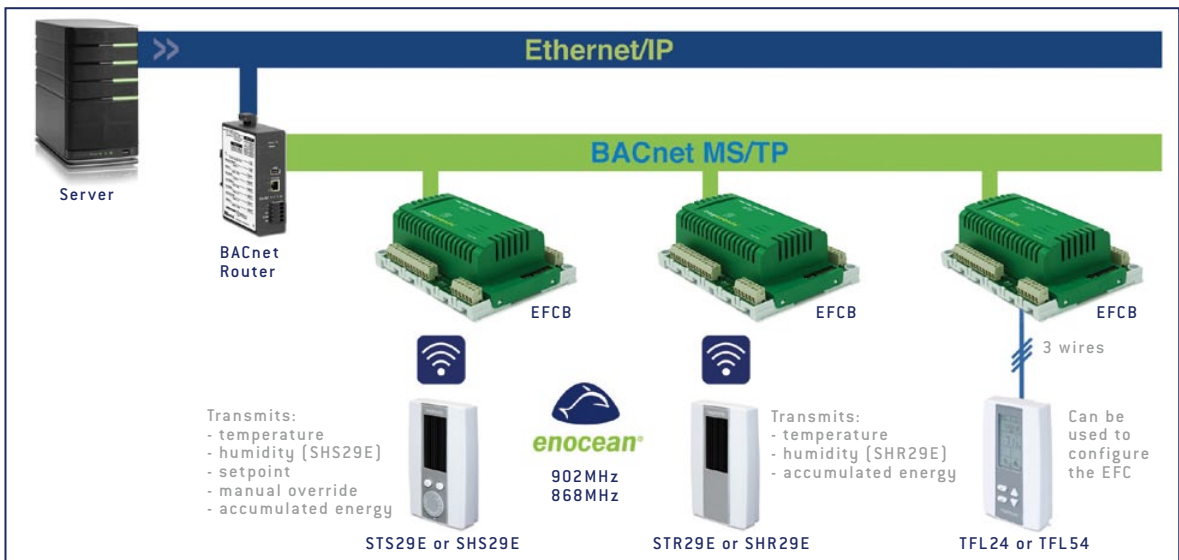
WIRELESS CONTROLLERS (B-ASC)

- EnOcean wireless communication
- Easy learning mode
- BACnet® MS/TP
- Field configurable fan coil algorithms
- Configurable inputs and outputs

WIRELESS COMFORT SENSORS

- Self-powered via ambient light energy (or 24Vac input)
- Largest light energy harvesting cell surface
- Energy harvesting provides operation for up to 14 days without light
- Energy harvesting functions down to 200 lux
- Optional backup battery for low light installations
- EnOcean wireless communication
- Built-in temperature sensor with optional humidity sensor
- Remote temperature sensor input

www.neptronic.com



VERSATILE, TIME-SAVING SOLUTIONS TO MANAGE ENERGY

WattStopper has introduced a new line of wireless occupancy sensors in response to customer requests for more choices to manage energy. The radio frequency (RF) products make it easy and cost effective to install code-compliant controls in existing buildings, or wherever wired occupancy sensors aren't the best fit. The product line includes dual relay controls not available from other manufacturers, as well as time-saving functionality.

By Carlos Villalobos, Director of Product Marketing, WattStopper



The sustainable product line includes a passive infrared (PIR) occupancy sensor, powered by unobtrusive energy harvesting photovoltaic panels, with a prime 360° coverage pattern. One or more sensors can be paired with a variety of single or dual relay 120/277 volt RF wall switches as well as self-powered handheld and wall mounted remotes, enabling wireless control from multiple locations. The wireless sensor is also packaged as a kit with a single or dual relay RF switch and these EnOcean-enabled products are factory paired for even faster installation.

PERFECT FOR RETROFIT PROJECTS

WattStopper's wireless RF controls are ideal for applications where traditional sensors are difficult, or even impossible to install, including historic buildings, buildings with asbestos in the plenum, or spaces with hard ceilings. The wireless sensor can accommodate a battery for low light applications, and includes magnetic and adhesive surface-mounting solutions.

Versatile functionality includes the ability to select manual- or automatic-on operation for each RF switch or wireless remote control button, select time delays and pair any button with any load. The products also mark WattStopper's participation in the EnOcean Alliance.

www.wattstopper.com



WHAT IF THE SENSOR IS THE ONLY TOOL YOU NEED?

Echoflex has simplified the installation process by embedding configuration/placement tools in all of its latest sensor products.

By Paul Greening, Sales and Marketing Manager, Echoflex

Each of Echoflex' products come with features that allow the installer to mount the sensors in the optimum location for signal transmission and solar energy harvesting without the use of additional equipment or personnel. In addition, local configuration tools are embedded in the sensor to allow access to modify basic configuration parameters.

RANGE AND LIGHT LEVEL CONFIRMATION

Echoflex sensors now have range confirmation technology (patent pending) embedded in them, which allows the sensor to display the connection quality between the receiver and the sensor. In addition, they can display

that the current light level over a certain period of time will sustain its operation to maximize its energy harvesting. Sensitivity settings, for the prevention of false triggering, have also been embedded as a feature in the occupancy sensors. Configuration, such as changing the operating parameters, is accomplished at the local level by using the sensors' "teach" button to make these changes.



www.echoflexsolutions.com





INTELLIGENT SUSTAINABILITY FOR A PERFECT FEEL-GOOD ENVIRONMENT

The smart home sector is facing a paradigm shift. Experts describe the home of today as one that features integrated and automated control of heating, shading and lighting systems. Social trends go hand in hand with this development, since customization, multiple options and multitasking are gaining prominence, along with a growing understanding of sustainability and benefit orientation.

By Heidi Häberle, Marketing, TELEFUNKEN Smart Building GmbH

According to Capgemini Consulting, 66 percent of German (online) households rate smart home concepts as attractive or very attractive. At the same time, developments in the global environment point to steadily rising energy prices and the beginning of an energy transition. This will significantly increase the burdens imposed on private households every year. To counteract this development, TELEFUNKEN Smart Building is hard at work further developing its Joonior series. The products series in the home automation segment is intended to motivate users to have fun with sustainable energy use and do their part for the energy transition.

LEVELS OF FLEXIBILITY

With the home automation system based on EnOcean wireless technology, users enjoy flexibility on all levels, in existing buildings as well as new ones. Joonior users can also count on smaller investments in energy management systems and choose an individual room controller based on thermostatic radiator or floor valves. Individual timer programs can be set for each room even at this expansion stage. Thus, radiators are automati-

cally turned down to a predefined temperature when no one is at home. Not only does this prevent unnecessary waste of heating energy but it also makes sure that the rooms don't get too cold. Just by mounting a small window contact, the Joonior app alerts the user to the fact that certain windows are open or not completely closed, which also turns off the individual room controller during this period.

CONNECTING TO VISSMANN HEAT EXCHANGERS

An additional Joonior system upgrade recently began offering direct thermal connection to Viessmann heat exchangers. This means that the controller does not impact only the individual radiators but rather the entire heating circuit. The values for the inlet temperatures, hot water temperatures or the yield of the solar thermal systems can be readily accessed transparently as well as customized and optimized individually. Users can now use energy more efficiently in next to no time, save heating costs and use a convenient home automation system at the same time. Those who prefer to set aside





Left side: The photovoltaic manager provides a clear overview of all current readings of your PV system.
 Above: The room thermostat provides easy control of the room climate in programmable stages.
 Right side: With the individual room controller, users can set and automatically control a pleasant room climate that best suits their needs.

their smart phones at home can easily set the room climate with a spiffy room thermostat, and the simplest operating elements are always close at hand.

HOME-GENERATED ELECTRICITY IS ADDED VALUE

The icing on the cake of integrated energy management with Joonior is the private use of home-generated electricity. The Joonior system provides the option of connecting electrical consumers to the in-home PV system via a meter adapter. Crucial added value is created by the fact that all consumers can be fully automated and switched on the basis of the feed-in capacity.

www.telefunken-sb.de



The Joonior app is easy to use – at home or on the road.



CLEVER COMBINATIONS OF LIGHT AND SOUND TRIGGER AN EMOTIONAL RESPONSE

The combination of sound systems, LED lighting and OPUSgreenNet has attracted the attention of planners, architects, builders and housing associations.

By Ina Trautmann, Marketing Director, JÄGER DIREKT

What are the most important factors in choosing technology? Along with objective arguments, emotional considerations play a crucial role in decisions about personal space, industrial applications and offices.

NEW ADDITIONS TO THE PORTFOLIO ATTRACT ATTENTION

OPUSgreenNet, the complete EnOcean system from JÄGER DIREKT, has long pursued the strategy of offering solutions instead of just products. As a result, practical solutions such as IP cameras and intercoms round out the portfolio – always with the goal of providing a reliable, user-friendly and complete system for home and building automation.

ATTRACTIVE LIGHTING – INTELLIGENT CONTROL

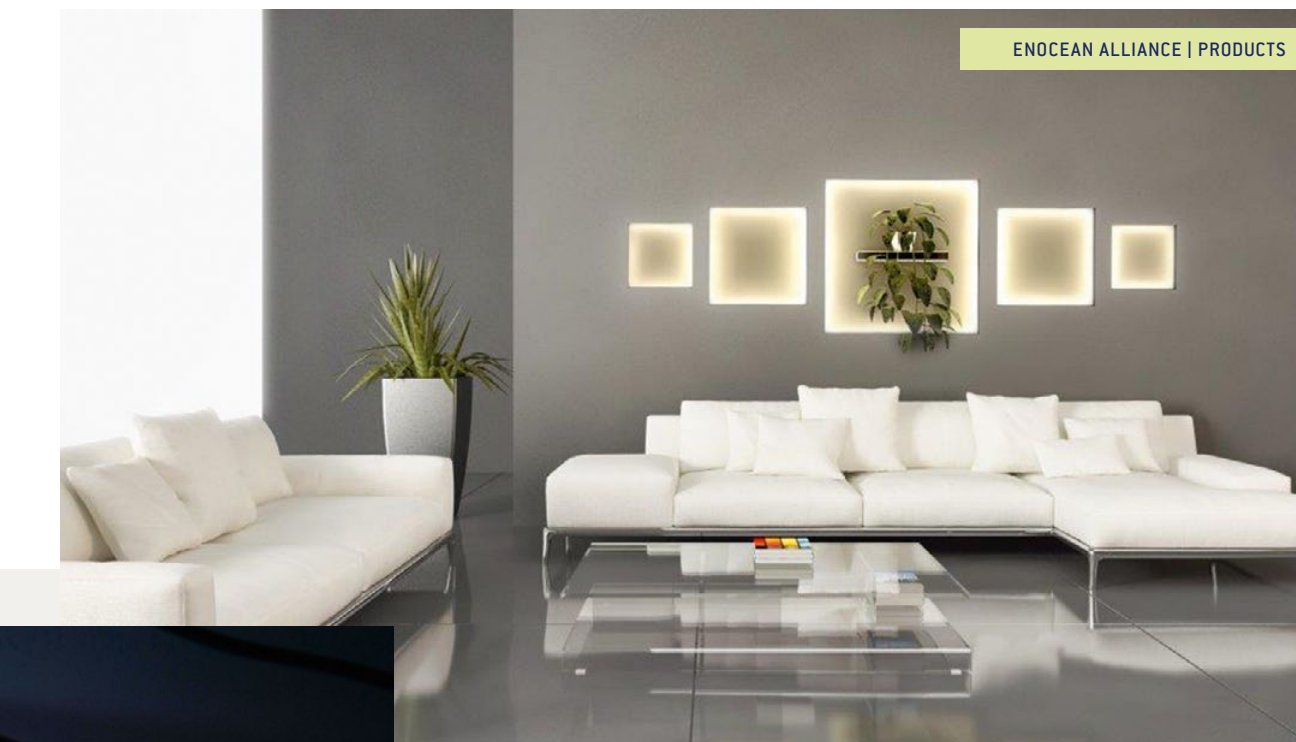
The future of light is digital: LED lighting systems have shaped the market at least since the Light+Building trade show in 2012. It is not always clear how to install the energy-efficient solutions in a way that is both smart and user-friendly. A great many alternatives are available. For example, LED stripes are no longer limited to indirect lighting but are an excellent choice for background lighting as well, thanks to their high lumen values.

Controlling the LED stripes with OPUSgreenNet and LED profiles is even bringing about a small revolution in the way in which lighting is integrated into buildings. The LED profile elements that JÄGER DIREKT markets in cooperation with LED Profilelement GmbH are a perfect solution to the problem.



THE RIGHT LED EVERY TIME

When it comes to functionality and finding the right look, customers benefit from a number of different advantages. Baseboards are replaced by metal profiles, suspended ceilings are given a clean frame, and the wall lights have simple end plates and attractive contours. The profiles also prevent the annoying cracks that often occur in drywall elements.



The LED stripes are fast and easy to install, thanks to a self-adhesive backing or practical magnetic strips. JÄGER DIREKT provides a selection of the most popular lengths, which are ready for mounting and only need to be coupled to a matching length. OPUSgreenNet handles the activation of light scenes, dimmer functions and convenient RGB control from a smart phone.

speaker membrane. The sound is transmitted through vibration excitation in the material, while electronic correction makes for convincing audio. The great advantage is a consistent volume throughout the room, while cabinets and cable clutter are no longer an eyesore.

GETTING STARTED IS EASY

OPUSgreenNet provides many different ways to control the invisible sound system, and Bluetooth turns smart phones and tablets into a simple audio source. The cost of basic solutions starts at only a few hundred euros, and even professional sound reinforcement in conference rooms or concert halls is provided by accessories such as subwoofers and amplifiers. Another benefit is the fact that the modular system goes hand in hand with OPUSgreenNet upgradeability. JÄGER DIREKT works closely together with the developer and manufacturer JM Audio Design in this segment.

INVISIBLE SPEAKER WITH POSITIONABLE SWITCHES

JÄGER DIREKT also offers clever combinations of sound and EnOcean. The controller is based on energy harvesting wireless technology and combines it with an invisible sound system. The so-called kx waVer turns many elements into a sound source. Suspended ceilings, walls, glass and pieces of furniture are used as a

www.OPUSgreen.Net



SMALL PUSH WITH A BIG IMPACT

BSC Computer GmbH has integrated a new function into its app solutions: push notifications, which allow users to receive, for example, all important alarms on their smart phones – without having to open the app or pay any SMS text messaging fees.

By Jörg Hofmann, Managing Director, BSC Computer GmbH

Intelligently networked buildings would be inconceivable without them: apps that allow users to run the functions of their automation equipment conveniently and at any time from their cell phones while they are out. BSC has now integrated a push notification service into its apps, one that uses the potential of intelligent control to maintain building security.

REAL-TIME ALARMS

As a result, the EnOcean-based sensors not only offer greater convenience, they can also be used as an alarm system. The same app that allows users to operate all functions also alerts them to security-relevant events by sending a push notification. It does this, for example, when water sensors detect a water leak, a window contact indicates that a window was opened, an occupancy sensor registers the presence of a person or a smoke detector is triggered.

PERSONAL ANONYMITY

Integrating the push services into BSC's controllers and apps means that the smart phone immediately displays messages from the selected sensors—without having to launch the app. The user can therefore respond much faster to a warning and not only after launching the app in the meantime. This establishes a much more direct connection between the user and the building automation system. At the same time, the service doesn't request any personal data such as cell phone numbers and e-mail addresses.

NO ADDED COSTS

Unlike solutions that use SMS text messaging services, the push services do not incur any additional costs. Configuration is also much easier and more flexible. The app for the GMS module in the Eltako 14 series (FGSM14) already supports the push service and is thus a convenient way to get started monitoring and controlling buildings.

www.bscgmbh.de



FIRST UNIVERSAL CONFIGURATOR FOR ENOCEAN INSTALLATIONS

Vesta-System has launched VestaEnergy AM (Architecture Manager), the first universal configurator for EnOcean installations, designed to work with any hardware platform from the market, including PCs.

By Sébastien Cadeau-Belliard, Director Sales & Communication, Vesta-System



Thanks to a very easy to use graphical user interface, users can organize their own installation and configure each single component themselves. Subsequently VestaEnergy AM automatically configures all peripherals needed: databases (online or on-site), graphical user interfaces (web servers, Android-based applications), gateways, etc.

AUTOMATIC IDENTIFICATION

When installing or preparing the system, VestaEnergy AM automatically identifies each product (no need to write down the ID) in accordance with the latest EnOcean Equipment Profiles (EEP). VestaEnergy AM is used at each stage of the project, to prevent information loss:

- Pre-sales: to define how many products are needed
- Installation: for fast and efficient configuration of products
- Commissioning: to provide reliable service to users and to allow for fast configuration

100 % CUSTOMIZABLE

Field-proven and presented at Bâtimat/Interclima Elec and Educatec in Paris this fall, VestaEnergy AM has already attracted many installers and education centers for its user-friendliness and capability to automatically generate Android applications, customizable for each user or contractor.

www.vesta-system.com



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SMART HOME PROJECTS WIN WITH ENOCEAN

According to the motto "Home Automation 2.0", ten experts of the French automation industry honored building projects in seven categories with the SMARTHOM AWARDS 2013. Two winning projects integrating energy harvesting wireless technology received prizes. The awards were presented at Interclima+Elec 2013 in Paris.

WINNER CATEGORY "ACCESSIBILITY"

The "Medetic Technologies" project in Colmar illustrates the use of automation to allow the elderly to remain in their own homes. The General Electric Energy Habiteq solution was used in the design of energy-efficient, smart housing for seniors, incorporating living-environment considerations that included entertainment, services, health and safety at reasonable cost. With regard to home safety, assisted living and energy savings, home automation systems were complemented by communications networks. The fit-out also included special home telehealth equipment.

WINNER CATEGORY "ENERGY EFFICIENCY"

DOMO LOGIS TEC installed an automation system in a

house in Belgium based on a KNX multi-brand solution (ABB, Zennio, Theben) and an EnOcean solution (wireless and battery-free technology). It controls the speed of the heat recovery ventilation system based on a ground-coupled heat exchanger depending on the inside temperature, monitors the rainwater collection system, optimizes the level of required lighting, and manages heating on a per-room basis with window contact for frost protection on opening. It also measures power consumption.



DGLOGIK WINS TWO AWARDS AT AHR EXPO 2014

DGLogik, a leader in building automation technologies, has received two Control Trends Awards at AHR Expo 2014.



The EnOcean Alliance member was honored for DGLux – The Visualization Platform that received the Best Application of the Year Award and DGBBox – The Application Platform that received the Best Commercial Product of the Year Award. DGLux is a drag&drop visualization platform that facilitates the design of real-time, data-driven applications and dashboards without writing a single line of code. DGBBox is a low-cost end-to-end solution for creating and utilizing appliance applications, for example EnOcean-based energy harvesting wireless sen-

sors. The solution consists of DGLux embedded into a commodity hardware box.

The Control Trends Awards program is in its 2nd successful year in hosting the award ceremony. It gathers leading automation professionals and companies like Honeywell, Johnson Controls, Tridium, and recognizes the leading automation products within the building automation and HVAC controls segment on the market.

www.dglogik.com

ONE-STOP-SHOP

Smarthome by EKE is an integrated home automation system for residential buildings, ranging from individual houses to apartment buildings. It utilizes both wired and wireless (EnOcean) communication technology and offers functions for HVAC control, home safety, energy and water metering and lighting management.

By Jorma Zielinski, Director, EKE Home Automation Business Unit



With Smarthome by EKE, the company adds a new wireless gateway to its comprehensive home automation system. The gateway is integrated into the EKE Smarthome room panel, thus allowing both stand-alone installation and installation as an extension of the existing Smarthome by EKE system. Due to the portfolio expansion, users of Smarthome by EKE can now choose batteryless wireless EnOcean-based switches, sensors and relays to flexibly and individually realize their intelligent connected house, also allowing a cost-efficient retrofit.

INTEGRATED HOME AUTOMATION

The Smarthome by EKE system adjusts air handling units based on humidity and CO₂ measurements. Room temperature is monitored using standard EnOcean-based temperature sensors and automatically adjusted via valve actuators. The system controls the temperature based on preset date and time programs as well as house profiles. In addition, the functionality includes energy and water metering, lighting management and home safety. The EKE Cloud Service offers users a secure remote access to the system from anywhere over the Internet.

EKE Group is committed to delivering its customers innovative solutions that make their every-day lives easier. The company wants to contribute to the sustainable development through its solutions for intelligent trains and energy-saving smart homes, and by constructing energy-efficient and resident-friendly buildings.

www.eke.fi



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NEW PEOPLE



MARKUS FLORIAN, SALES DIRECTOR CENTRAL EUROPE, ENOCEAN GMBH

In early November 2013, Markus Florian joined the sales team of EnOcean as Sales Director for Central Europe. In this role, he serves customers in Germany,

Austria and Switzerland as well as in Italy. His main tasks include the sales of batteryless wireless solutions, consulting existing customers, the expansion of the new customer business in the regions as well as opening up new markets for energy harvesting radio. Markus Florian has over 20 years of experience in sales and product integration for electronic solutions. Prior to joining EnOcean, he worked at Energy Micro AS in Munich as Director of Sales Central Europe. Besides a significant expansion of the business based on new design-ins, he developed additional applications in major markets such as metering, industrial and home automation, security and consumer electronics.

E-Mail: markus.florian@enocean.com



ADVANCED DEVICES IS NEW ENOCEAN PARTNER IN CHINA AND TAIWAN

Since taking its first steps in the Asian market in late 2011, EnOcean's business in China and Japan has experienced a fast-paced growth. Partnering with Advanced Devices, an innovative design-in focused distributor, EnOcean converts this rapidly increasing interest in self-powered devices in China and Taiwan into a growing and diverse customer base in the region. Major team objectives are to support existing Chinese and Taiwanese customers, to expand EnOcean's business and to accelerate product design-ins. Experienced technical sales representatives and field application engineers from Advanced Devices in Shanghai works closely with EnOcean's existing team in Beijing. Thereby, EnOcean has a presence in two major Chinese business locations.

www.enocean.com/cn

www.advanceddevices.com



IPPEI TANAKA, FIELD APPLICATION ENGINEER JAPAN, ENOCEAN GMBH

For the growing customer base in Japan, Ippei Tanaka has joined the company's Japanese operations as Field Application Engineer. In this position, he is responsible for

supporting the growing base of projects and customers in Japan, helping with customer training and helping to create new design-ins. In addition, he is responsible for technical documentation in Japanese language.

Ippei is a veteran of the electronics industry and brings a wealth of experience in this field. After graduating from the University in Osaka with a degree in physics, he has spent 30 years in the industry, including at Asahi Kasei Microelectronics and Tomen Electronics. His experience includes being Wireless Communication Project Leader for WiFi and managing a software developer team.

E-Mail: ippei.tanaka@enocean.com



TOM JAMES, BUSINESS DEVELOPMENT DIRECTOR NORTH AMERICA, ENOCEAN ALLIANCE

The EnOcean Alliance has appointed Tom James as new Business Development Director

for North America. In this position, Tom actively supports the region's EnOcean Alliance members in projects, trainings and events. In addition, he educates the market and the public on the benefits of energy harvesting wireless solutions for energy-efficient buildings to increase awareness and demand for the products and services. Tom James brings in more than 20 years of experience in pioneering innovative, energy efficient lighting products in the commercial lighting industry. As National Business Development Manager at Tambient he was responsible for the education of industry thought leaders, utilities, and end users across the United States. He created numerous award-winning projects based on next generation office lighting systems and helped pioneer the creation of a self-powered, wireless lighting control system for Tambient.

E-Mail: tom.james@enocean-alliance.org

A HANDLE ON EVERYTHING

The worldwide patented window alarm handle from SODA sets new standards in security and sensor technology.

By Heike Bedoian, CEO, Soda GmbH

The new window alarm handle revolutionizes technology through the integration of alarm, temperature and other sensor functions. Based on the most modern sensors systems, the integrated alert and climate function reacts to vibration and glass breakage by emitting a 115db loud signal.

MONITORING AND METERING IN COMPREHENSIVE DESIGN

During the development of a sensor for deterring burglars, a multifunctional sensor technology came into being. A highly innovative solution for measuring the handle position, humidity, brightness, temperature, etc., transmitted via EnOcean radio, which complies with today's environmental and energy saving ideals.



HIGH PERFORMANCE MULTI TALENT

In all handle positions, the window sensor handle transmits the information needed to the likewise newly developed multibox (base station). Based on EnOcean radio, and according to intelligent home automation, all technical devices,

heating systems, shutters etc. can be connected and controlled via the window alarm handle. The multibox's highlight is its price-performance ratio.

PLUG&PLAY IN THE VERY SENSE OF TERM

Furthermore, the handle offers the unique possibility of integrating other wireless standards, and thus expanding the system with correlative functions.

www.soda-gmbh.de



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www.sauter-controls.com

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Mar 30-Apr 4, **Light+Building**, Frankfurt, Germany
www.light-building.messefrankfurt.com

APRIL

Apr 14-16, **China Intelligent Building Expo 2014**, Beijing, China
www.china-ibuildexpo.com/IB14

JUNE



Jun 3-5, **LIGHTFAIR International**, Las Vegas, USA
www.lightfair.com



Jun 9-12, **Guangzhou Electrical Building Technology**, Guangzhou, China
www.building.messefrankfurt.com.cn

SEPTEMBER

Sep 3-5, **Shanghai Intelligent Building Technology**, Shanghai, China
www.building.messefrankfurt.com.cn

Sep 16-18, **EQUIPMAG 2014**, Paris, France
www.equimag.com



Sep 24-25, **IBS Paris**, Paris, France
www.ibs-event.com

OCTOBER

Oct 29-31, **HI TECH BUILDING**, Moscow, Russia
www.hitechbuilding.ru/en/htb/

NOVEMBER

Nov 11-14, **Interlight Moscow**, Moscow, Russia
www.interlight.messefrankfurt.ru

Nov 16-20, **Equip'Hotel**, Paris, France
www.equiphotel.com

FURTHER INFORMATION ...

Interesting links, news, images and videos from EnOcean and the EnOcean Alliance can be found at:



WHICH MODULE FOR WHICH PRODUCT?

The EnOcean Product Finder answers this question online and always up-to-date www.enocean.com/product-finder

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