
Universal Series 04 – Used by Timesavers around the world.

Bright ideas – LED illuminated control panels.

Safety first – The Series 61 buzzer.
**Editorial**

Dear customer and partners

How can a simple pushbutton be innovative, intuitive and reliable? And isn’t it true that the future belongs to the touchscreen anyway?

These are questions I asked myself as the new Head of Product Application Marketing and also as a newcomer to the world of HMI. It was everyday life that soon answered these questions and sparked my fascination for our products.

Instead of the 200 Swiss francs I’d wanted, I found I was holding 500 francs in my hand – simply because I had twice tapped an ATM screen too quickly. Needless to say, I had no trouble spending the 500 francs; but is a touchscreen really reliable here?

Or haven’t you ever tried to find a specific function on the touchscreen of a new copier? Are these machines intuitive? Since I’ve been at EAO, I’ve also become convinced that conventional switch technology can be highly innovative.

With this in mind, I invite you to read this issue of our “in touch” customer magazine and learn more about EAO innovations, including our new Series 04 and 61 products.

How innovative, intuitive and reliable do our customers find our EAO products? Discover more about our new exhibition concept, which debuted at this year’s InnoTrans in Berlin.

Enjoy the read!

Till Wieczorek
Head of Product Application Marketing

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**An innovative exhibition concept – at InnoTrans 2014 in Berlin for the first time.**

It’s almost like walking onto a railway platform: the dynamically curved backdrop with its picture of a train immediately captures the attention of fair visitors. Their gaze is drawn from the LED screen perfectly embedded within the main wall and showing a sequence of individual product images to the stand’s interior, where fully functioning HMI products are innovatively and intuitively presented.

EAO’s modular and innovative exhibition concept, which reflects the company’s integrated brand management strategy, made a tremendous impression when it premièred in Berlin at InnoTrans 2014, the world’s leading trade fair for railway technology and vehicles. “It is rare for an exhibition stand to be so well designed that it allows visitors to experience products and solutions in such an immediate way”, said one impressed InnoTrans visitor of the new stand. The positive feedback from customers was overwhelming. “We have managed to present our products innovatively, intuitively and reliably in a realistic setting that reflects our core values” said Kurt Loosli, CEO of EAO, with great satisfaction.

Innovatively presented inside perspex cubes, the company’s products attracted crowds of visitors to the EAO stand. A specially designed display table, which functions as a docking station, provided all the necessary power. Additional tables offered space for in-depth consultations with experts and face-to-face talks regarding individual HMI system solutions. “The new exhibition concept puts our products at the heart of EAO’s target markets and provides visitors with a unique product experience: this is three-dimensional brand management”, explained David Kramer, Head of Corporate Communications.

The new exhibition concept will now be adapted for all target markets. You too can experience the fascination of EAO. Get to know our experts and the latest HMI technologies in person! We look forward to welcoming you to one of our exhibition stands.

David Kramer
Head of Corporate Communications

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**International trade fairs 2015**

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Dutch company Timesavers is a leading manufacturer of wide belt, sanding and grinding machinery for processing metal, wood, plastics and other materials. Their machines are developed and built completely in-house, which enables them to design flexible comprehensive solutions for their customers.

Timesavers have once again demonstrated their innovative strength with their new 42 Range. This new product line offers innovative technology for de-burring and two-sided surface finishing.

In addition to greater efficiency, the modern ergonomics of the machines represent a further benefit for customers. An integral feature of the 42 Range is the operating panel, which is modern, robust and durable. Timesavers chose EAO as their preferred partner to meet all the demands placed on an innovative Human Machine Interface.

From its wide product portfolio, EAO suggested its Series 04 – a comprehensive, innovative range of actuators and indicators, whose large operating surfaces are combined with positive tactile feedback functions and enable confident, reliable operation. Bright LED illumination and the fact that text engraved on the lenses is always clearly visible help to make the control panels intuitive and easy to use. The wide range of Series 04 actuators and indicators, from pushbuttons through indicators to keylock switches, made it possible to use just one series.

Timesavers’ modular approach to production calls for considerable flexibility on the part of their suppliers. EAO accommodates this logistical requirement by supplying product kits that are individually packaged and labelled for each machine. This makes assembly faster and easier and helps Timesavers save valuable time.

David Polman
Managing Director EAO Benelux B.V.

Series 04
- Pushbutton
- Keylock switch
- Illuminated selector switch
- Emergency-stop
- Potentiometer
Bright ideas.

**LED illuminated control panels** – from light channelling technology and component hardware to controlling and changing light patterns.

Integrating LED technology into HMIs

LEDs are available in two basic types: through-hole and surface-mount technology (SMT). The ideal type depends upon the design brief in respect of intensity/brightness, directivity and the mounting constraints of the application. However, SMTs are more versatile and are designed for modern production techniques. They can be as tiny as a pinhead or as large as a postage stamp. In combination with a flat lens and shallow cavity, they emit light evenly over a wide angle.

Channelling light

Light pipes are necessary to channel light from PCB-mounted LEDs to the surface of an HMI. They are especially useful in densely-packed control panels to isolate the light and prevent colour bleed or in cases where light must be directed around a corner.

An example: The EAO Series 57 door-opening pushbutton (see illustration) has been engineered with maximal brightness. Built-in pipes channel light from the SMT LEDs around the dual ring illumination to create an even, consistent glow. Fewer LEDs are required, which in turn improves power efficiency.

Matching components

Matching LEDs and light pipes is crucial. The pipes should emit at least 90% of the LED light and colour. It is important to consider:

- Cavity size and shape: as light should be trapped, the cavity must be designed to match the LED. Working with an HMI expert who has plastics moulding experience ensures the correct cavity size.
- Position: the LED should be placed close to the light pipe – 8% of light is lost when it travels through air to a pipe.
- Viewing angle: the LED angle should closely match the ‘acceptance pattern’ angle of the light pipe.
- Colour binning: LEDs should always come from the same bins.

Ray tracing

This technology is used to design light pipes by calculating the path of light through a light pipe using a virtual model. EAO utilises state-of-the-art ray tracing software in conjunction with 3D CAD / CAM models. This ensures that the design provides maximum light transmissions and minimum light loss. Costly time wasted on trial-and-error design is eliminated and products are developed more quickly.

Controlling and changing LED light patterns

LEDs are low-voltage light sources that require a constant DC voltage or current to operate at optimum efficiency. Changes in line-voltage can produce a disproportional change in current, which in turn can cause light output to vary, as LED light output is proportional to current and is rated for a certain current range. If current exceeds the manufacturer’s recommendations, the LEDs can become brighter, but their light output can degrade at a faster rate due to higher temperatures.

Dimming

In many applications a dimming function is desirable; train drivers need this as they enter and emerge from tunnels. Because LEDs react instantaneously to changes in power input, this is relatively simple to implement with the added advantage of lower energy consumption. There are two main approaches to dimming LEDs: analogue and pulse.

Analogue dimming simply controls the drive current fed to the LEDs. The current is linearly reduced to achieve dimming, until the LED eventually emits zero light in the off position. At 50% current, the light is at half brightness. Analogue dimming is based on a relatively simple technique and costs considerably less. There can, however, be a visible colour shift.

PWM dimming switches the LED on and off at a high frequency. The LED current is either off or on: zero or the nominal LED current. This virtually eliminates the unwanted colour shift phenomenon associated with analogue dimming and is therefore the preferred method.

Colour blending/mixing

Full colour RGB LEDs offer exciting possibilities for HMI designers. They contain three separate diodes with three isolated circuits and three separate colours: red, green and blue. By mixing these, it is possible to obtain endless combinations that cover the entire visible rainbow spectrum. Mixing is achieved by dimming the individual colours.

A PWM controller activates one or more of the three RGB channels to increase output, causing that particular colour or optical wavelength to appear dimmer. Modulating the pulse width of each individual channel independently generates a vast array of unique colour combinations.

HALO illumination

Colour mixing can also be achieved by means of HALO illumination. The EAO Series 84 illuminated pushbuttons (see illustration) make use of this innovative technology. Up to eight coloured SMT LEDs can be mounted in a ring around an illuminated lens with a single bi-colour LED in the centre. With the help of additional electronics, these ten ‘segments’ can be independently controlled to light up in any combination. A single pushbutton can therefore be turned into an interactive, multi-functional device that is able to:

- Display initiation sequences with a dynamic LED countdown around the outer ring.
- Show increases/decreases in output – each time the button is pressed, another LED lights up around the ring.
- Substantial cost savings are achieved when several functions are combined in one switch, thereby drastically reducing panel space.

This is an extract from our technical article: The Application of Illumination Technologies within Human Machine Interface design. Visit www.eao.com/downloads.

Marco Bighi
Product Application Manager
Safety first.

From industrial plants to heavy-duty vehicles, from packaging equipment to public transport – the world is totally reliant on machinery. And safety is of paramount importance.

Machine design, or rather safe machine design, is a critical aspect of every industry. Accidents resulting from the use of machinery can be reduced through proper safety features. In addition to visual warnings, acoustic alarm signals may be required to comply with safety standards, especially where a machine is out of the operator’s sight.

As expert in Human Machine Interfaces (HMI), EAO continues to exceed requirements for component performance and to set new standards for the safe operation of machinery. The new Series 61 buzzer has the IP65 degree of protection and emits a clear 82 dB acoustic warning sound that meets the signalling requirements generally in force for machinery and equipment.

The 22 mm flush-mounting design perfectly matches the front appearance of other EAO products, including Series 51, 61, 71 and 84. By pairing up with other devices from EAO’s wide range of HMI components, such as its foolproof E-Stops, designers can build safer ergonomic control panels that give users a uniform, safe and intuitive operating experience.

Quick facts: Series 61 buzzer
- 82 dB(A) acoustic warning signal
- IP65 or IP66 front protection
- Continuous or intermittent tone
- Operating temperature – 25 °C to + 55 °C
- Flush, modern design
- Reliable, proven technology

Did you know?
Sound is typically measured at a distance of one metre from source. The range is affected by environmental conditions including wind speed and direction, fog, rain and terrain.

Can you guess the volume of these?
- Aircraft, firecrackers (120 dB)
- Pneumatic drill (110 dB)
- Car (90 dB)
- Office (60–70 dB)
- Clock, living room (30 dB)
- Forest, bedroom (20 dB)

Sound advice
Does your machine need an acoustic warning signal?

What does the machinery directive say?
Machinery built for use in the European Union and European Economic Area must comply with Machinery Directive 2006/42/EC (previously 98/37/EC). The directive aims to improve operator safety by laying down a set of Essential Health and Safety Requirements (EHSSR) for the design and construction of machinery. Machine builders use the CE mark (Communauté Européenne) to indicate compliance.

And what is EN60204?
This is the harmonised EU standard. All member states have approved the contents of the standard in question and published it in the official journal with the EN standard designation EN 60204-1.

Does it apply to me?
The term ‘machinery’ is broadly defined in the directive and is generally understood to include machinery, partially assembled machinery, interchangeable equipment, safety components, lifting accessories and chains, ropes and webbing.

Is the standard binding?
The machinery directive is a legal instrument whose rules and regulations must be observed. The standards are the basis for the design of machinery.

What does it say about acoustic warning signals?
It is all a matter of risk assessment. The machine must be constructed in such a way that it can be operated and serviced without risk. Individual stipulations are, therefore, very general, such as:
- Machinery must not start up unexpectedly.
- An audible and/or visual warning must be given before every start-up if a hazard area cannot be clearly seen. Ideally, however, an acoustic warning signal should be emitted every time machinery starts up.

Where can I find more detailed information?
Guidelines for EHSSR compliance are contained in EN 457: Auditory danger signals general requirements, design and testing; EN 881: System of auditory and visual danger and information signals.

- The acoustic danger signal must be easily recognised, clearly audible (15 dB greater than ambient noise), unambiguous and easily distinguished;
- Different types of signal should be used in different situations – danger, caution, all clear, etc.

Benjamin Brumec
Product Application Manager
Interview with Matthias Griner, Manager Engineering and Maintenance with CARBOGEN AMCIS.

EAO aims to be both an expert and a partner for its customers, for which reason it always puts their needs first. How this is perceived by CARBOGEN AMCIS AG is illustrated by this interview with Matthias Griner, Manager Engineering and Maintenance.

CARBOGEN AMCIS AG is a leading service company in the field of product and process development through to commercial GMP production of active substances for the pharmaceutical and biopharmaceutical industry. It has offices in Switzerland, France and Great Britain.

Mr. Griner, what is your area of responsibility?
The installation of new process equipment, the engineering and production of equipment controls (hardware/software) and equipment maintenance. My team consists of measurement and control technicians, mechanics, electricians and heating/sanitary engineers.

What are the challenges of your job?
Most of our equipment is custom-made and requires a lot of technological expertise to keep it running reliably. Pharmaceutical process technology requires compliance with strict standards and regulations. This knowledge needs to be implemented every day.

Why did you choose EAO?
Most electrical specialists in Switzerland know EAO. Its products are well established. If not already installed, EAO’s innovative and intuitive products are often used to replace or improve production equipment.

Logistical considerations are very important here, especially long-term availability and flexible scheduling. We can’t keep all the spare parts we need in stock, which is why EAO’s rapid logistics service is essential for us to respond quickly to maintenance issues.

ECIA Marketing Award for in touch newsletter
Every year, ECIA and Penton Media spotlight the industry’s best marketing efforts in the United States. This year, EAO’s in touch customer magazine has won a coveted ECIA Marketing Award in the category ‘Best Corporate Newsletter’. This represents important recognition of both the reorientation of our company’s communication strategy as well as the successful relaunch of our customer newsletter. Thank you very much!

Robert Meier
Coordinator Marketing Communications

The wide range of functions and characteristics of EAO products coupled with their reliability are a big plus. Thanks to your customised laser engraving and flexible service, we are able to create intuitive HMIs for our production operators.

So you’d recommend our products and services?
Yes. The diversity of EAO’s portfolio, its flexible modular systems and the availability of customised engraving on the products are decisive factors.

Optional pull quotes (excerpts):
• “EAO products are often used to replace or improve production equipment.”
• “We can’t keep all the spare parts we need in stock, so a rapid logistics service is essential.”
• “The wide range of functions and characteristics of EAO products coupled with their reliability are a big plus.”

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