



ENABLED BY ENOCEAN

perpetuum®

MAINTENANCE-FREE WIRELESS SWITCHES & SENSORS

2010 ISSUE 1

STANDARDIZATION

ENOCEAN TECHNOLOGY

The dynamism of an idea – from simple beginnings to an international standard

SMART METERING

Implement tomorrow's smart metering solutions with the Dolphin platform

NH HOTELES

Europe's third biggest hotel group modernizes more than 5000 rooms with EnOcean

DOLPHIN READY

The new small actuator from Kieback&Peter sets up on the Dolphin platform from EnOcean

Frankfurt 11.–16.04.2010

light+building

EnOcean exhibits: hall 9,0 B40



Easy operation – as simple as a smile

» www.thermokon.de

**Wireless – no batteries – very reasonable:
EasySens[®] in combination with BUS gateways**

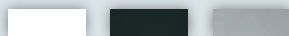


› SR04PST Room Operating Panel



› Wireless Switch »mini«, 61 x 61 mm at a reasonable price

Thermokon design in pure white, glossy, anthracite, aluminium



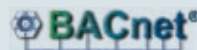
The interoperable **EasySens system** makes your operation as easy as possible. Only one network node is enough to evaluate up to 32 different wireless sensors and switches.

No complex wiring is needed any more. Thus, you are fully flexible with regard to your interior design.



» **Advantages at a glance:**

- wireless
- no batteries
- maintenance-free
- cost-effective
- interoperable



light+building

11. – 16.04.2010 Frankfurt

Please visit us in Hall 9.0
Thermokon Main Stand D50

EnOcean Partnership Stand B40
LONMark Partnership Stand E10
BACnet Partnership Stand B60



Dear readers,

This year EnOcean is attending the Light+Building show, the world's leading trade fair for Architecture and Technology, for the fifth time. When we first came here, we had no products to exhibit – but at least we brought revolutionary ideas. At that time we didn't even have prototypes of wireless light switches powered simply by finger pressure. But although we set up seemingly non-descript in a corner of the exhibition hall, more and more visitors came to the small booth in the course of the show. What would you call them? Visionaries in building technologies like Thermokon, PEHA, Omnio and Wago seized the initiative, and before long they had developed their first products based on EnOcean technology.

Today these companies are successfully marketing EnOcean-enabled products and are also co-founders of the EnOcean Alliance. In the meantime our booth is 120 square meters in size, and no longer tucked away in a corner but right in the middle of the exhibition hall. Together with twelve members of the EnOcean Alliance, EnOcean is showing a whole variety of new products and solutions based on its self-powered wireless technology.

And the product portfolio itself has long expanded beyond light switches. In 2004 already, Thermokon came out with the first solar-powered room thermostat. That was followed by humidity and light sensors, motion detectors and literally hundreds of actuators from various manufacturers. This year alone numerous new products are being presented, including A.C. meters from Eltako, a wireless controlled heating valve from Kieback&Peter, an integration into the Philips automation system and switch designs from Siemens, Jung and Vimar. But not only the product portfolio, EnOcean's presence on international markets is also constantly growing. At the beginning of this year Emmanuel François joined the EnOcean team in Paris.

At this years Light+Building and Lightfair there'll be EnOcean-enabled solutions on show from more than 60 manufacturers. A clear indication that self-powered wireless technology is well on its way to becoming an international standard. And worldwide hundreds of engineers are working on new and improved solutions. So EnOcean's future trade show appearances are bound to be worth watching.

Markus Brehler,
CEO, EnOcean GmbH

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ENOCEAN TECHNOLOGY

from simple beginnings to an international standard

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SMART METERING

Implement tomorrow's smart metering solutions with the Dolphin platform

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MASTHEAD

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Festo AG & Co. KG : p11 (design study)
NH Germany: p22/23



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NH HOTELES

Europe's third biggest hotel group modernizes more than 5000 rooms with EnOcean technology

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DOLPHIN READY

The new small actuator from Kieback&Peter sets up on Dolphin



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THE ABC OF ENOCEAN

EnOcean GmbH is the originator of patented self-powered wireless technology. Headquartered in Oberhaching near Munich, the company manufactures and markets maintenance-free wireless sensor solutions for use in buildings and industrial installations. EnOcean products are based on a combination of miniaturized energy converters, ultra-low-power electronic circuitry and reliable wireless. EnOcean wireless components are already in use in more than 100,000 buildings. EnOcean won a number of awards in recent years, for example Elektra 2008: "Wireless & Telecoms Design" and "Company of the Year".

By Andreas Schneider, Executive VP and Co-Founder, EnOcean GmbH

GREEN

The innovative enabling technology from EnOcean works entirely without batteries, and is completely service-free. To detect information and then transmit it by short-range wireless, an EnOcean solution harvests the necessary power from its surroundings: from linear motion, light or differences in temperature for example. The energy obtained in this way suffices to send a wireless signal, and turn on a light for instance. Plus, the use of wireless switches and wireless sensors very much simplifies the cabling of a building. At the same time they make for a great deal of flexibility because no new cabling is needed if alterations are due. With little effort and with no breaking into walls, EnOcean-enabled products can be placed exactly where they are of optimum use.

SMART

EnOcean is a system that optimally connects a number of components: wireless sensor networks, energy management, software and sensor link. Each wireless node possesses its own local processor to capture measured data, for instance, and control energy management or wireless transmission. EnOcean wireless modules always come with firmware set up so that no modifications are necessary. Plus there is enough scope for application-specific configuration. Added to which, wireless sensor modules from EnOcean are very simply integrated in a whole number of different sensors.

WIRELESS

The EnOcean wireless signal uses the 868 MHz or 315 MHz frequency band, meaning the technology is suitable for solutions worldwide. Telegrams are just one millisecond in duration, and are transmitted at a rate of 125 kilobits per second. To exclude transmission errors, a telegram is repeated a number of times in the space of

30 milliseconds. Transmitting data packets in random intervals makes the probability of collision extremely small. The range of EnOcean wireless sensors is 300 meters in the open and up to 30 meters inside buildings. Each EnOcean module comes with a unique 32-bit identification number to eliminate any possibility of overlap with other wireless sensors.

BIDIRECTIONAL

In the new Dolphin system architecture EnOcean offers a platform optimized for energy harvesting applications enabling, for the first time, the creation of batteryless, bidirectional wireless sensors and actuators. This flexibly expanded hardware and software architecture is suitable for use in very different areas. Central components of the Dolphin platform are the simply integrated TCM 300 and TCM 320 modules plus the solar-powered STM 300 module.

INTEROPERABLE WIRELESS STANDARD

There are already many manufacturers using EnOcean technology in their products. More than 100 OEM partners in a variety of sectors have developed products enabled by EnOcean technology. All of these products are interoperable. So combining switches, gateways and sensors from any OEMs is quite straightforward.

www.enocean.com



ENOCEAN ALLIANCE – THE WIRELESS STANDARD FOR SUSTAINABLE BUILDING

By *Graham Martin, Chairman & CEO, EnOcean Alliance*



The EnOcean Alliance is a consortium of companies working to establish innovative automation solutions for sustainable building projects – and so to make buildings more energy-efficient, more flexible and lower in cost. The core technology of the Alliance is self-powered wireless technology from EnOcean for flexibly positioned and service-free sensor solutions. The EnOcean Alliance aims to standardize and internationalize EnOcean wireless technology, and is dedicated to creating interoperability between the products of OEM partners.

The EnOcean Alliance was officially created in April 2008. The majority of product manufacturers of EnOcean technology, suppliers to the eco-system, as well as additional major international companies developing with the technology are committed to the Alliance. More than 120 companies currently belong to the EnOcean Alliance.

The Alliance has three membership classes:

- **PROMOTERS:** innovative and key players who lead, define and drive the Alliance
- **PARTICIPANTS:** companies and suppliers providing product and services using the Alliance technology
- **ASSOCIATE MEMBERS:** building professionals, academics, smaller distribution partners and others interested in the technology, advancements, examples, training etc.




JOIN US

Become part of the world's largest Alliance for sustainable buildings and show your commitment to a better, more comfortable and energy-efficient world:

www.enocean-alliance.org/membership





THE DYNAMISM OF AN IDEA – FROM SIMPLE BEGINNINGS TO AN INTERNATIONAL STANDARD

It all started with a click. The piezo snapped over and produced a signal instead of a spark. That, or something like it, marked the birth of a technology that has long left the nursery, and is now on its way to becoming an international standard. The pure dynamism of the idea to use ambient energy for wireless sensors is revolutionary.

By Andreas Schneider, Executive VP and Co-Founder, EnOcean GmbH

Self-powered wireless technology symbolized by the dolphin was first presented to a wider public at Light+Building 2002. In 2004 already, ten different manufacturers presented interoperable products. And you could hear talk of a possible new standard. Today EnOcean is recognized as a batteryless wireless standard for flexible green automation, especially in commercial property in Germany, and quite naturally takes its place next to wired backbones like KNX, LON and BACnet. In addition to formal standardization a number of factors like provider and product variety, project quality, regional spread and growing market acceptance contribute to the perception of EnOcean as a standard.

FIRST DIMENSION – ECOSYSTEM

The most prominent self-powered product is the light switch that generates the energy it needs from movement of the rocker. Following the first switch designs from PEHA, the technology now appears in the range of some 15 other manufacturers. The latest company to join their ranks is Jung in Schalksmühle. In some of their very first projects, Thermokon also offered service-free, solar-powered temperature sensors, and WAGO its building management systems, all with EnOcean wireless technology. These are the origin of a product and application ecosystem of very different manufacturers, associated in the EnOcean Alliance. In addition to light and temperature controls, solutions today comprise all kinds of sensors for energy-efficient regulation, a variety of switching actuators for decentral control through to gateways and TCP/IP-based systems. Then there are specialized companies that offer planning and test tools, service providers support in development projects, and component suppliers are working on new developments

intended to enable use of the batteryless technology not only in buildings but also in industrial, automotive and end-user markets.

SECOND DIMENSION – TIME

An important step on the way to becoming a standard is the technical quality of the overall solution throughout the value-added chain. But who is first to implement innovations that by nature cannot be tried in the field? Visionaries bear part of the risk of first-time installations, and participate in the immense communication effort generated by revolutionary technologies. If a solution presents an advantage for all those involved in a project, it will be implemented in increasingly short cycles by more and more users. Experience in the development of technology, products and projects shortens the time span until new products appear, which in turn results in a broader application spectrum.

THIRD DIMENSION – GEOGRAPHIC SPREAD

Made in Germany? That is the case with the core technology and many of the end-products developed round about and enabled by the modules. It was also natural that the first building worldwide with the self-powered wireless technology, the headquarters of Bosch Siemens Home Appliances, should be in Munich – close to where EnOcean is sited.

In Omnio AG, in 2004, Switzerland was the first export market, in which both building projects and products were implemented. At this year's Light+Building global players like Siemens and Philips will be presenting EnOcean-enabled products.

In the meantime the solutions are marketed worldwide by more than 120 OEMs. Buildings in every corner of the earth use the same batteryless wireless standard from EnOcean. In the USA too, the home marketplace of competing wireless solutions, more commercial products for light control are being offered with the dolphin than with bees as their (ecological) logo.

FOURTH DIMENSION – FORMALIZATION

Formal standards are an assurance for the user, they generate a broader application spectrum and result in lower consumer prices through more competition. EnOcean wireless technology satisfies all requirements for formal standardization in the International Electrotechnical Commission (IEC). The very fundamental technology was developed to internationally recognized standards such as the OSI layer model.

In November 2009 the EnOcean Alliance adopted and published the first EEP (EnOcean equipment profile) specification V2.0, which is important through its clearly defined sensor and actuator profiles for interoperable system solutions. Partnership with developers of standardized building system solutions such as KNX, LON or BACnet ensures compatibility of the EnOcean field solution with wired bus systems. The EnOcean Alliance is actively pursuing the path to an open wireless standard, to officially satisfying all formal criteria for a worldwide standard.

At Light+Building 2010 the dolphin cannot be missed. The logo and product solutions will be on show everywhere, from hall 1 among the luminaire manufacturers through to the new hall 11. The major focus will be hall 9, where the EnOcean Alliance is presenting the further development of the standard at a central booth.

www.enocean.com



CONTROL LARGE INDUSTRIAL MACHINES WITH MINIMUM AMOUNTS OF ENERGY

ENERGY-AUTONOMOUS SUPERVISION OF INDUSTRIAL MACHINES



Paper factory in Spremberg, Hamburg

It goes without saying that high availability and reliability of production plant are essential factors for the success of a business. In most cases one attempts to prevent outages and costly repairs by preventive maintenance at fixed intervals. Nevertheless, that causes extra cost and still reduces the availability of machinery. Consequently, innovative technologies – such as batteryless wireless technology from EnOcean – are playing an increasingly important role in the supervision of industrial plant.

By Markus Kreitmair, Innovation Manager, EnOcean GmbH

In many cases permanent monitoring of the operating parameters of production plant can be a better safeguard against unexpected failures. Here deviations from the normal status and irregularities of measured values are immediately reported. In that way the maintenance intervals are extended, and major damage is avoided.

But common systems for monitoring machine status have one drawback – they need what can be fairly elaborate cabling. And cables are costly, not particularly flexible, and cannot always be used in places that are difficult of access for instance. Batteryless wireless transmission is an ideal – and maintenance-free – alternative for creating a monitoring system.

PROFITING FROM AMBIENT ENERGY

Harvesting energy from the surroundings is a pivotal aspect. There are three major ways of doing this to power wireless sensors in an industrial environment: solar cells, vibration and thermal converters.

Solar cells are the simple and cost-attractive method to harvest energy there and then. The ECS 300 solar cell (35 x 13 mm) was specially developed for use in artificial light, based on amorphous Si technology. Combined with the EnOcean STM 300 wireless module, it is possible to detect operating temperature for example. Upwards of 50 lux a measured value can be wirelessly transmitted for 10 to 15 minutes. Continuous operation calls for as little dust as possible in the surroundings however.

For a number of years now there have been vibration converters based on the piezo effect as well as inductive systems. These serve well on vibration with a tightly limited bandwidth such as the line frequency of an electric motor (50 Hz). Broadband vibration in many applications will hinder sufficient energy yield however. Universities and research institutes have now started to look into the subject, and are in the process of developing appropriate solutions.



Right: Design study for energy-autonomous compressed-air sensor with EnOcean technology. Demonstrator from festo.



Another possibility of harvesting energy from the environment is that of the thermal converter. Virtually every unit of industrial machinery exhibits differences in temperature. A difference of just 1°C (1 K) is sufficient to power a wireless sensor. A temperature difference of > 10°C will then enable the operation of more elaborate wireless sensors to analyze oscillation.

ONGOING PROJECTS

As part of projects sponsored by Germany's Ministry of Education and Research, EnOcean is currently developing energy converters and wireless modules to monitor the status and condition of machinery. The first prototypes and results from field trials are expected in the course of 2010. The joint projects are as follows:

- **ECoMoS – energy-autonomous condition monitoring system**

The objective here is to develop self-powered, miniaturized wireless sensor nodes. The wireless sensors will be used to set up and trial a network for plant diagnosis in a paper factory.

- **MIKOA – miniaturized energy-autonomous components with reliable wireless communication for automation technology**

A consortium of institutes and industry is developing energy-autonomous wireless systems for plant and process automation. Major aspects are realtime control and the condition monitoring of machines and processes.

THE RIGHT TOOLS

In the new bidirectional Dolphin system architecture EnOcean is expanding its selection of modules for self-powered wireless technology. For the first time miniaturized transceivers can not only transmit information but also receive it. That shows the way to using energy-autonomous wireless sensors and actuators in a whole variety of applications. Numerous energy-autonomous solutions for industrial condition monitoring can be developed even faster using the Dolphin modules, the EDK 300 developer kit and the ECT 300 thermal converter.

www.enocean.com
www.mstonline.de
www.mikoa.de



ENOCEAN MODULES 868 MHZ

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

ENERGY HARVESTING WIRELESS SENSOR MODULES

PTM 200C – ULTRATHIN MINIATURIZED SWITCH MODULE

- ▶ Maintenance-free powering by finger pressure
- ▶ Optionally 1 or 2 rockers or up to 4 push-buttons
- ▶ Dimensions 40 mm x 40 mm x 11.2 mm
- ▶ Actuating travel 1.8 mm
- ▶ Actuating force approx. 7 N



ECO 200 – ENERGY CONVERTER FOR LINEAR MOVEMENT

- ▶ Dimensions 29 mm x 20 mm x 7 mm
- ▶ Successor to ECO 100

COMING IN Q2/2010



PTM 230 – RADIO TRANSMITTER MODULE

- ▶ 2 digital inputs
- ▶ Dimensions: 20 mm x 25 mm x 6 mm
- ▶ Operation with ECO 100 or external energy source



STM 110 – SENSOR MODULE

- ▶ Maintenance-free sensor module
- ▶ Powered by mini-solar cell, 13 mm x 35 mm
- ▶ Dimensions 21 mm x 40 mm x 9 mm
- ▶ Operates for several days in total darkness
- ▶ Periodic presence signals
- ▶ 3 A/D converter inputs
- ▶ 4 digital inputs



STM 300 – ENOCEAN SCAVENGING TRANSCEIVER MODULE

- ▶ Operation with external energy converter (e.g. ECS 300 solar cell) and energy storage
- ▶ Basic firmware for cyclic sensing and transfer of measured values
- ▶ Programmable by software API, also bidirectional radio available
- ▶ Dimensions 19 mm x 22 mm x 3 mm

NEW



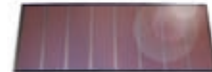
ECS 300 – SOLAR CELL

- ▶ For use with STM 300 for unidirectional sensors
- ▶ 35 mm x 12,8 mm x 1,1 mm
- ▶ 4 V, 6,5 µA at 200 lux



ECS 310 – SOLAR CELL

- ▶ For use with STM 300 for bidirectional sensors with Smart Ack
- ▶ 50 mm x 20 mm x 1,1 mm
- ▶ 4 V, 14 µA at 200 lx



RECEIVER AND TRANSCEIVER MODULES

RCM 100/120/122/130/140/152 – RECEIVER MODULES

- ▶ Wireless receiver module and actuator control module for receiving and decoding EnOcean wireless transmitter signals
- ▶ Dimensions 18 mm x 42 mm x 5.5 mm
- ▶ 5 V voltage supply
- ▶ 25 mA current consumption
- ▶ Basic functions: switch, blinds control, dimming and serial interface for bus systems
- ▶ Simple teaching of up to 30 wireless transmitters
- ▶ Memory function (for light and blinds scenes)



TCM 300/320 – ENOCEAN TRANSCEIVER MODULE

- ▶ Unidirectional serial communication
- ▶ Bidirectional serial communication
- ▶ 1-channel/ 4-channel relay mode
- ▶ 1-channel dimming mode
- ▶ 1- and 2-level repeater functionality
- ▶ Programmable by API software
- ▶ Dimensions TCM 300: 19 mm x 22 mm x 3 mm
- ▶ Dimensions TCM 320: 36.5 mm x 18 mm

NEU



TCM 110/120/130 – ENOCEAN TRANSCEIVER MODULE

- ▶ 5 V voltage supply
 - ▶ 33 mA current consumption
 - ▶ Dimensions 24 mm x 42 mm x 5 mm
- TCM 110:** ▶ Single- and two-level repeater for EnOcean wireless telegrams
- TCM 120:** ▶ Bidirectional wireless
▶ Serial interface
- TCM 130:** ▶ Software API for TCM 120 module
▶ Programmable in C
▶ Bidirectional radio
▶ Bidirectional serial interface
▶ Single-level repeater functionality
▶ Power saving modes
▶ 4 D/A inputs, 4 digital outputs

**OEM PRODUCTS****PTM 250 ENOCEAN EASYFIT – UNIVERSAL SWITCH INSERT**

- ▶ Compatible with following designs with 55 x 55 mm rocker:
 - BERKER S1, B1, B3, B7 glass
 - GIRA Standard 55, E2, Event, Esprit
 - JUNG A500, Aplus
 - MERTEN M-Smart, M-Arc, M-Plan
- ▶ Surface mounting without casing
- ▶ Switch program frame flat on the wall
- ▶ Single or serial rocker
- ▶ Colors: white, aluminum, anthracite, structured, high-gloss pure white

**STM 250 – WINDOW/DOOR CONTACT**

- ▶ Maintenance-free powering by daylight
- ▶ Operates for several days in total darkness
- ▶ Immediate signal transmission as soon as window closes or opens, triggered by window magnet
- ▶ Periodic life signal
- ▶ Contact monitor (110 x 19 mm, height 15 mm) attachable to all frame profiles

**RCM 250 – UNIVERSAL SINGLE-CHANNEL SWITCH ACTUATOR**

EnOcean easyfit switch actuator for wireless switching of very different 230 V loads, e.g. incandescent lamps, high-volt halogen lamps or low-power motors. Up to 30 EnOcean PTM wireless switches or up to 2 EnOcean STM 250

wireless window contacts can be teached. Simple connection of the line voltage and load by screw terminals.

**ACCESSORIES****EPM 100 LEVEL METER**

The electrician's installation tool for EnOcean wireless components – for range analysis and simple detection of signal quality and sources of interference.

**EVA 100 EVALUATION KIT TEST BOARD**

for simple startup of EnOcean wireless modules.

**EVA 120 EVALUATION KIT TEST BOARD**

for quick startup with STM 110.

**ECT 300 PERPETUUM DEVELOPER KIT**

EnOcean has developed a thermal energy harvester that is able to power wireless sensor nodes from temperature differences of only a few Kelvin.

**EDK 300**

Developer kit for fast implementation of EnOcean TCM 300/320 and STM 300 bidirectional wireless modules and software API.



ENOCEAN MODULES 315 MHZ



Modules with 315 MHz frequency are suitable for North America and other countries

ENERGY HARVESTING WIRELESS SENSOR MODULES

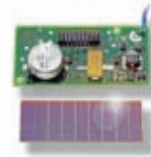
PTM 200C – ULTRATHIN MINIATURIZED SWITCH MODULE

- ▶ Maintenance-free powering by finger pressure
- ▶ Optionally 1 or 2 rockers or up to 4 push-buttons
- ▶ Dimensions 40 mm x 40 mm x 11.2 mm
- ▶ Actuating travel 1.8 mm
- ▶ Actuating force approx. 7 N
- ▶ Newly certified for use in Japan



STM 110C/112C – SENSOR MODULE

- ▶ Maintenance-free sensor module
- ▶ Powered by mini-solar cell, 13 mm x 35 mm
- ▶ Dimensions 21 mm x 40 mm x 9 mm
- ▶ Operates for several days in total darkness
- ▶ Periodic presence signals
- ▶ 3 A/D converter inputs
- ▶ 4 digital inputs



STM 300C – ENOCEAN SCAVENGING TRANSCEIVER MODULE

- ▶ Operation with external energy converter (e.g. ECS 300 solar cell) and energy storage
- ▶ Basic firmware for cyclic sensing and transfer of measured values
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COMING IN Q2/2010



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- ▶ 4 V, 6,5 µA at 200 lux



ECS 310 – SOLAR CELL

- ▶ For use with STM 300 for bidirectional sensors with Smart Ack
- ▶ 50 mm x 20 mm x 1,1 mm
- ▶ 4 V, 14 µA at 200 lx



TRANSCEIVER MODULES

TCM 200C/220C – ENOCEAN TRANSCEIVER MODULE

- ▶ Bidirectional transceiver modules
- ▶ 5 V (TCM 200C) / 3 V (TCM 220C) supply voltage
- ▶ Basic functions: receiver with serial interface and integrated repeater
- ▶ Programmable in C using software API
- ▶ 6 digital or analog inputs, 5 digital outputs
- ▶ Dimensions 18 mm x 36.6 mm x 5 mm



TCM 300C/320C – ENOCEAN TRANSCEIVER MODULE

- ▶ unidirectional serial communication, backward compatible with TCM 220C
- ▶ Bidirectional serial communication
- ▶ 1-channel/ 4-channel relay mode
- ▶ 1-channel dimming mode
- ▶ 1- and 2-level repeater functionality
- ▶ Programmable by API software
- ▶ Dimensions TCM 300C: 19 mm x 22 mm x 3 mm
- ▶ Dimensions TCM 320C: 36.5 mm x 18 mm

COMING IN Q2/2010



ACCESSORIES

EPM 100C – LEVEL METER

The electrician's installation tool for EnOcean wireless components – for range analysis and simple detection of signal quality and sources of interference.



EDK 100C – DEVELOPER KIT



Developer kit for quick startup with EnOcean wireless modules PTM 200C, TCM 200C, and STM 110C/112C, including API software for TCM 200C.

NEW

EDK 300C

Developer kit for fast implementation of EnOcean TCM 300C/320C and STM 300C bidirectional wireless modules and software API.



SMART TECHNOLOGY FOR SMART METERS

What counts on deregulated energy markets is above all efficiency and flexibility. Meaning that the manual and error-prone, annual reading of meters will soon be a thing of the past. In its new Dolphin platform EnOcean has created an innovative technology that presents an excellent, visionary solution to implementing and networking smart metering in energy-efficient buildings.

By Armin Anders, VP Product Marketing and Co-Founder, EnOcean GmbH

Against a background of the EU energy efficiency directive and its implementation in national law, from 2010 utilities are required to install what are called smart meters so that their customers are kept informed of their consumption. Then, from 2011, they are also to offer flexible electricity rates.

The utilities are responding to this with an electronically controlled meter in a building that can be read automatically and as often as wished. This will collect the data for electricity, gas and water consumption.

CONSUMPTION DATA OVER THE INTERNET

Centrally controlled, and on a secure data link, data are retrieved every 15 minutes. Data are then sent on a DSL line to the computer center of the utility. Flexible use of other services like customer relationship management (CRM) will allow the automated generation of billing for consumption. Customers can very simply call up their momentary consumption data on the Internet. Here they have a variety of graphical presentations for comparison

purposes. In this way an end-user can determine how much energy a whole building is using at any time.

But energy saving requires decentral acquisition of the consumption data inside a building plus smart control of individual consumers. Assisted by EnOcean wireless sensors at important points of consumption, metered and measured data can be transported in realtime. Bidirectional wireless actuators control the major consumers as a function of time, cost and demand. Whole buildings, operators, end-users and utilities are connected over the Internet to intelligent centers and mobile display units.



IDEAL ADDITION TO EXISTING FUNCTIONALITY

EnOcean's self-powered wireless technology enables smart control of lights, blinds, heating and air-conditioning, and has already been implemented in such applications for a number of years to produce significant energy savings. Smart metering is now the ideal addition to achieve further energy savings. The new EnOcean Dolphin platform enables utilities to offer their customers innovative solutions that deliver consumption data at different locations in a building in realtime. The various systems are non-proprietary because of the open and modular concept.

EnOcean technology is suitable not only for electricity, gas and water but also for other meters such as heating costs and distributors. For the end-user EnOcean-enabled devices mean substantial energy cost savings, more convenience, and a large choice of interoperable products from different manufacturers.

ENOCEAN-ENABLED SMART METERING DEVICES

Smart meters need standardization. Which is why the EnOcean Alliance standardized a specific device communication protocol called the automated meter reading (AMR) device profile. Based on this cross-manufacturer protocol, there are already EnOcean-enabled smart metering devices and systems from a number of manufacturers on the market – for example devices from Eltako and a control and visualization system from BSC.

The Eltako components serve for wireless acquisition of momentary



Washing at a cheaper rate cuts energy consumption and saves money.



electricity, water and gas consumption including meter readings at all kinds of points inside a building. The BSC software monitors the current readings of electricity meters and compares them to given figures. If a washing machine is to be turned on for example, but the momentary consumption of electricity is already close to a higher price rate, the system can tell you that it would be better to do the washing later.

Another example is that of the freezers in a supermarket. These can be controlled offset in time to reduce the peak power demands that are cost-intensive for the market. To make sure pizzas in one of the freezers do not thaw, suitable temperature sensors are placed at critical points. When a given setpoint temperature is reached, these sensors will send a wireless signal to a controller indicating that the freezers need to be powered up again.

SMART ENERGY SAVING

Buildings consume about 40 percent of our primary energy. Seen in this way, the legislation has put things on the right course so that smart meters become a reality in a few years. For local optimization of consumption, cableless wireless sensors and actuators, flexible in where they are located, have to be retrofitted in buildings and households. Because it requires no cables, is maintenance-free and independent of one particular manufacturer, EnOcean technology is especially suitable for metering and controlling consumption in buildings of any size.

www.enocean.com





NH HOTELES: SMART RETROFIT SAVES 20 PERCENT ENERGY

The third largest hotel group in Europe brings more than 5000 guest rooms up to date in the space of a few months thanks to the latest self-powered wireless technology from EnOcean.

By Christian Genter, Managing Director, Omnio AG

Hotel rooms consume a lot of energy. On the one hand, this is due to the high maintenance costs. On the other hand, many guests make thoughtless use of electric power. All in all, there is ample scope for optimization. In order to improve energy efficiency, NH Hoteles therefore decided to modernize a large number of guest rooms throughout Germany. The solution: "Ratio", the disruption free and easy-to-retrofit wireless system by Omnio.

"The alternative would have been a conventional wired solution," says Andreas Ecker, Environment & Engineering Manager, NH Hoteles Deutschland. "The resulting significant disturbance in hotel operation, structural building measures and inconvenience through noise and mess from installing new cables would have however been unacceptable".

THIRD LARGEST BUSINESS HOTEL GROUP IN EUROPE

The Madrid-based NH Hotel Group manages more than 400 hotels and 50,000 guest rooms, and ranks third in Europe. Most NH Hoteles are in Spain, throughout Central Europe (Germany, Austria, Switzerland, Benelux and Italy) and in South America. Every fifth guest room is in Germany, where NH Hoteles runs 58 hotels with more than 10,000 guest rooms.



MAXIMAL ENERGY SAVING WITH MINIMAL INVESTMENT

NH Hoteles has an ambitious energy management and environmental strategy, aiming at cutting energy consumption and CO₂ emissions by 20 percent. In order to achieve these goals, in May 2009 work commenced on retrofitting 25 hotels - equalling more than 5000 rooms - with the EnOcean-based wireless energy management solution.

The system's advantages: totally maintenance-free, high energy efficiency and easy integration thanks to the lack of wiring. The self-powered devices can be placed wherever required without damaging the walls. They can also be easily integrated into EIB/KNX, LON, BACnet or Ethernet networks for central energy management.

ILLUMINATION AND CLIMATE CONTROL ON DEMAND

The so-called keycard forms the basis of the self-powered system, acting as door key and master key for automatic activation/deactivation of lights, heating and climate control. The act of inserting the keycard into the wireless reader device - which can be placed anywhere in the room - generates sufficient energy for sending a wireless command, e.g. to turn on the lights. Removing





the keycard upon leaving the room automatically turns off all electrical appliances.

In a further step to conserve energy, the guest rooms can also be fitted with solar-powered window contact switches which automatically detect whether the windows are open or not, and adjust the heating and climate control system accordingly. If a window is opened, the heating or cooling is switched off.

Climate is governed by individual room temperature controllers, which enable the guest to make individual adjustments to suit personal requirements.

INSTALLATION DURING NORMAL HOTEL OPERATION

The guest rooms were retrofitted with the wireless system during the course of normal hotel operation - at zero inconvenience to guests or hotel staff. On average 30 rooms per day were retrofitted with the system. Work on some rooms was carried out and completed in the short time between one guest checking out and the arrival of the next guest on the same day. On average, installation and testing took a maximum of just three weeks per hotel.

SUSTAINABILITY PAYS

By introducing the Ratio wireless bus system, NH Hoteles can optimize and reduce energy consumption on behalf of its guests to the advantage of the environment:

“We are delighted about the way the whole project has developed - with how the installation was carried out, with the reliability of the system and with the results obtained”, said Andreas Ecker. “We were hardly aware that any work was being carried out within the guest areas, but we have noticed that unoccupied rooms are now using virtually no energy at all. According to our calculations, we foresee a return on investment in well under two years” explained Ecker.

www.omnio.ch
www.nh-hotels.com





BUILDING MODERNIZATION WITH BRAINS INSTEAD OF BRAWN

EnOcean-based products
are now implemented
in the headquarters of
Telecom Italia.

Telecom Italia modernized its Milan-based headquarters while continuing to operate

By Frank Neudecker, Export Manager, Thermokon Sensortechnik GmbH

Given the increasing cost of energy and efforts to reduce carbon footprint, energy-efficient building modernization is constantly gaining in significance. In office buildings in particular, it is heating, air-conditioning and lighting that account for a lot of energy consumption. In a building that could do with renovation for example, heating and water can even account for as much as one third of facility operating costs. Modern heating regulation governed by time of day and room temperature can save a lot of money in both residential and office buildings.

Properly controlled networking of heating, air-conditioning and lighting has now become standard in new buildings. If older buildings are to be operated economically and ecologically friendly, outdated installations need to be replaced or retrofitted with energy-saving technology.

Although a retrofit will generally involve considerable effort and expense. You have to drill holes in walls and lay whole meters of cabling, creating noise, dust and dirt. So it can hardly be undertaken while a building is occupied by people trying to concentrate on their job. There is consequently increasing focus on high-performance, wireless systems with minimal power consumption that are simply and speedily installed, and without drilling any holes in walls to route cables. EnOcean technology for example.

MODERNIZED FAST

Self-powered wireless technology is now implemented in the headquarters of Telecom Italia, the country's leading telecommunications provider. Established in 1994 and headquartered in Milan, the company operates the larger part of Italy's landline network with internet services, and is also the major Italian cellphone provider through its affiliate Telecom Italia Mobile.

The EnOcean-enabled products work entirely without cables and batteries. If any renovations are then carried out, removing and relocating them is speedy and straightforward.

HEATING, VENTILATION AND AIR-CONDITIONING CONTROLLED WIRELESSLY

To make the eight-floor corporate headquarters – with more than 40 offices on each level – more economical in operation and more comfortable and convenient in subsequent use, the telecommunications enterprise decided to modernize its old HVAC plant and link it to a central control system.

The first step was to replace all existing fan coils. This meant removing about 1000 old units. Modern electric fan coils were installed in their place and connected to Siemens RXC21.1 room controllers. These enable automatic control not only of fan coils but also of chilled ceilings and radiators in individual rooms. The next step was to install 200 SRC04-FTT EnOcean/LON gateways



All system components are integrated into the Siemens DESIGO building automation system.

“Pivotal for selecting EnOcean-enabled products was the flexibility and speed of installation you get from self-powered wireless technology”, says Dr. Diego Cattaneo, product manager of Siemens Building Technologies Division, the partner responsible for implementing the project. „That enabled us to modernize the eight-floor building in next to no time – without having to interrupt regular, day-to-day operations.”

from Thermokon, which were then tied to the LON bus. The building contains a total of 14 vertical LON bus routes. Finally 600 Thermokon SR04 PST room temperature sensors were installed, with setpoint and fan level setting. The batteryless room sensors regulate temperature and ventilation in the individual rooms. Information is transmitted to receivers by EnOcean standard wireless telegrams. A solar-powered energy storage mechanism makes operation service-free.

All system components are integrated into the Siemens DESIGO building automation system. An open platform makes DESIGO compatible with all existing and future systems and components. So it is possible to both continue using ready products and integrate new ones. The automation system supports Ethernet TCP/IP, OPC, BACnet, EIB, LonMark, PROFIBUS, the telephone network and the internet. A further advantage is that the entire installation can also be controlled from a PC – by the DESIGO INSIGHT management station.

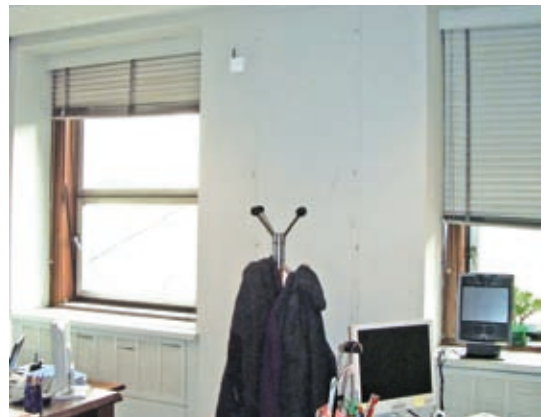
INSTALLING WITHOUT HINDERING

Installing the 800 self-powered devices proved to be very simple. The modernization work, completed in January 2009, only took about three months. Renovation was undertaken while the company continued to operate, without disturbing its employees. The old fan coils were replaced during the night. Installation of the controllers in the various offices was possible during the day however, because no cabling had to be laid for the purpose.

SMART CONTROL OF POWER CONSUMPTION

Innovative technology in its corporate headquarters enables Telecom Italia to offer its people more comfort and convenience, and at the same time to cut power consumption by matching it to real needs. Then there is the attractive flexibility of installation that comes with the technology. With little effort, and without damaging walls, it was possible to fit the wireless sensors speedily and simply, precisely where they are of optimum benefit. “Not forgetting the cost savings on installation and any future renovation compared to a cabled solution”, adds Dr. Cattaneo.

www.thermokon.com
www.siemens.com





FAMILY HOMES ON THE GREEN WAVELENGTH

The Rothermel family decided conventional light switches and heating controls were a no-no when it built its house in Lemgo.

By Thomas Köthke, System Consultant Building Automation, EnOcean GmbH

The times when cost hindered the use of automation in housing are past. A trend has been emerging for some time in house building towards modern and intelligent houses that attract attention not only through their architecture but also because they integrate innovative technologies. Using modern technologies in homes makes everyday life easier for the inhabitants, in addition to promoting the important, more efficient utilization of energy. One drawback of the various components and systems is often the many cables and numerous remote controls for all the different devices.

An alternative, a solution to this is EnOcean's self-powered wireless technology, which works entirely without cabling. It does not require any batteries either because it draws or harvests the power it needs from the surroundings, even the pressure of a finger or the light. With little effort and without breaking into walls to create ducts, EnOcean-enabled products can be attached precisely where they are of optimum benefit, and just as easily removed again.

HEATING, ROLLER SHUTTERS AND LIGHT CENTRALLY CONTROLLED

Arguments like these convinced the Rothermel family in Lemgo. When they built a home they decided to do away with conventional light switches or heating controls. The whole house was fitted with a system that is operated through self-powered wireless transmitters from EnOcean. This not only controls the entire lighting and heating, it also drives the roller shutters. In addition to buttons to control lights and regulators for the heating in the rooms, sensors were attached to doors and windows that can tell the system at any time if anything is open anywhere. Should a window be opened to let some fresh air in for example, the temperature in that room is automatically



turned down to save energy. When the window is closed it is automatically turned up again. All components are linked to the I/O automation system from WAGO. That enables this convenient central control of heating, roller shutters and lighting.

FLEXIBILITY IN PLANNING

A plus factor of the energy-autonomous solution was of course that the owners, when planning the house, did not have to worry at all about where they would like to

Visualization software enables convenient central control of heating, roller shutters and lighting.



have the light switches, now or later. Once the rooms were ready, they could simply attach/adhere the switches where they were really needed and useful. Their number and their positions can be adapted at any time.

“Unlike in many other cases when people build houses, our switches and sockets were where we wanted them right from the start. We even attached a switch to a door, which would have been impossible with conventional cabling of course”, says Stephan Rothermel.

LESS COSTLY THAN CONVENTIONAL

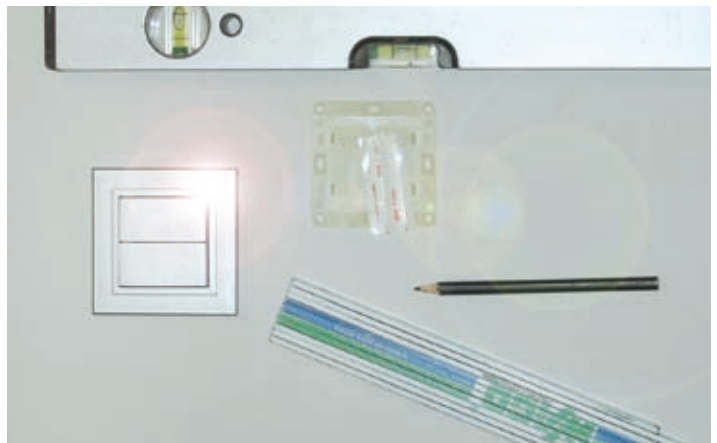
The use of modern household automation pays off in many a respect. It reduces the initial cost outlay in addition to enhancing living comfort and convenience. Then there is the saving of valuable energy resources of course.

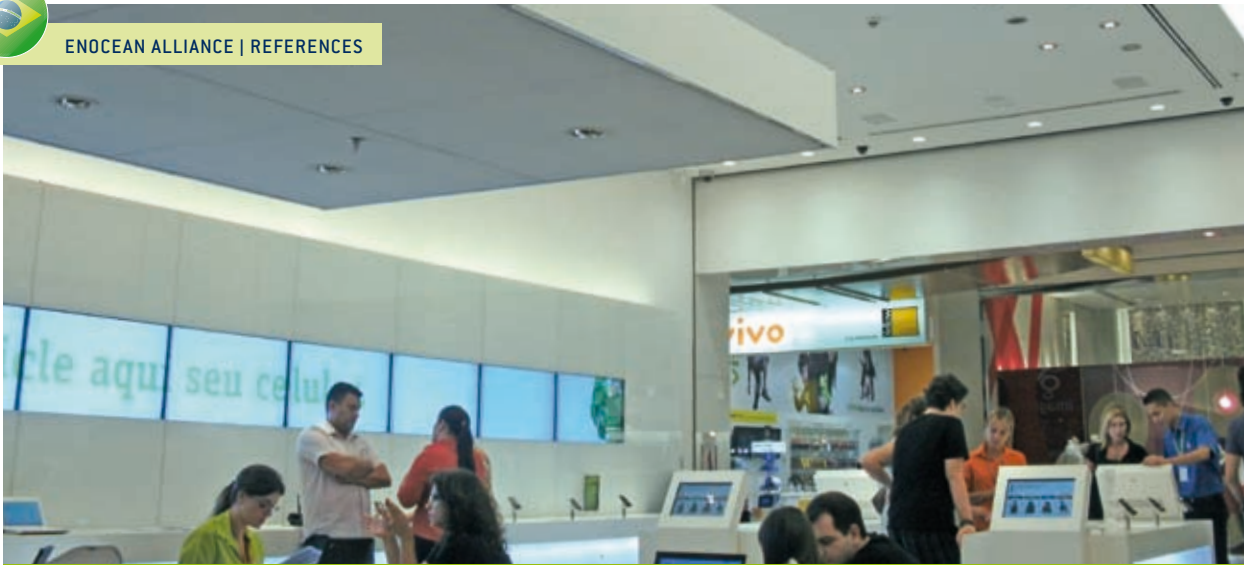
“When I think of the cost of piping, cables and digital engineering needed for central control of each light switch or heating control and compare that to the wireless so-

lution, it’s obvious that the conventional solution would have been more expensive“, reckons Rothermel. „And that’s not even considering the cost of all the usual underplaster work.”

But not only the cost turned out to be more attractive, there were also the tremendous time-savings. There was much less underplaster installation to be prepared in the bare brickwork for instance, and the plasterers were able to start their work faster. In the interior there is no longer any need to mask fixtures before the painter can move in. Less cables or leads had to be routed of course. And then there was the lack of dust and noise throughout. „All that was necessary was a ruler, a spirit level and a pencil“, concludes Rothermel.

www.wago.com





LIGHT MANAGEMENT WITH OSRAM AND ENOCEAN

Vivo, Brazil's biggest cellphone vendor, is working with batteryless wireless technology from EnOcean in the first high-tech design and sales shop in São Paulo.

By Oskar Pzillas, Managing Director, ASP Automação Ltda

For its new design and sales shop in São Paulo, Telefonica affiliate Vivo looked about for a sustainable light management system with low energy needs and simple to operate. It opted for DALI Advanced, EASY Color Control from OSRAM plus EnOcean-enabled handhelds from Eltako. More than 180 luminaires – LEDs for the most part – are operated in 170 sqm of shop space with the DALI Advanced controller. The luminaires are divided into 16 groupings. Each of these can be turned on and off and dimmed by the convenient, wireless remote control. Another two wall-attached wireless transmitters were also installed. C.A. Mingrone, a famous name in Brazil, was responsible for the lighting design. Control and programming of the lighting were contracted to ASP Automação.

DIFFERING LIGHT SCENES ON DEMAND

The system makes it possible to call up five different light scenes at any time. Appropriate use of DALI repeaters means that the number of luminaires driven simultaneously can be very much expanded.

Basic functions of the system such as dimming remain available at all times. The dynamic lighting in the showcases was implemented with the sequencer function of the

DALI EASY light control. Here too, and at any time, light scenes can be called up or altered by remote control or from a PC.

SIMPLE PROGRAMMING

The simple cabling of the luminaires is obviously a special advantage. The routing of the DALI control line is not at all critical. Programming is wireless through the HPG programmer. This does not call for any special expertise. Actuators for blinds and lighting in the office and workshop rooms are controlled by Eltako handhelds.

Apart from the wireless control input the switching actuators only have one other wired switching input that can be used at any time – an advantage when it comes to expanding an existing light installation of course.

www.aspcontrol.com.br
www.osram.com





MK'S ECHO PROVES IT'S NO SUCKER!

Originally intended for lighting applications MK Electric's echo is finding itself being pressed into service in other ways. The self-powered switch technology has recently been harnessed to provide local switching for the central vacuum system at the Aberdeen headquarters of Acergy, an offshore oil and gas engineering company.

By Joanne Reynolds, Senior Marketing Communications Manager, MK Electric



The novel application came about when the company's cleaners found that it was hard to remove the suction hose from wall outlets connected to the central vacuum system – in effect a giant built-in hoovering system. Back pressure in the system made removing the hose difficult and the only way the cleaners could remedy the problem was by walking back to the plant room and turning off the system. Not only was this inefficient and time consuming, it was also tiring for the cleaners who at times were walking distances of up to 85 metres to the plant room to either switch the vacuuming unit on or off.

SIMPLE INSTALLATION

The solution was arrived at thanks to some lateral thinking by consultants CCPD, who used echo's installation flexibility – no wires needed – to install echo switches at each vacuum outlet. Each switch was then 'aligned' to a contactor acting as an isolation switch for the vacuum system, enabling the cleaner to turn the system on or off from the outlet that was being used. CCPD's Niall Wood, who initially came up with the idea, said: "Installing the echo switches was a five minute job because there was no need to hard wire. We simply stuck the switches to the wall by the outlets and there was no need to move

people, desks or office furniture. It was all very unintrusive. "Now the cleaning staff can activate the vacuum from wherever they may be. The echo switches simply 'talk' to the contactor via its RF receiver and because there's no hard wiring, it was an easy retrofit project," he continued.

MK ECHO: NO WIRES, NO BATTERIES, NO FUSS

MK Electric's echo range of self powered switches means no wires, no batteries and no fuss. Echo is radically revising the way switching is treated within commercial spaces; and is delivering a host of benefits to the specifier, installer and facilities manager. Echo switches are low maintenance, sustainable and highly accessible; they represent a new generation of switching devices and help take the company's renowned strength of product depth, quality and service to a new level.

MK Electric will be exhibiting at the Light+Building 2010 in Frankfurt in hall 11.1, booth B18.

www.mkelectric.co.uk





OFFICES RESHAPED IN RECORD TIME – ENOCEAN PLUS WAGO SOLUTION CONTROLS LIGHTING AT DAILY LE MONDE

The daily Le Monde recently renovated its 5000 sqm of office space, and contracted Wago to implement control and automation of the lighting. The company's solution combined its Winsta connector system with EnOcean technology.

By Emmanuel François, Consultant, EnOcean GmbH

The circumstances defining the application were not at all simple because at Le Monde the partitions between offices are shifted on average every two weeks. Depending on what is going on in the world, editors, graphic artists and the like for a changing focus or different topic are posted elsewhere or brought together in newly formed teams. The constant, repeated reconfiguration of office space meant that the solution for control of the lighting needed to be fast, flexible and variable.

to-day business. The facility manager also underscores the very important benefit of a service-free installation through using batteryless switches.

Le Monde achieved numerous savings through this investment, which could be ploughed back into the editorial operations of the major French daily.

www.wago.com



At the major French show for building automation Interclima & Elec, Jean Luc Pellati, facility manager of Le Monde, was attracted by the integrated solutions from Wago with their EnOcean technology. Simplicity of use and reprogramming were decisive factors for their subsequent implementation. The differences of brightness in the office space went into the planning phase supported by Wago. To achieve an optimal result in terms of convenience and energy savings it was decided to drive single groups of lights separately.

SIMPLIFIED AND ENERGY-SAVING

The fact that the EnOcean receiver in a Winsta distributor box can handle switching signals from as many as 32 different buttons very much simplified the application. After reconfiguration of the office partition walls, the Winstabox is easily reprogrammed at the press of a button to compose new groups of lights matching the change in office layout. In no time at all it is possible to create work islands, and without unduly disturbing day-



Optimal result for convenience and energy saving with EnOcean-enabled products



ROOM LEVEL AND LABORATORY TEMPERATURE CONTROL RETROFITTED WITHOUT DISRUPTION

The central temperature control system originally fitted to this new hospital facility did not allow for individual room and laboratory temperature monitoring and control. By nature, a hospital facility needs individual temperature control in areas dedicated to different tasks and occupied by patients or medical staff performing different functions, e.g. in a laboratory. A wireless system from Regulvar, employing EnOcean technology, replaced it without requiring structural work which would have necessarily closed down the facility for some time.

By Marc Dugre, President of Regulvar, Quebec, Canada



The hospital complex, although very recently built, was fitted with a centralized temperature control system unable to control individual room and laboratory temperatures. In order to improve patient comfort and medical efficiency, in 2008 it was decided to upgrade the climate control system. The main priority: to avoid messy, disruptive modifications to a nearly-new hospital building already in operation.

“We wanted to bring the climate control system up to date with the most energy-efficient solution. At the same time, we had major concerns about the building work endangering an environment which should ideally be as sterile as possible. Obviously, structural work would lead to large build-ups of dust” said Facilities Manager at the Pavillon J. Jouis Levesque.

QUICK, CLEAN RETROFIT

Therefore, the avoidance of contamination was of great importance - especially as far as the laboratory facilities are concerned, where a broad range of experiments take place under closely monitored conditions.

Retrofit installation of the whole system was minimally invasive. It took place unobtrusively over a period of just a few days, including installation of the Regulvar BACNet gateway solution for central monitoring and control. The self-powered, maintenance-free thermostats transmit

data to a central antenna and a repeater for additional system reliability under all conditions.

SINGLE-ROOM TEMPERATURE CONTROL FOR OPTIMAL ENERGY MANAGEMENT

By ensuring that different areas enjoy appropriate temperatures (e.g. cooler corridors, warmer rooms and stable temperatures for laboratory areas), huge savings can be made. Research has shown that a 20-30% reduction in costs can be achieved through the use of “central single-room controller” systems monitoring occupancy, time of day and personal settings.

MORE COMFORTABLE WORKING ENVIRONMENT

The system provides a more comfortable working environment for the staff and patients. Precise laboratory climate control - vital for certain experiments requiring stable climatic conditions – can also be easily achieved.

“We’re very happy with the result, and are considering extending the system to other areas within our hospital”, said the Facilities Manager.

www.regulvar.com





ENERGY MANAGEMENT IN PERRYSBURG JUNIOR HIGH SCHOOL

EnOcean and DimOnOff have joined forces to battle hiking energy consumption rates at Perrysburg Junior High School.

By Daniel Noiseux, VP Business Development, DimOnOff Inc.



The newly retrofitted system disposes of energy consuming products replacing them with more efficient ones along with wireless energy harvesting controls. The new system reduces energy usage by more than 50% and lighting quality will be throughout the gymnasium with the introduction of fluorescent fixtures. Using existing wires, system integrators replaced the ailing single zone system and created eight scenarios of lighting designed exclusively according to the school's preferences. Retrofit installation barriers were overcome by DimOnOff's hybrid approach using energy harvesting and wireless attributes associated with EnOcean-based lighting controls.

LIGHTING ON DEMAND

EnOcean-based wireless system maximizes the gains from the replacement of energy consuming HID (high intensity discharge) lights. The archaic HID lights featured geriatric turn-on rates and ran with single zone control technology meaning if only a few lights were needed, every light had to be turned on. Additionally, the Jurasic system did not monitor the occupancy status of the gymnasium; causing the gymnasium to consume energy when not in use. The school recognized these inefficiencies and sought to: reduce energy consumption, add multiple-zone lighting control, created selective patterns of on/off lighting and improve lighting quality - using only the wires from the original HID system.

SIMPLE INSTALLATION

DimOnOff controls integrated with EnOcean technology provided the ideal solution. Bridging the gap to sustainability, the wireless control solution was able to attain huge savings and incentives after a simple installation. The lighting system utilizes customized control functions designed by the school exclusively. Low level lighting is used during gym classes, while high output is reserved for events. Lights are controlled by a wireless, battery-free transmitter with secure access. When the gym is empty the lights are easily turned off. When lighting scenarios change, modifications or additions can be easily made via laptop or web access.

ENOCEAN-BASED LIGHTING CONTROL REDUCE TIME AND ENERGY CONSUMPTION

The lighting system was upgraded overnight in eight hours without having to run new wires. The results were an extensive reduction in energy consumption, expanded multi-zone lighting control, improved lighting quality, and several Ohio-state sustainability tax incentives.

The State of Ohio provides huge tax incentives for sustainable school buildings. Ohio's utility energy efficiency incentives offer rebates as high as \$145 per fixture. In addition, the retrofit qualified the school for the HB264 Energy Conservation Measure providing additional incentives. The lighting retrofit amounted to a total savings of more than \$ 5000 annually.

www.dimonoff.com





DESIGN UPGRADE OF WIRELESS MULTI CEILING SENSOR SR-MDS

The design upgrade of wireless multi ceiling sensor SR-MDS offers new possibilities and can be integrated smoothly into an energy optimized building automation system.

By Nico Gotthardt, R&D Product Management, Thermokon Sensortechnik GmbH

SR-MDS by Thermokon is a multi ceiling sensor for detection of motion, brightness and temperature. Motion is detected via the PIR (passive infrared) principle and enables a 360° detection. Thanks to this function, a light control or presence detection can be realized, as well. Temperature detection is made via an inside sensor integrated in the SR-MDS cover.

The range of detection amounts to 0-51°C and covers typical room environments. Measurement of the prevailing light intensity is effected in a brightness range of 0-510 lx. A common office building has a light intensity of approx. 50-500 lx. All measuring values detected are sent via an EnOcean based RF telegram to a receiving unit which evaluates and processes the data received.

MADE TO CREATE HIGH-EFFICIENT GREEN BUILDINGS

Whereas a motion detection activates the transmission of a telegram immediately, temperature and brightness values are detected every 100 seconds as a standard and are only transmitted wirelessly in case of a significant value change (>10 lx compared to the previous brightness value or >0,8K compared to the recent temperature value). This principle is integrated as a basic function into all wireless

EasySens devices supporting the target to create high-efficient green buildings.

MODULAR CONSTRUCTION

The design upgrade of the SR-MDS sets a new standard in the range of ceiling mounted sensors. Thanks to the modular construction of the device a variable voltage supply is enabled by the power pack. One type of the SR-MDS enables a power supply in the range of 15-240V AC/DC. Thus, a connection to a 230V supply network is feasible, as well. Another SR-MDS model is battery-powered and working without any wiring. This self-sufficient unit can be placed anywhere in a room. The design upgrade offers various application possibilities of the SR-MDS multi ceiling sensor.

FULLY INTEROPERABLE

As an EnOcean Alliance promoter, the interoperability of the telegram was of paramount importance to Thermokon during the development of the SR-MDS. Thus, a combined operation with products of other manufacturers can be realized without any problems.

www.thermokon.com



CONVERGENCE OF NETWORKS AND FACILITIES

When people first started talking about the smart home some 15 years ago, it really only meant controlling domestic electrical installations. That alone was revolutionary for its times and new ground for many a workman, tradesman and architect. Home bus systems like LCN, LON or KNX can still represent a considerable challenge for electrical contractors. Planning and implementing a multimedia and intelligent networked home can of course be even more difficult.

By Günther Ohland, Journalist, Paderborn

Modern entertainment electronics, just like domestic appliances, telecommunications and information technology, uses the standardized Internet protocol (IP). Even home medicine and telemedicine devices communicate over IP. What used to be insular technologies are merging in the modern networked home to create new, expedient and possibly even more reasonably priced applications. That, at least, is what the theory tells us. Research projects like Inhaus in Duisburg and Smarter Wohnen NRW in Hattingen, both Germany, or FutureLife in Zug, Switzerland demonstrated that an intelligent networked home really can be created – but for what ratio of benefit to cost? For the first time regular commercial products were used in the SmartHome Paderborn and for the HiFi Forum in Baiersdorf. Both have clearly showed that a project of this nature cannot be implemented without a savvy planner and cross-facility project manager. Because it is not only a matter of installing top-notch technology for all facilities side by side, but of molding them into an intelligent network so that occupants benefit from them to the full. Aggravating matters, the LCN, LON and KNX bus systems are really only suitable for newly built homes. So the biggest costs come at the beginning, when building capital might be threatening to run out anyway.

COMBINED COMPETENCE

But with products enabled by EnOcean technology, soft migration is possible from a standard electrical installation to intelligent control and management. Of particular interest is the integration of EnOcean technology in the IP landscape of a building. This is where ITC distributor NT plus enters the scene. In Team50 the Osnabrück-based wholesaler and convergence specialist has formed a nationwide network of teams, each consisting of a certified ITC dealer, partnered by an electrical installation firm and

an innovative architect. The 42 different teams benefit from special training that ranges from Microsoft Exchange through David from Tobit Software and KNX to EnOcean and BSC-BoSe. Certification as a Team50 member is not obtainable as a mere bonus, it has its price – proven competence. The three team members are capable of implementing any building project. Compared to a solo operation or one with a single focus, in this case each team has a wider market presence through its three mainstays: electrical, information technology and communication plus architecture.

WELL-ENGINEERED PRODUCTS – THE WAY TO SUCCESS

The answer to complexity is structure and keeping to the essential. From the diverse products offered by SmartHome those were sought out that are technically mature and promise customer satisfaction plus business success. NT plus offers its partners tested solution packages from different manufacturers. EnOcean products play a prominent role. Even simple bundles – detecting open windows for example, and then automatically turning down heating radiators – solve pressing problems presented by a final solution. There is also frequent demand for visualization of status, alarm issue if windows or doors are opened without authorization, as well as securing evidence by video. NT plus partners with Team50 qualification implement a whole variety of such projects. NT plus is active in the EnOcean Alliance.

www.ntplus.de/team50
www.smarthome-deutschland.de



TRAINING FOR TECHNICIANS AND SALES IN TEAM50

KNX, EnOcean, Tobit David, media storage and distribution, audio/video conferencing, network infrastructures to EN 50173, energy management, safety technologies, integration & green IT, remote control and monitoring of buildings by cellphone, IP telephony



ENERGY WASTE IS A THING OF THE PAST

The new and easily retrofitted system from IPcontrols enables significant savings of heating energy in industrial installations.

By Michael Bartels, Member of the board, IPcontrols AG

On cold days you can see it especially clearly – glimmering air over factory shops with open skylights. Trying to maintain the temperature in a shop by maximum use of the heating is really a waste of energy. It is only money down the drain. The same happens when the doors to a shop are opened. The proprietor of a car dealership realized this, he saw the money vanishing through the skylights. Wishing to undertake something against the waste of increasingly expensive energy, he decided to install IP/temp from IPcontrols.

IP/temp is a solution that is very easily retrofitted, and produces considerable savings of heating energy. Batteryless wireless sensors, powered by solar cells to send their signals, are simply adhered to a window, door or rolling gate. These communicate to a central controller

when a gate is opened for instance. The controller in turn drives relays that turn the power to the controls of the various shop heating units on or off to regulate the heating up and down. Each wireless sensor, independently of others, can drive single heating groups.

Any particular time plan can be entered on the controller, defining an individual turn-on and turn-off time for each shop, for example. The controller is operated over a standard web browser. The controller is linked to the data network (LAN), so changes can be made at short notice and from any point. The system is also secure to prevent access by unauthorized persons.

www.ipcontrols.de



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INNOVATIVE CONNECTIONS

ENOCEAN HELPS REDUCE KITCHEN FIRE RISKS

Just launched into the UK and European markets, the Spoon2 Fire Suppression System is the world's first commercial kitchen fire system to not only extinguish oil fires, but prevent many of them happening in the first place.

By Robert Powell, Managing Director, Spoon2 International Limited

The main risk in any commercial kitchen is the deep fat fryers, if these high temperature pieces of equipment encounter a problem the oil will auto ignite at a relatively low temperature, and this type of oil fire is notoriously difficult to put out. Using capabilities of the EnOcean wireless system the temperature of the high risk equipment in the kitchen is monitored and a range of alarm levels provide early warning of heat build up so that in most cases the equipment can be shut down before the fire even starts.

OPERATING PARAMETERS 24 HOURS A DAY

The system is monitored for all of its operating parameters 24 hours a day by EnOcean wireless modules, and does not rely on mains power to provide full fire protection. The wireless modules provide a real-time monitor of the condition of the extinguishant energy source. The Spoon2 system has been developed to overcome many of the shortcomings of previous equipment in the market. The detection system is unlikely to be damaged or compromised during the duct or ventilation canopy cleaning process, and false alarms and triggers are drastically reduced.

IN USE IN THE NEW WEST MIDLANDS FIRE BRIGADE H.Q

A Spoon2 Kitchen fire system was installed in the new West Midlands Fire Brigade H.Q. building opened by H.R.H. The Duke of Kent. The Chief Fire Officer for West Midlands Fire Service, Vijith Randeniya OBE, explains. "We are extremely proud to plan and occupy this first class facility which has achieved an 'Excellent' BREEAM rating for its sustainability. Not content with this we have enhanced this building's credentials through the installation of Ordinary Hazard sprinklers and the Spoon2 fire suppression and kitchen monitoring system. It is our intention to promote these high standards in our future building projects".

DETECTION IN TIME

The innovative Spoon2 Blutec system will detect a fire at any point along its length, and start the extinguishing process which will then put the fire out in seconds. This system can also run through the air extraction ductwork providing the best possible protection from hidden fires.

In the event of a fire the Spoon2 DataHub will activate the existing fire alarm system in the building, as the system is likely to detect a fire far earlier than the standard fire system. Alongside that operation the main energy source to the fire is automatically shut down whether this is at the gas valve or the electrical trip, or both. Business down-time due to clean-up after a fire is dramatically reduced due to the facts that the fire is detected as early as possible, and that the extinguishant is near pH neutral, water soluble and easy to clean up. All the data and alarms are collected at the EnOcean equipped DataHub in the building and regularly transmitted via the GSM/GPRS network to the central database. Alarms are sent immediately, not waiting for a scheduled update slot. The database can then provide building owners and users with archived data on the fire system status, and more importantly immediate notification of any fire system issues at the site.

CHECK PASSED

Spoon2 is the only European company to gain approval for their Fire Suppression Systems to LPCB 1223, having been through the full testing and approvals process with BRE, the UK fire testing authority. The system is also approved to ISO 15371; ships and marine technology, fire extinguishing systems for protection of galley deep-fat cooking equipment onboard marine craft of all sizes across the world. Spoon2 is currently the only company worldwide to have a proactive kitchen fire system.



MONITORING OF ALL RELEVANT DATA

Operating alongside the Fire Suppression data system is the capability to monitor many other equipment and building system's data. The favourite one with Spoon2 clients running commercial kitchens is the fridge and freezer temperature monitor and alarm service. This is provided by EnOcean wireless modules configured to send analogue temperature data to the DataHub that is already running the fire system. The temperature and timed door open alarms can be notified to the user and the database entries are archived to enable kitchen operators to fulfil their legal obligations of temperature record keeping. Spoon2 clients have found that it is then also easy to spot refrigeration equipment problems, and many have identified minor problems that when fixed have saved them a great deal in energy costs. This data is available to the client on the Spoon2 database in graphical or table report formats.

The temperature monitoring system can still be used where there is no fire system, and Spoon2 already have a number of temperature monitoring clients such as mortuaries where the fire risk is very small. Retro fit and new build fit of EnOcean is very quick and easy. This is particularly helpful in Heritage buildings with restaurants where it is preferred that the decoration of the building is not altered or damaged.

As Spoon2 use the standard EnOcean data protocols, the DataHub is able to interface with any other EnOcean enabled devices. All the usual EnOcean protocols can be used to transfer data from client equipment and sites to the Database, and sort by username/password into client exclusive areas, generate remote alarms, and provide secure archived data.

www.spoon2.com



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PREMIERE: WIRELESS MD15-FTL SMALL ACTUATOR WITH ENOCEAN TECHNOLOGY

The Kieback&Peter MD15-FTL small actuator is the first Dolphin-based small actuator that supports the open EnOcean wireless standard. It communicates in accordance with the neutral EnOcean acuator profile for small actuators.

By Jörg Bachmann, Kieback&Peter GmbH & Co. KG

The MD15-FTL is based on the Kieback&Peter MD15 platform with its numerous user benefits. The combination of temperature probe/sensor, controller, motor-driven actuator and innovative electronics in one device offers a range of applications from a classical actuator to a simple room controller. Powerful long lasting batteries provide energy, and are protected against theft in a special battery case. Through energy-saving technologies and a sophisticated mechanism its energy consumption is small.

INTEGRATION IN ROOM AUTOMATION

MD15-FTL plays the role of an intelligent actuator for room automation in combination with compatible cable-based room controllers/gateways. The room controller can communicate with and process the data of all room automation components both wirelessly and via cables. It takes on all of the room automation's control and regulating functions, and ensures that the MD15-FTL is optimally integrated into the overall system. For buildings with high

degree of automation, this solution offers direct access from the management level to the wireless motor actuator.

SELF-SUFFICIENT ROOM CONTROLLER WITH ENOCEAN TECHNOLOGY AND AN EXTERNAL CONTROL PANEL

When the user wants room conditions to be individually controlled, the MD15-FTL can work in combination with a wireless partner (e.g. a SolarFunk room device). Via the room control unit, the user can individually adjust the set point or submit his own time schedule, for example. This information is transmitted to the MD15-FTL wireless small actuator via the EnOcean wireless standard. An integrated control algorithm provides precise room control with the easiest operation and configuration by means of the software functions.

SELF-SUFFICIENT ROOM CONTROLLER WITHOUT INTEGRATION IN AN AUTOMATION SYSTEM

With its integrated transducer and controller the MD15-FTL can also work without integration in a room automation system. The setpoint is automatically observed. Application areas include anywhere self-sufficient and cost-effective temperature control is to be implemented with minimal installation effort.

www.kieback-peter.com



CONNECTING ENOCEAN DEVICES VIA MOBILE RADIO

The new mobile radio control center MoRoS EnOcean from INSYS MICRO-ELECTRONICS is an innovative control, alarm and configuration center.

By Barbara Gallert, Marketing Director,
INSYS MICROELECTRONICS



The new mobile radio control center MoRoS EnOcean reduces the workload for building services and maintenance engineers. All connected EnOcean sensors and actuators can now also be re-remote monitored by mobile phones, PCs or notebooks via mobile radio networks. In case of freely definable status changes, the EnOcean mobile radio control center autonomously and immediately sends a corresponding SMS to the building engineer. Featuring an integrated 4 port switch and a serial interface, Mo-RoS EnOcean is ideally suited for additional tasks in control networks.

UP TO 100 ACTUATORS AND SENSORS CAN BE CONNECT

The new mobile radio control center is based on a proven GPRS industrial router from INSYS. Thanks to an integrated, custom-tailored communication module for EnOcean devices, it can connect and administer up to 100 actuators and sensors. Registering EnOcean

devices is simple: after pressing a push-button or teach-in button, MoRoS EnOcean automatically recognizes the units. If required, each unit can be assigned a freely selectable alias name. An intuitive web interface allows for complete configuration of MoRoS EnOcean and continuously displays the current status of all EnOcean devices. A list in the web interface concisely displays all registered devices, sensor/actor connections and required actions such as text messaging.

OPTIMAL OVERVIEW FOR BUILDING MANAGEMENT

MoRoS EnOcean provides building services engineers and facility managers with an optimal overview of critical building functions and an innovative solution for targeted alarms, allowing for remote and central monitoring and control.

www.insys-tec.de



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LEVITON'S ENERGY-AUTONOMOUS PRODUCT FAMILY CONTINUES TO GROW

Leviton Manufacturing Company has expanded its line of commercial wireless occupancy sensors with a comprehensive offering of LevNet RF wireless energy management devices. The revolutionary line of self-powered, eco-friendly devices integrates Leviton's signature performance and design features with best-in-class technology from EnOcean, the world leader in wireless control technology.

By Bob Freshman, Marketing Manager, Leviton



With no wires to run, the family of LevNet RF devices reduces labor and material costs and takes only minutes to configure. Once installed, LevNet RF devices can be used in virtually any commercial retrofit environment to control energy consumption and reduce a facility's carbon footprint.

LevNet RF wireless control devices meet a wide range of application requirements in addition to occupancy detection. Devices can be used for single-pole On/Off switching, multi-location switching, HVAC control, motor control and more.

LevNet RF self-powered transmitters do not require external power and there are no batteries or components to replace or maintain. Devices are interoperable and can interact with other devices on the LevNet RF wireless network.

Ideally suited to achieve energy savings in hospitality applications, the revolutionary LevNet RF Key Card Switch signals a room's electrical and HVAC controllers to automatically turn lights off and set-back the HVAC system when guests leave their rooms. It turns lighting back on

and adjusts temperature controls when guests re-enter using the Key Card.

Levnet RF's innovative Wireless Thermostat receives signals from transmitting devices such as LevNet RF occupancy sensors or the LevNet RF Card Switch and adjusts temperature controls when occupancy is detected. LevNet RF occupancy sensors use artificial light and switch products use kinetic energy to power themselves, further adding to energy savings. LevNet RF transmitters and receivers can send and receive signals from 50-150 feet in range. Products come with a 3-Year Limited Warranty, and have a performance lifespan of over 20 years. All devices are NAFTA- and Buy America Act compliant.

"The introduction of this latest generation of LevNet RF products has established Leviton as the leader in wireless, self-powered lighting controls," said Richard Westfall, VP/GM of Leviton Lighting Management Systems. "LevNet RF is the ideal solution for adding lighting controls to existing commercial structures."

www.leviton.com



DISTECH CONTROLS LAUNCHES COMPLETE BACNET PRODUCT LINE

Distech Controls is expanding its product offering, providing customers with a complete line of BACnet controllers.



By Caroline Cadieux, Marketing Director, Distech Controls

Starting in spring 2010, the company will offer a total of 23 BACnet products ranging from Application Specific Controllers and Advanced Building Controllers to the new Allure EC-Smart-Vue configurable communicating sensors.

The company has taken engineering innovation to a higher level by making its BACnet products exceptionally easy to use by integrators. For example, there are several plug & play features to help reduce installation costs and commissioning time. For specifying engineers, the products in the new BACnet line comply with the ASHARE BACnet Standard and will be BTL listed when released in spring 2010. Building owners and users will appreciate the user-friendly, icon-driven interface of the new EC-Smart-Vue. EC-Smart-Vue's innovative ECO-Vue icon promotes user energy-conscious behavior by graphically reproducing, in real-time, the impact of users' decisions on their environment.

WIRELESS AND BATTERY-LESS "OUT-OF-THE-BOX"

The new line integrates Distech Controls' wireless and battery-less technology by delivering "out-of-the-box" wireless capability. Not only does this provide unprece-

dent flexibility, it is an important money saving benefit for end users.

Distech Controls has leveraged its extensive experience with LONWORKS products to create a genuinely open system. The company's building automation line of products features a common network management tool as well as a graphical user interface for both LONWORKS and BACnet.

2010 AHR EXPO INNOVATION AWARDS

Ahmed Hirani, Distech Controls' Executive Vice-President, Sales and Marketing, said: "With the launch of the complete BACnet product line, our company moves to the forefront of open building automation solutions. We are both pleased and proud that Distech Controls' BACnet VAV controller (ECB-VAV model) coupled with our Open-to-Wireless technology was awarded an Honorable Mention in the Building Automation Products category at the 2010 AHR Expo Innovation Awards."

www.distech-controls.com



VISUALIZING EASYCLICK FUNCTIONS



By Werner Petritz, Product Manager,
PEHA Paul Hochköpfer GmbH & Co. KG

With the myHomeControl® visualization software from BootUp it is now also possible to display and control Easyclick functions onscreen. myHomeControl® communicates with the Easyclick components through a combined USB transmitter and receiver. The visualization software monitors, controls and regulates wirelessly,

and is compatible with all EnOcean-enabled components. Programming is extremely simple, it is supported by graphical elements, and allows intuitive use of the system by its simple menu guidance. PEHA system consultants provide extensive project and implementation support.

www.peha-elektro.com
www.myhomecontrol.ch



ENOCEAN DESIGNED BY NATURE

Recent appearances are the EnOcean PTM 200 and PTM 200C modules in an unusual look – as wall switches in a „natural“ design with a genuine wood frame obtainable in different colors.

By Pavel Maruna, Managing Director, WMOcean

This new combination of wireless technology and natural materials is a true continuation of EnOcean's sustainability principle – no wires and no batteries. Dependability, performance and long life are of course primary.

Choice of the right kind of wood and its treatment are important in producing switches with their own individual design. The polish used for the EnOcean switches not only lends the wood a special and noble appearance, it also makes it extremely resistant to scratches and wear. Supplied with each switch is a mounting set and a double-sided adhesive band for fast and reliable adhesion to



practically any material. So there is full flexibility in where you place the switches.

www.wmocean.com





EXTREMELY COMPACT AND VERSATILE – THE RF 10 WIRELESS CUBE

The RF 10 wireless cube from steute is suitable for very different purposes in building services engineering.

By René Scherer, Product Manager, steute Schaltgeräte GmbH & Co. KG

It is (almost) square, extremely compact and, compared to a conventional switching device, it is missing a quite important feature – the RF 10 wireless cube manages without cabling for a power supply and signal transmission because it communicates by the EnOcean standard. Plus it is compact enough for use in tight corners, like in ventilation plant.

EASILY OPERATED

The actuator of the switching device is a spring rod that acts on a microswitch. The actuating travel is only very small, as is the actuating force that is needed. If, in the presence of unfavorable operating conditions, the mechanically actuated wireless switch cannot be used, an alternative is a contactless version of the wireless switch.

In addition to size and straightforward installation, long life is a notable feature of the RF 10 wireless cube. Mechanical lifetime is more than one million switching operations, and at as many as 1800 operations per hour it is still very much in its element.

VERSATILE IN USE

With characteristics like these the RF 10 wireless cube is suitable for a whole variety of applications in building services automation. Typical uses are security functions and supervision or monitoring, e.g. of emergency exits or flap and valve positions in ventilation plant.

The switching electronic circuitry is powered from a conventional battery that can be exchanged with simple tools. The small energy need of the cableless transmission promises very long battery life.

www.steute.com



RELIABLE ENOCEAN CONNECTIVITY— RADIO LINK QUALITY AS OBJECTIVE CRITERION (PART 1)

Users of EnOcean-enabled solutions are satisfied they are implementing a pace-setting technology. Their sustained satisfaction results from the features of such solutions: no wires, no batteries, no limits.

By Thomas Rieder, Managing Director, PROBARE

The absence of wires means clear advantages at first-time installation and in the event of any alterations that become necessary in a building. Of course, users will expect the reliability of a short-range radio link to match that of a wired solution. The satisfaction of users with EnOcean links in daily use can be described by radio link quality, an objective value derived from measurable parameters.

The EnOcean standard, in its approach, optimizes the reliability of a wireless link by carefully considering the boundary factors resulting from energy-autonomous sensors and actuators. Very short telegrams minimize the probability of collisions in time with other users of the wireless frequency, and still ensure correct transmission of the required quantity of data.

The necessary redundancy is produced by intelligent use of the wireless channel based on EnOcean subtelegrams and their coding. Independently of this, a wireless channel represents a non-deterministic transmission path. A fact that must be considered for implementing a reliable EnOcean system.

A first-time installation in a building that does not yet exist can be planned entirely on the basis of the floor plan and any allocation of space already made. The details in the EnOcean application note „Installation of EnOcean wireless systems“ are very useful as a solid planning foundation. For a ready standing building its layout should also be the starting point to plan a new installation or alter existent EnOcean systems. Here, however, it is of course possible to first walk through the location and test the quality of selected EnOcean radio links. Upon completion

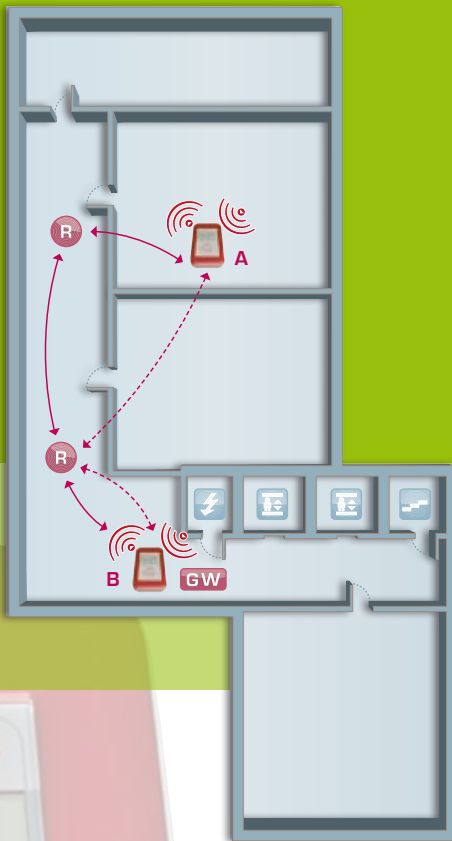
of an installation it is advisable, in view of upcoming acceptance of the facility and subsequent commencement of a warranty, to verify the quality of at least representative EnOcean links and document this in suitable form.

HOW TO DETERMINE RADIO LINK QUALITY

When determining radio link quality, you not only consider received level but also the „Error rate“ message of EnOcean subtelegrams, and occupancy of the wireless channel by other users of the frequency for the parameters to be evaluated.

For bidirectional communication the wireless link quality is a result of these parameters for both directions because the quality of communication from point A to B need not be the same as that from point B to A. If repeaters are used, evaluation of parameters must be separate for the direct path and for 1-level and 2-level repeating. In this case radio link quality is a result of combining all possible paths.

In all cases it is important to take only the data of sufficiently extensive wireless communication for the required evaluation so that a result, difficult to reproduce and thus deceptive, is not obtained from an impression at a given instant.



In the configuration without a second repeater there are a number of reasons why radio link quality between point A and the gateway at point B is not up to expectations. A reliable direct link between point A and the gateway is not possible because it is hindered by a partition wall and the electricity distribution. Communication from A via the top repeater to the gateway is by reflection of the wireless signals in the L-shaped corridor because there is no line of sight between repeater and gateway. Depending on the length of the corridor, the materials used in the building and how the area in and around this corridor is used, the signal received at the gateway may be relatively weak as a result of multiple reflection, or it may fluctuate considerably due to multipath reception. This phenomenon is familiar from changing radio reception when driving through mountainous areas.

A pure level measurement combined with displaying the received telegram content is thus hardly suitable to properly judge the sustained reliability of an EnOcean installation.

WHEN RADIO LINK QUALITY DOES NOT TURN OUT AS PLANNED

The picture shows a typical floor plan of an office building, an EnOcean gateway (GW) is close to the electricity distribution and covers the lower and middle part of the building as illustrated. The upper part of the building, as originally planned, should be supplied by the repeater (R) positioned in the corridor at the top. The repeater further down was not intended to begin with.

Irregular telegram losses may be the result, an error scenario that is difficult to reproduce, but which determination of the wireless link quality soon reveals. Installation of the second repeater is a fast remedy.

The article will continue by taking a closer look at the determination of wireless link quality, together with the results measured on installations of particular interest.

www.probare.biz



A BUILDING WITH A VIEW – MULTIVENDOR ENVIRONMENT IN COMPLEX G OF BIBERACH UNIVERSITY OF APPLIED SCIENCES

By Thorsten Wegener, B.Eng. and Prof. Dr.-Ing. Martin Becker, Biberach University of applied sciences (Institute for Building and Energy Systems)

Complex G of Biberach University of applied sciences not only presents the students with space for lectures but can also, given its adequate technical equipment, be used as an experimental environment for teaching and research purposes. In addition to a laboratory for building automation, here you find various seminars with different automation systems offering numerous possibilities of showing the students in practice what they have learnt about instrumentation & control and building automation. Functions of room automation are illustrated in two seminars for example, with LON technology and with programmable logic controllers (PLCs).

As part of the bachelor work of Thorsten Wegener, batteryless wireless components from different manufacturers were integrated into the existing automation systems (KNX and PLC) to judge suitability in terms of functionality, flexibility, performance, limitations and the engineering effort called for in system integration.

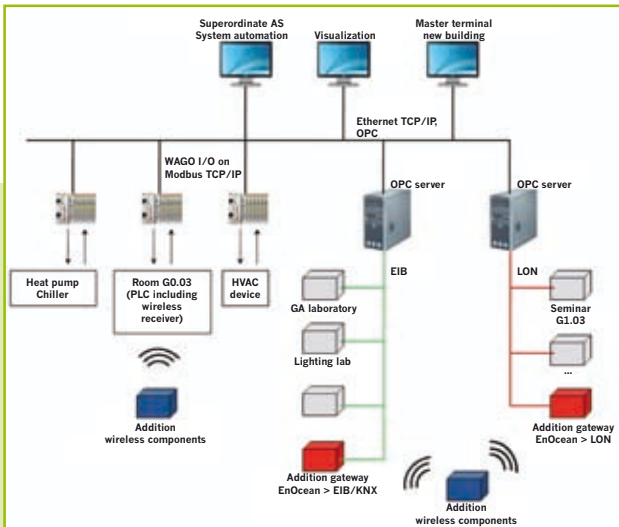


Complex G of Biberach University of applied sciences – teaching, research and demonstration building for building climate control studies and Institute for Building and Energy Systems

INTEGRATION OF ENOCEAN WIRELESS COMPONENTS IN EXISTING AUTOMATION STRUCTURE

Complex G with its seminars ready equipped for room automation offers excellent prerequisites for creating a multivendor environment through batteryless wireless components and integrating them in the existing structure. A wireless receiver for PLC and two new gateways for KNX and LON enabled transmission of telegrams from different wireless sensors, window contacts, temperature and outdoor brightness sensors or motion detectors to wired systems. In this way the existing actuators of the automation systems could be driven and continue in use.

Attention was paid to ensuring that the functionality of the wireless components was comparable to that of the existing automation systems. In part the existing functions were not only copied but also expanded so that lighting control as a function of presence and brightness, and automatic control of blinds by outdoor brightness



Expansion of existing automation structure to integrate EnOcean wireless components in seminars of complex G and in laboratory for building automation

sensors could be implemented. The existing systems were started up by the particular software tools – ETS, LonMaker or CoDeSys for example – so that the integrated devices are also subject to the defined standards through the gateways.

EXEMPLARY AUTOMATION FOR A HOTEL ROOM

To enable a general comparison between wired automation systems and purely wireless systems, the bachelor work also saw development and setting up of a laboratory panel that shows examples of automation functions for a hotel room.

Implementation of the contained functions to switch lighting, regulate constant light and temperature is virtually identical to ready established bus systems.

Summarizing it can be said that implementation of wireless components, whether autonomous or integrated in existing automation systems is very simple and straightforward. At field level it is possible to create precise controlling and regulating functions. The standardized communication of the devices also enables cross-brand installations and interoperability. Alone the reduction in cabling for additional sensors, often where access is difficult, will justify the use of a wireless system. All in all an innovative solution that pays what it promises.

www.hochschule-biberach.de



LEED CERTIFICATION: JIM O'CALLAGHAN, PRESIDENT OF ENOCEAN INC. IN INTERVIEW

Climate change and rising energy prices make energy-efficiency, sustainability and flexibility increasingly important factors in buildings. To successfully implement these prerequisites, a growing number of operators and owners are investing in modern building management systems. The aim is to automate a variety of functions, for example controlling the lighting and heating through the use of automation systems that continuously monitor status and deliver light and heat only when and where needed. As a result, energy costs are reduced while comfort and performance are enhanced by granting occupants personal control of their workspace. This translates into buildings that lease faster and at higher rates than comparable buildings without automation systems. Sustainable building can be made measurable and transparent through LEED certification.

perpetuum spoke with Jim O'Callaghan, President EnOcean Inc., about the LEED certification and the significance of the EnOcean technology for the certification.

Jim, everyone seems to be talking about LEED. Can you tell us briefly what LEED is all about?

Jim O'Callaghan: The U. S. Green Building Council established the Leadership in Energy and Environmental Design (LEED) Green Building Rating System as a nationally accepted benchmark for the design, construction and operation of high performance green buildings. It's a voluntary certification procedure, intended to promote more environment-friendly and economically attractive building.

So how does the certification work?

LEED Rating Systems award points for independently verified building performance. There are Systems for new and retrofit construction, as well as commercial and residential buildings. Points are awarded for factors like site, water and energy consumption, materials and indoor environmental quality. There are four possible certifications: certified, silver, gold and platinum. The points needed to qualify for one of these four levels are as follows:

Certified 26 – 32 points
Silver 33 – 38 points
Gold: 39 – 51 points
Platinum: 52 – 69 points

Can you tell us a little more about the points system?

LEED points are awarded in six categories – energy and

atmosphere, water efficiency, materials and resources, quality of the air in a building, sustainable site plus innovation and design.

When it comes to energy efficiency for instance, the installation, and supervision of the lighting and heating and air-conditioning systems play an important role, as does the use of renewable forms of energy. Innovation is encouraged by awarding points for exemplary performance and the implementation of new and efficient technologies, such as EnOcean's self-powered and batteryless wireless technology.

What types of performance, and hence LEED points, can one achieve by using EnOcean technology?

EnOcean technology is ideally suited to LEED categories of Energy and Atmosphere, Indoor Environmental Quality and Innovation and Design Process. For example, one can earn a LEED point providing occupants personal control of Lighting Systems and another for Thermal Comfort. Wireless switches and thermostats that are conveniently placed for easy occupant access enable such performance.

What do you think are the major benefits of LEED certification for the owner and occupants of a building?

The owner has independent verification that their building meets the highest standards of sustainability, cost efficiency and occupant comfort. A 2009 study by Hen-



Jim O'Callaghan has spent his career building brands, customers and value for a host of innovative technology companies, both public and private. He spent the first dozen years primarily in finance and accounting positions, culminating as CFO participating in two successful IPOs. For the last decade and a half, Jim has worked almost exclusively in sales, marketing and management roles, both with technology and with RF ventures. He is best known as co-founder of Cirque Corporation, the originator of touchpad pointing devices now common on virtually all notebook computers. In 2005 Jim joined EnOcean to establish a North American presence. Jim has a BBA in accounting and a MBA.

ley University Business School (Reading, UK) found commercial building price premiums of 10% and 31%, respectively, for Energy Star and LEEDcertified buildings. Occupants save costs because LEED buildings are more energy efficient, and LEED buildings typically have better lighting, thermal control and indoor air quality, resulting in more satisfied employees and higher productivity.

What kind of buildings are most suitable for certification?

While LEED initially targeted new commercial construction, the program has expanded to cover homes and neighborhoods, commercial buildings, schools, health-care and retail structures.

Has EnOcean technology been used for any LEED certified buildings?

Certainly, Canada's Promutuel Insurance Group's corporate headquarters is a good example. To make its head office in Quebec really sustainable, the insurer decided to have the new building LEED Gold certified. To achieve this, it invested in innovative technologies like EnOcean. A total of 800 EnOcean-enabled products from various manufacturers were installed – including energy-harvesting motion sensors, photo sensors, light switches and receivers connect with BACnet enabled gateways. Implementing self-powered wireless technology in the Promutuel building enabled significant savings in energy and operating costs, enhanced occupant control and comfort, while providing greater flexibility to layout offices



and in the future to change the layout without the need to pull wiring. Eliminating the need for batteries makes the system maintenance free, and avoids disposal of hazardous chemicals.

Another case is the Leggat McCall Building in Boston. This was renovated using EnOcean enabled products, including wireless switches and occupancy sensors. Energy consumption has already been reduced by about 40 percent, and the entire renovation was completed in just 15 days.

LEED certification is spreading to Europe, and employing EnOcean technology – such as the four Siemens City buildings in Vienna.

Thank you for taking the time for this interview. ☐

ENOCEAN SPEAKS NOW FRENCH TOO



EnOcean GmbH is reinforcing its activities in France. For better contact with French OEMs and attunement to their requirements, EnOcean is joined by Emmanuel François, who is experienced in the sector and knows it throughout. He will now support EnOcean in planning and implementing its sales activities in France.

EMMANUEL FRANÇOIS INVESTS INDUSTRIAL EXPERTISE

In Emmanuel François, EnOcean is joined by a professional in this sector with 24 years' experience, and who has already carried out a number of projects with EnOcean in France. Prior to this he was, for a number of years, managing director of Wieland-Electric France. Before that he held a number of managerial positions, including sales manager at CAPRI CODEC and at ABB-ENTRELEC.



Working as a consultant, Emmanuel François will cooperate closely with current and new French OEM partners to get innovative building solutions to market fast and implement building projects.

"France is a major marketplace for us", says Markus Brehler, CEO of EnOcean. „In Emmanuel François we've acquired an experienced, committed and highly competent man who will help us to expand our market in France fast, and to create strategically important partnerships with established French enterprises."

SUCCESSFUL APPEARANCE AT INTERCLIMA 2010

At this year's interclima from February 9 through 12, a number of members of the EnOcean Alliance presented a variety of EnOcean-enabled products – including Thermokon, Kieback&Peter, WAGO, Schulte Elektrotechnik, WIT, Sauter as well as EnOcean itself. interclima is the major show in France for HVAC and building automation, and is staged every two years in Paris.

www.enocean.com



AHR EXPO 2010:

ENOCEAN ALLIANCE AND BACNET INTERNATIONAL TO DEVELOP INTEROPERABILITY SPECIFICATION FOR INTEGRATING WIRELESS/WIRED BUILDING SYSTEMS

BACnet International and the EnOcean Alliance announced its cooperation develop a vendor independent gateway specification for integrating EnOcean-based wireless energy-harvesting nodes into the world's leading data communications protocol for building automation and control.

Latest meetings between the two organizations have opened the door to the full integration of wireless EnOcean and wired BACnet-enabled technologies, with the result that an EnOcean interoperability proposal has been drafted for the BACnet committee meeting at AHR Expo in Orlando, Florida. The working group's current standardization efforts aim to ensure the interoperability of multiple EnOcean and BACnet solutions available today or in development, as well as future implementations.

SUCCESSFUL SHOW FOR THE ENOCEAN ALLIANCE

Several Alliance member companies participated at the AHR Expo, held in Orlando on January 25-27, 2010. Echoflex Solutions Inc, EnOcean Inc, Illumra, Kieback&Peter and BSC Magnum demonstrated a broad range of the latest EnOcean-based monitoring and control products for HVAC/R applications. Focusing on the energy-saving potential in buildings, products on display included building energy-management solutions based on EnOcean's new Dolphin system platform; HVAC monitoring and controls; wireless actuators as well as EnOcean-BACnet based solutions for HVAC. □

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At the beginning of 2008, NT plus became part of the Actebis Group. In 2008, the Actebis Group achieved a turnover of 3.66 billion euros with 1800 employees and is the third largest ICT distribution company in Europe.

To serve dealers in the building automation segment, NT plus carries KNX and EnOcean products and also cooperates with PEHA, ELTAKO, B.A.B-Technologie, AGFEO, Tobit and BSC-Software.

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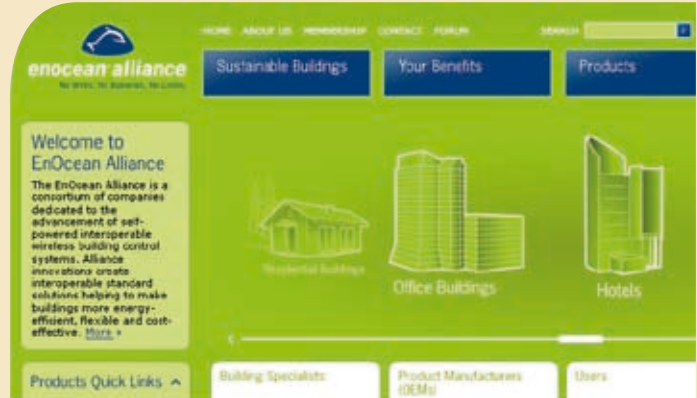
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ENOCEAN ALLIANCE WEBSITE – A FEW CLICKS TO THE RIGHT SOLUTION

In the new web application “Solution Finder” the EnOcean Alliance now offers you a possibility of finding a service-free wireless solution to your requirement in just three steps. After choosing the type of building, just define the application area, and then the region/frequency. In no time at all you have the matching system solution, and you can view references for the selected market segment and the available products.

www.enocean-alliance.org



GREENBUILD 2009:

ENOCEAN ALLIANCE ANNOUNCES FIRST OPEN SPECIFICATION FOR ENERGY-HARVESTING WIRELESS SENSORS



Jim O'Callaghan and Al Gore. At the Greenbuild 2009 the former Vice President and environmentalist held the keynote.

At the Greenbuild 2009, held in Phoenix November 10-12, the EnOcean Alliance announced its first global,

open specification for self-powered, wireless sensors. Jointly produced by EnOcean Alliance members, the public specification presently contains 50 equipment profiles supporting the development of a variety of solutions for building automation. Currently available EEPs include switches, remote controls, sensors, sensor combinations and data of every kind.

At the Greenbuild several Alliance member companies – such as Echoflex Solutions, EnOcean Inc and Illumra – demonstrated a broad range of the latest EnOcean-based monitoring and control products for building automation. In addition to these participants at the EnOcean Alliance booth, several Alliance members displayed further EnOcean-based solutions at the exhibition including Leviton Manufactur, Osram Sylvania or Verve Living Systems.

Greenbuild is the world's largest conference and expo dedicated to green building. Building professionals from all over the world visit Greenbuild for outstanding educational sessions, renowned speakers, special seminars and networking events.

MORE AWARDS FOR THE BATTERYLESS WIRELESS TECHNOLOGY FROM ENOCEAN

ENOCEAN SINGLED OUT FOR “BEST APPLICATION OF ENERGY HARVESTING”

EnOcean, the inventor of energy harvesting wireless sensor networks, was awarded the top prize for “Best Application of Energy Harvesting” by IDTechEx’s panel of independent experts. EnOcean’s energy harvesting radio modules were recognized for their role in simplifying the integration of building energy management systems via self-powered wireless sensors and switches. While buildings account for approximately 40 percent of all energy consumed in the United States and 50 percent of greenhouse gas emissions; EnOcean has taken giant strides towards reducing the amount of energy lost to unnecessary lighting, heating and cooling of buildings. BAS (Building Automation Systems) have proven reliable means of reducing energy consumption in buildings up to 40%. Self-powered sensors and switches, enabled by EnOcean, overcome the integration barriers that have stalled widespread BAS retrofitting. The award distinguishes EnOcean as having actual commercial success with its end product using energy harvesting..

LEDALITE’S AIRWAVE SELECTED BY THE IESNA FOR ADVANCEMENT IN THE ART AND SCIENCE OF LIGHTING

Ledalite’s Airwave Wireless Lighting Controls have been selected by The Illuminating Engineering Society of North America (IESNA) for its innovative technology. Each year, the IES Progress Committee evaluates and selects lighting products and technologies that represent a significant development within the lighting industry. Airwave is recognized by the IES as a unique lighting controls solution that advances the art and science of lighting. Airwave wireless and batteryless components operate by capturing miniscule amounts of kinetic and solar energy which then are used to transmit wireless commands to dim or turn ON/OFF light fixtures. The revolutionary miniature energy harvesting and wireless communication utilize the latest EnOcean technology to reduce environmental impact and dramatically improve flexibility for the latest sustainable construction initiatives. □

VERVE WINS 2009 BEST PRODUCTS AWARD FROM BUILDER NEWS MAGAZINE

Whole House Lighting Control System from Verve Living Systems was awarded by Builder News Magazine as the Best Product 2009. The system uses the energy harvesting wireless technology from EnOcean. EnOcean created small wireless sensors that can collect and harvest the tiny amounts of energy. When Verve got a hold of the technology, it used it to create a wireless, energy-harvesting, whole-house lighting control system that can control incandescent and compact fluorescent lights. The system turns the lights on and off and can dim them without having to wire the switches to the lighting sources, so the switches can be totally movable. The system is wired through controllers, which allow different lighting scenes to be set up and controlled through the click of a switch.

www.vervelivingsystems.com



ONE LITER OF ENERGY

By Gotthard Sauer-Sperling, Freelance, EnOcean GmbH

I close the hood with my right hand. Fasten the belt. A glance at the range indicator shows there's enough to get there and back. The pedals and the steering move smoothly. Everything looks okay. I press the speed button, my TWIKE responds with a kind of buzz and rolls out of the yard.

If that reminds you of the start of an aircraft, well, there are similarities. But it's a little more cramped than in a cockpit. No steering wheel but instead a kind of joystick in the middle between driver and co-driver, plus bicycle pedals for the feet and the glass hood over the top.

NO CO₂, NO SOOT, NO SMELL

But it's meant for the road: 3 kW electric motor, space for two, three wheels, 85 km/h top speed. It accelerates and drives in everyday commuter traffic like a normal car. Perhaps it's not quite as comfortable, and not so zesty going uphill. But it's quiet and has zero emissions. No CO₂, no soot, no smell. And with a range, the way I drive, of about 70 km per battery charge – that's something like 5 kWh – I can easily get from Starnberg to Munich and back again.

THE TWIKE VIRUS

Why electric? Why TWIKE? Because – quite apart from the virus that got hold of me a good two years ago – there have long been other means than diesel and gasoline for our daily mobility needs: my TWIKE is a 1999 model after all. And because in my opinion it's slowly becoming a matter of urgency to adopt a different attitude to the environment and the use of energy, and to spread this feeling to others.

TWIKE attracts attention, and perhaps it will make one person or another think whether there's really any sense in 8 liters ROZ95 per 100 km for one person and more than 1 tonne of live weight – when about 1 liter (in converted terms) would get you just as far. And there's just as much driving pleasure. □

Gotthard Sauer-Sperling enjoys driving carbon-free in his TWIKE.



TEAMING UP – MEMBERS OF ENOCEAN ALLIANCE PUT ON JOINT SHOW AT LIGHT+BUILDING 2010

EnOcean GmbH is appearing at this year's Light+Building together with several members of the EnOcean Alliance. In addition to EnOcean, the companies BootUp, BSC Computer, IK Elektronik, IP controls, Jäger Direkt, Osram, PEHA, PROBARE, Sauter, Siemens, steute and Thermo-kon will be attending to give visitors to the joint booth B40 in hall 9 full details of EnOcean technology and products integrating this self-powered wireless technology. Over 40 product and systems manufacturers are presenting their EnOcean-based solutions. A highlight of the show will be the new products enabled by the leading-edge Dolphin platform.

Graham Martin, chairman and CEO of the EnOcean Alliance, is very pleased to see this joint effort: „Light+Building is one of the major international shows for light applications. The combined appearance demonstrates that we're all



pursuing the same ambition – to make EnOcean-enabled solutions successful worldwide.“

Light+Building 2010 is staged from April 11 through 16 in Frankfurt, Germany.

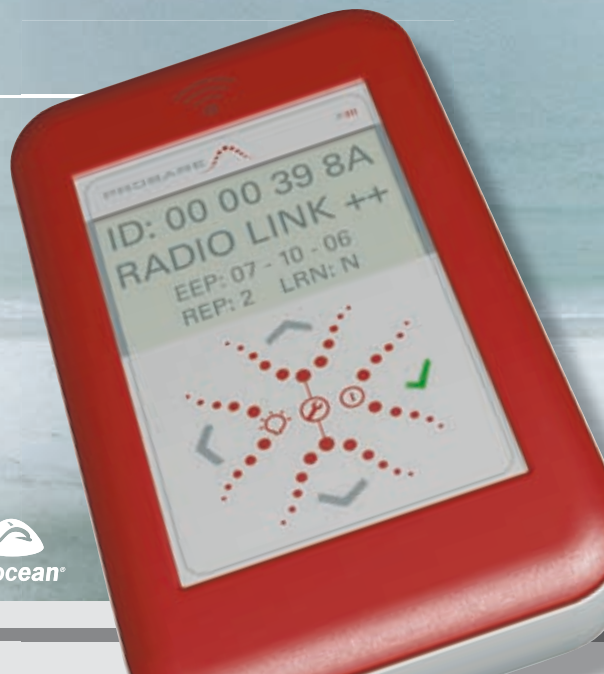
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MARCH 2010**Mar 23-27, 2010:****Mostra Convegno, Milano, Italy**EnOcean Alliance member Thermokon exhibits.
www.mcxpocomfort.it**Mar 24-25, 2010:****Milliwatt Energy Harvesting for Wireless Automation,
Munich, Germany**

Presentation by Markus Kreitmair and Frank Schmidt (EnOcean) on the topic „Design Strategies for Energy Harvesting“.

APRIL 2010**light+building****Apr 11-16, 2010:****Light & Building 2010, Frankfurt, Germany**EnOcean Alliance and partners exhibit in hall 9.0, B40.
light-building.messefrankfurt.com**MAY 2010****May 11-14, 2010:****Lightfair 2010, Las Vegas, Nevada, USA**EnOcean Alliance and partners exhibit.
www.lightfair.com**May 26-27, 2010:****Energy Harvesting & Storage Europe 2010,
Munich, Germany**EnOcean GmbH exhibits. Presentation by Graham Martin and workshop on the topic „Design Strategies for Energy Harvesting“.
www.idtechex.com**JUNE 2010****Jun 22-23, 2010:****Consense, Stuttgart, Germany**EnOcean Alliance exhibits.
www.messe-stuttgart.de**JULY 2010****Jul 14-16, 2010:****Wireless Japan, Tokyo, Japan**EnOcean exhibits.
www.expocomm.com**Jul 21-23, 2010:****Techno-Frontier, Tokyo, Japan**EnOcean and Kaga Electronics exhibit.
www.jma.or.jp**SEPTEMBER 2010****Sep 21-22, 2010:****IBS Event 2010, Paris La Défense, France**EnOcean Alliance Partner exhibits.
www.ibs-event.com**NOVEMBER 2010**24. Weltleitmesse
Neue Messe für den
09.-12. November 2010**Nov 9-12, 2010:****Electronica, Munich, Germany**EnOcean exhibits.
www.electronica.de**Nov 10-11, 2010:****Wireless Congress, Munich, Germany**Presentation by Frank Schmidt (CTO EnOcean GmbH) on Energy Harvesting Wireless Solutions.
www.wireless-congress.com



ENOCEAN GOES ASIA

By Michael Gartz, International Sales Manager, EnOcean GmbH

As part of its strategy of international expansion, and following on from activities in Europe and the USA, EnOcean now intends to reinforce its presence in Asia. Japan has been selected as a starting point. The Japanese market is the world's second biggest national economy, and is a strong indicator of new developments and trends especially in the electronics and automobile sectors.

COMMITTED DISTRIBUTION PARTNERS

In Kaga Electronics Co. Ltd and Moritani & Co. Ltd, EnOcean has found two solid, established partners to market EnOcean products. Both companies work through an excellent and experienced network in marketing electronic components and modules.

Says EnOcean's international sales manager Michael Gartz, who in addition to business contacts also has family ties with Japan:

„Entering the Asian market and this focusing on Japan are a further important step in spreading EnOcean technology worldwide. In Japan in particular the consciousness of and demand for sustainable and environment-friendly technologies have increased considerably in recent years. So I'm convinced that our decision to expand our activities in this direction is strategically correct.“

SHOWCASES IN JAPAN

Together with its distribution partners EnOcean is participating in two major shows:

- Wireless Japan (July 14 - 16, 2010)
- Techno Frontier (July 21 - 23, 2010)

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