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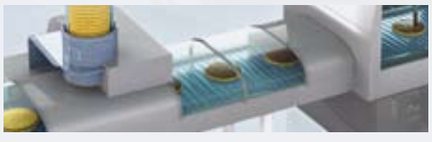

The optimal path to safe machines

How the Omron Safety Service helps customers by supervising the process and drawing up risk assessments to the implementation of documentation

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Beaphar and DeviceNet Safety

Beaphar has been developing and producing medicines and care products, as well as premium food for pets, for more than 65 years

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realizing

Safety... at your service!

Many years ago, Omron's founder, Kazuma Tateishi created the company motto, "At work for a better life, a better world for all". At Omron, we are still very much inspired by this motto and believe that Safety is fundamental to this vision, and when applied to Industrial Automation, Machine Safety becomes a key focus.

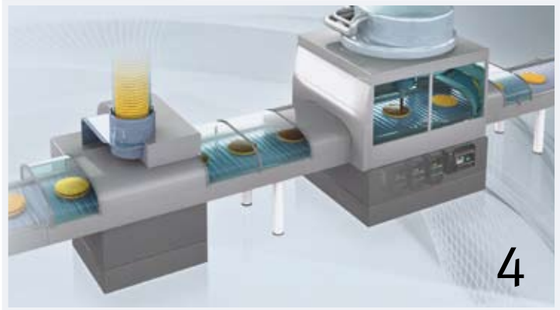
Safety has become a much more prevalent issue for our society, and this is shown in both the developments in safety technology and the resulting business levels, which appear to have been largely unaffected by the recent economic crisis. The trend is moving from reducing the *risk* of injury or death to *preventing* them all together, maximizing safety and reducing downtime.

With the development of software based safety systems and integrated safety features within machine control, the safety system became a driver of machine productivity. Key issues raised by the machinery directive, like inherent safety design, or the transition from EN954-1 Categories to the more realistically adjusted performance levels defined in EN 13849-1, become common issues in modern machine safety.

Omron – almost unique in the market – owns all of its safety related core technologies, from leading know-how to design and production of reliable forcibly guided relays and safety switches, to safety sensors using superior photoelectric competence, up to embedded safety functions in machine and motion controllers and drives.

Safety is at the core of our company, and is likely to be where Omron fulfills your needs most. Learn more about our experience in safety, our competence in safety risk assessment, our wide product portfolio and safety services, which will help you to design safe and efficient machines!

Maurizio Poli – *Editor in Chief*
Division Manager
Sensing Safety and Component Division
EMEA Countries



Cover:

Let's keep the balloon from bursting!

Today, Safety in machinery is continuously evolving. The probability of an "unsafe failure" must always be taken into consideration when implementing necessary safety measures.

Peter Goebbels

Lars Kothes

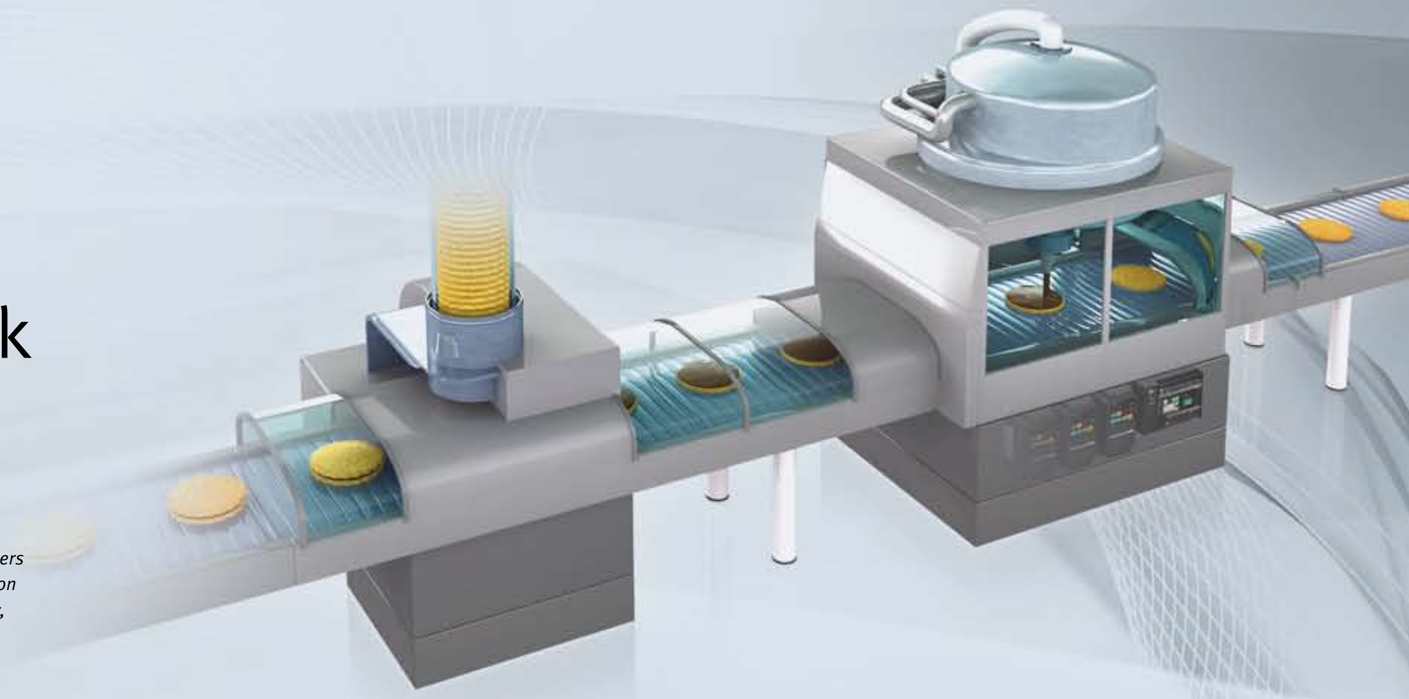
Ulrich Hochrein

Talk about...

Safety Service Competence Network

The optimal path to safe machines

The CE marking of machinery and plants requires extensive knowledge of the relevant directives and standards. This applies to machine and plant builders but also to operating companies. How the Omron Safety Service helps customers by supervising the process, drawing up risk assessments to the implementation of documentation is described by Peter Goebbels (Product Manager for Safety, Omron), Lars Kothes (CEO, Kothes! Technische Dokumentation) and Ulrich Hochrein (EDAG) in an interview with Regina Berg-Jauernig, Editor of GIT SICHERHEIT + MANAGEMENT magazine.



Regina Berg-Jauernig: Mr Hochrein, could you please provide us with a brief insight into the requirements of the Machinery Directive for which the network intends to support fulfilment with the safety service?

Ulrich Hochrein: Firstly, we must not reduce the requirements to the Machinery Directive only. The requirements of the European domestic market directives are far-reaching and the distributor (not necessarily always the manufacturer) must confirm that the requirements of all directives concerned have been fulfilled in their entirety for his product. Machines must pass the right conformity procedure, be correctly marked, be adequately documented and, of course, be safely constructed, installed and put into operation. With ingenuity and knowledge of current state-of the-art technologies, the safety service competence network determines which systems and products are right for the task. Many different experts bring their concentrated specialist knowledge to all issues mentioned to the network. An individual can hardly fulfil these comprehensive requirements, especially in the case of specific, unusual tasks.

Regina Berg-Jauernig: Unlike other companies in the industry, you have chosen a partner model for the organisation of these services. How does this model work in particular – and who takes on what role here?

Peter Goebbels: Here, we are falling back on partners who have already successfully worked with Omron as system integrators for many years and have often proven their competence in engineering and services. Safety technology specialists complement the network as service partners where sound, expert knowledge is required.

Regina Berg-Jauernig: Mr Kothes, your company takes on the subject of technical documentation. How do you support the customers in this?

Lars Kothes: With our employees, we cover the entire area of technical documentation: from risk assessment through instruction manuals to after-sales information. Our criteria is the valid minimum of requirements from standards and directives. Through consultation, analysis and use of up-to-date software, we manage to compile high value, and above all for the end customer, useful documentation at a reasonable cost.

Regina Berg-Jauernig: Mr Goebbels, the service has already been introduced in Italy and thanks to the acquisition of STI you have a network in the USA. According to your planning, how will the service be organised on a European and International level?

Peter Goebbels: Omron is gradually building up an extensive network which can operate internationally. Other industrial nations will soon be included. Consequently, we will be able to meet the demands of customers who operate between countries or even have global structures.
The Omron sales team will prepare intensively to get off to a good start in 2011. The SPS/IPC/Drives trade show in Nuremberg offers the ideal framework with which to present this new service from Omron to the professional public.

Read more about the safety service from Omron on page 12

Maximum Safety in the automated production of renewable energy sources

Precision and safety are the key words for Helios Energy Europe (Heliene), one of Spain's leading manufacturers of high-output solar panels, used for commercial-scale electricity generation.

Heliene applies maximum safety in its solar panel manufacturing lines, which are highly automated and include robots.

Spain enjoys more hours of sunshine than almost any other European country, so it is hardly surprising that it is one of the leaders in the development, manufacture and installation of photovoltaic energy systems. These generate electricity from sunlight, using solar panels of photovoltaic cells, and they are increasingly used as a source of renewable energy, especially for newly built houses, offices and factories.

Helios Energy Europe (Heliene) is one of Spain's leading manufacturers of high-power (200W to 250W) photovoltaic modules, which are used mainly by industrial companies and for generating electricity on a commercial scale. The company has a reputation for making high quality and innovative products that are both efficient and competitively priced. To a large extent, Heliene's reputation derives from its customised production lines which are highly automated, to optimise productivity.

Precise positioning

The solar panels are made up of 156mm square cells, which are precisely positioned and linked in 6 x 10 arrays with short ribbons of copper. These are precisely positioned on to a glass panel and soldered together, before the panel is laminated at temperatures of 150°C. The laminated panels must have all air removed from between the layers, as this would adversely affect the energy generating performance. The final stage is to assemble the panels into aluminium frames before they are tested in a solar simulation to make sure that they meet the required standards.

"The need for precision is paramount."

The whole process is carried out using a line of robots, with very little human intervention apart from machine control, visual inspection and some cleaning of the products as they move down the line. The need for precision is paramount, because once the panels are laminated, it is almost impossible to rectify any defects. In addition, safety is a key consideration, and the delicate – and expensive – materials must be handled with extreme care to avoid damage, or injury to the trained staff who work the line.

Advanced safety systems

Workers can visualize and accede to the operation of each of the robots, as well as all the parameters controlled in the production line through the NS10 series, interfacing with Omron motors and inverters, sensors, relays and controllers. This ensures the precision which is needed for quality manufacturing.

The safety system is controlled by an NE1A Safety Network Controller, which has expansion modules along the production line on a DeviceNet bus. This set-up controls the emergency stop pushbuttons at each of the robot stations, limit switches on the safety doors around the robots, and F3S-TGR-CL safety light curtains protecting the loading/unloading sections.

José Cardenas, part of the management team at Heliene, explains that using automatic systems for both control and safety has improved both reliability and precision in the production process: *"Compared with previous lines, we get more speed as well as improved quality, and relying on a single brand for the equipment makes maintenance and expansion much easier."*

Reliable, versatile and flexible

Oscar Chillón, Process Engineer, agrees with this: *"Robotic manufacturing processes like this need production and safety systems that are reliable, versatile and flexible. We've achieved that with this line, and we've made productivity improvements as a result."*

Spain has committed itself to reducing its reliance on non-renewable energy sources. It is estimated that by 2020, solar power could be generating as much as 20 GW of the country's electricity, compared with 1 GW at the beginning of 2008, and Heliene is well-placed to support this ambition.

Over the past 20 years, Controlled Area Network (CAN) technology has become the basis for communication between electronically controlled devices in a wide range of equipment. Originally developed as a serial bus for vehicle electronics, it is now used in applications as diverse as trains, X-Ray scanners, escalators and coffee machines.

Yes you CAN!

Widely used CAN hardware based protocols include CANopen, DeviceNet, J1939 and NMEA 2000. Besides these open standards, some proprietary CAN protocols are only used by a specific equipment manufacturer. This is hardly surprising, because no car manufacturer, for example, wants anyone else to change the way their braking or fuel delivery systems work.

User-defined CAN systems

One of the advantages of CAN is that it is robust and easy to use, making it ideal for applications such as packaging machines, robots, ships, and mechanical handling equipment. Traditionally, manufacturers designed their own control systems for these CAN installations, which can cause problems when there is a need to upgrade: replacing obsolete parts or implementing the latest technologies may call for a complete system redesign.

PLCs are theoretically ideal for such situations, because they have many communication interfaces, and are easily re-configured and re-programmed. What's needed is a user-defined CAN unit that can be installed in the PLC to send and receive frames over the CAN bus: in order to meet just this need the Omron's CORT21 module has been developed. The CORT21 is truly protocol-independent, and is available for both the modular CJ-series PLC, and the rack-based CS-series.

> "Ideal for applications such as packaging machines, robots, ships."

The unit can be set to any baudrate up to 1 Mbps, so even if the proprietary network has a non-standard rate, it can still communicate. As the unit has no fixed protocol, standard PLC commands are used to set up all parameters on the CORT21, such as memory buffers and message structures. Any memory area can be allocated for the send and receive buffers, the send triggers and the receive flags. In total, up to 640 send and 640 receive buffers can be assigned.

Working independently

Once configured, the CORT21 communicates independently of the PLC CPU. It monitors the trigger area and reads the send buffers to fill the CAN frames it sends out and extracts data from passing CAN frames that match its filter settings. The CORT21 also has extensive diagnostics that show the status of the unit and of the CAN-network, as well as the number of pending CAN-messages in the receive and send queues.

The CORT21 enables machine makers to rethink the control solution on existing equipment. A PLC can be programmed and re-programmed, even remotely, so that replacing a bespoke control board with a PLC allows control functions to be easily modified as required. This gives machine makers new opportunities to contact existing customers to offer upgrade packages on in-service equipment. In addition to the sales advantage, there are significant long-term customer-relationship benefits in providing improved performance without the need for major financial investment.

Seamless integration

It's in new installations that the CORT21 really comes into its own. For instance, diesel engines on a CAN J1939 system controlled by a PLC can be used on ships, trucks, buses, excavators or forklift trucks. All that's needed is simple programming: and the same technology can be used to control everything from power-take-offs to fuel monitoring.

You can now order the new CAN brochure on: www.industrial.omron.eu

Safety in Motion since 2004

In 2004, Omron launched the first built-in safety inverter drive – the L7. It was simply a case of putting together what belonged together. Since then Omron has continued the trend of offering customers safety products compliant with the latest safety legislation with improved functionality, such as the F7 and V1000 inverters and the Sigma-II servo drive. Now, Omron introduce to the market the new MX2 drive and the Accurax G5 servo drive, both complying with the latest safety regulations in order to enable our customers to make modern machines safer and more efficient.

Accurax G5

MX2 inverter

Reduce hardware and wiring complexity

The Standard Safety Circuit (1) requires one contactor at the output of the Inverter to break the power to the motor. Additionally, each contactor confirms its status with a digital output to the safety controller.

With the built-in safety function (2), only a direct connection to the safety controller is needed.

You can now order the new MX2 brochure on:
www.industrial.omron.eu

Accurax G5 – Integrated safety as standard.

The built-in safety of the Accurax G5 servo drive provides multi-drive connection with a single safety relay circuit. The redundant safety inputs and the external device monitoring (EDM) output can be linked from one servo drive to another without using additional safety relays for interfacing. Up to 8 servo drives can be connected to a single safety controller, saving hardware and wiring costs.

G5 drives provide integrated safety across its entire power range from 100W to 15kW (100, 200 and 400V) and the safety function is available when using any of the different control methods such as EtherCAT, Mechatrolink-II, Analogue and Pulse train control.

The G5 servo drives comply with:

- Performance Level d (PL d) according to ISO 13849-1
- Safety function STO (Safe Torque Off) according to IEC 61800-5-2
- Safety Integrity Level 2 (SIL 2) according to EN 61508
- Safety Category 3 (Cat. 3) according to EN 954-1

MX2 inverter – Integrated safety as standard.

Each MX2 inverter provides a redundant safety input and one external device monitoring (EDM) output. The EDM output confirms the safety status of the inverter, saving you the cost and wiring of external devices to carry out the same function.

Easy integration into the machine safety circuit

MX2 inverters can be easily integrated into the safety circuit. The safety inputs can be linked from one inverter to another without additional safety relays.

MX2 inverter complies with:

- Performance Level d (PL d) according to ISO 13849-1
- Safety function STO (Safe Torque Off) according to IEC 61800-5-2
- Safety Integrity Level 2 (SIL 2) according to EN 61508 and EN 62061

TechnoGR Safety Services

In the 21st century, machine manufacturers and end users alike must guarantee the safety and security of anyone and everyone who will come into contact with their machines. European and national worksite safety regulations are continually changing and evolving but still it is essential that your machines comply with all applicable legislation.

TECHNO GR
Member of Omron Europe

Protect your business
Accidents in the workplace can cause major problems for your business, ranging from possible legal action through lost production to impacts on staff morale, corporate reputation and profitability. The TechnoGR Safety Service supports safety throughout the entire lifecycle of your machines and helps you to protect your business.

Partner network throughout Europe
The TechnoGR Safety Service network is an integrated part of the Omron Europe organization and available in most European countries. This supports your operation if your customer is operating your machine in another country. You and your customer will benefit in using the documentation that was prepared by the TechnoGR Safety Service partners during the design and installation of the machine. This reduces effort in initial inspection as well as in periodical 6- or 12-month inspections.

Support throughout the entire machine lifecycle
Safety is part of every phase of the entire machine life cycle, from the design phase, to the operational phase, and finally ending when the machine is put out of service.

In the design phase, our specialized partner network can support you in risk assessment, help you set up the proper documentation for your specific machine and finally assist in the CE-marking process of your machine according to the relevant European or Global directives. This covers the Machinery Directive as well as the EMC- or Low-Voltage Directive. TechnoGR Safety Service customers benefit from the information in the TechnoGR Safety News. These newsletters will keep you up to date when directives or standards change.

All selected TechnoGR Safety Service partners and safety experts are well trained and have many years of experience in all kinds of safety. The European partner network ensures support with the right knowledge and experience, depending on your real needs. This offer covers documentation according to the Machinery Directive, risk assessment, electrical tests, stopping performance tests and many more. TechnoGR safety experts help you to select and get the proper components for the safeguarding of your machine, irrespective of whether it is mechanical or electrical when installing and setting up the machine.

During the installation of the machine in its final workplace, training and information of the staff operating the machine is a key element to operate the machine safely.

European and local directives, standards and rules are the basis for the training that the TechnoGR Safety Service provides along with the initial inspection before the machine is put into operation or the periodical inspection of the safety system on a 6- or 12-month basis when the machine is fully operational. The TechnoGR Safety Service offers you years of experience working closely with the world's top machine manufacturers and the associations who define international safety regulations.

For further information please contact your local Omron Sales representative or visit our website www.industrial.omron.eu

Beaphar and DeviceNet Safety

Beaphar has been developing and producing medicines and care products, as well as premium food for pets, for more than 65 years.

About Beaphar
At Beaphar, QUALITY is the key focus. As a veterinary pharmaceutical company, Beaphar is obliged to comply with European Directive 91/412/EEC. This directive is well known and denotes “GMP” (Good Manufacturing Practice). Compliance with the list of requirements is not optional, but obligatory. Compliance ensures that the manufacturing permit for the production of veterinary medicines is retained and safeguarded. Every day everyone within the organisation is involved in complying with this directive in some way. The management of all processes that take place has to be demonstrable and verifiable.

Engineering
Beaphar has an on-site engineering department that is supported by a technical service. The engineering department is responsible for the design and modification of both existing and new production lines. The subject of machine safety is playing an ever greater role in the design and modification of production lines. Beaphar has set itself the goal of ensuring that machine safety devices comply with the new EN ISO 13849-1 standard. To this end, the engineering department performs its own risk inventories, and with the manufacturer’s support, the correct components and systems are chosen in order to ensure correct safety.

New extrusion line
Last year, Beaphar developed a new extrusion line with which different types of premium animal feed can be produced. Incorporated in this line are extruders, a hammer mill, a cutting and rolling installation and various filters and driers. Inspection hatches or protective devices are fitted in most parts of this extrusion line. If these are opened, this can be a risk for the user, because they can come into contact with the product or with dangerous parts of the machine. To prevent this risk, every hatch or protective device is fitted with one or more door switches.

The extrusion line has a considerable number of door switches, emergency switches and other safety devices. On account of the high number of components, Beaphar has opted for a DeviceNet Safety controller plus a number of safety slaves from Omron Electronics. The advantages to Beaphar are that, because of the bus architecture, less wiring is necessary. As the system is software-based, modifications are easy to make. However, the main reason for Beaphar opting for this system is that in the control room it is possible to see immediately where unsafe situations occur. Previously, it was necessary to search for the open hatch, or to find out which emergency switch had been operated; this is now immediately evident on a computer screen. This results in a significant time saving, as the production line can be operational again much more quickly.

> “It is possible to see immediately where unsafe situations are occurring.”

Safety network controller NE1A

Colophon & Contact

technology&trends

is the customer magazine of Omron Europe B.V.

Publisher: Omron Europe B.V.
Wegalaan 67-69
NL-2132 JD Hoofddorp
The Netherlands
Tel: +31 (0) 23 568 13 00
Fax: +31 (0) 23 568 13 88
www.industrial.omron.eu
Editor in chief: Maurizio Poli
Editorial office: Karen Wassink, Johanna Lampe, Kristina Krüger

CD_EN01+TechnologyTrends14

Omron Europe B.V.
Wegalaan 67-69, NL-2132 JD, Hoofddorp, The Netherlands.
Tel: +31 (0) 23 568 13 00, Fax: +31 (0) 23 568 13 88, www.industrial.omron.eu

Austria
Tel: +43 (0) 2236 377 800
www.industrial.omron.at

Belgium
Tel: +32 (0) 2 466 24 80
www.industrial.omron.be

Czech Republic
Tel: +420 234 602 602
www.industrial.omron.cz

Denmark
Tel: +45 43 44 00 11
www.industrial.omron.dk

Finland
Tel: +358 (0) 207 464 200
www.industrial.omron.fi

France
Tel: +33 (0) 1 56 63 70 00
www.industrial.omron.fr

Germany
Tel: +49 (0) 2173 680 00
www.industrial.omron.de

Hungary
Tel: +36 1 399 30 50
www.industrial.omron.hu

Italy
Tel: +39 02 326 81
www.industrial.omron.it

Middle East & Africa
Tel: +31 (0) 23 568 11 00
www.industrial.omron.eu

Netherlands
Tel: +31 (0) 23 568 11 00
www.industrial.omron.nl

Norway
Tel: +47 (0) 22 65 75 00
www.industrial.omron.no

Poland
Tel: +48 (0) 22 645 78 60
www.industrial.omron.pl

Portugal
Tel: +351 21 942 94 00
www.industrial.omron.pt

Russia
Tel: +7 495 648 94 50
www.industrial.omron.ru

South Africa
Tel: +27 (0) 11 608 3041
www.industrial.omron.co.za

Spain
Tel: +34 913 777 900
www.industrial.omron.es

Sweden
Tel: +46 (0) 8 632 35 00
www.industrial.omron.se

Switzerland
Tel: +41 (0) 41 748 13 13
www.industrial.omron.ch

Turkey
Tel: +90 212 467 30 00
www.industrial.omron.com.tr

United Kingdom
Tel: +44 (0) 870 752 08 61
www.industrial.omron.co.uk

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SIMPLY SAFE

Safeguarding has never been this simple

Omron F3S-TGR-CL safety light curtains provide comprehensive body, hand and finger protection on every kind of machine from robots to machine tools, packaging lines to presses. And whatever the application, they are faster and simpler to engineer and install than anything else on the market. The feature-set is the same across the range, standard connectors and mounting brackets, integrated dip-switches to set-up all functions, and a full range of accessories. No specialised tools, no software programming, no complex wiring: safeguarding has never been this simple.

- **Protective heights from 150 mm to 2400 mm**
- **Operating distance up to:**
  - **6 m for finger protection models**
  - **14 m for hand protection models**
  - **50 m for body protection models**
- **Control functions include: full and partial X-, T- and L-muting; fixed and floating blanking; single- and double-break operation; and pre-reset function**
- **Certified as type 2 and type 4 according to EN 61496, and PLc and PLe according to EN ISO 13849**

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