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Dear customers and partners

EAO is making history again with the launch of the new Series 09 Rugged CAN Keypads. For our numerous customers in the heavy duty and special vehicles markets, we are offering for the first time CAN-based modules and joysticks with proven EAO quality – specifically designed for the harsh environments these vehicles are exposed to.

An initial overview of the products and their possible applications can be found on pages 4–7.

And some other new products will be presented here. Read through the intouch and be fascinated by the world of EAO.

Reinhard Kalla
Head of Product Marketing

Rugged and configurable HMI’s are crucial for heavy duty and special vehicles.

Since 1947, EAO has provided intuitive control elements and systems for special vehicles and equipment that fulfill all ergonomic and safety requirements. Intuitive operation, performance, robust construction and reliability are key factors in the design of these vehicles and the equipment. EAO control elements and systems meet these requirements, making us an indispensable partner for manufacturers of heavy duty and special vehicles.

Thanks to our long-standing experience in the automotive and transportation industries, we are also able to develop high-quality, ergonomically designed HMI control elements and systems for vehicles and equipment used in construction, agriculture, passenger transport and public services.

EAO – Your Expert Partner for Human Machine Interfaces

Further information is available at www.eao.com

HMI’s for off-road or on-road vehicles.

EAO offers a wide range of actuators and indicators that are designed for a wide variety of applications in heavy duty and special vehicles.

EAO develops and produces high-quality HMI Components and Systems for heavy duty and special vehicles. Whether HMI Components and Systems are used in off-road or on-road vehicles in outdoor environments or driver cabins, the focus of EAO products and solutions is always on reliability, robust construction and individuality. We strive to ensure that the operator has full control over the vehicle or equipment at all times.

The table provides an overview of numerous EAO actuators and indicators that are designed for a wide variety of applications in heavy duty and special vehicles.

Further information is available at www.eao.com

International trade fairs 2019

<table>
<thead>
<tr>
<th>Event</th>
<th>Dates</th>
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<tr>
<td>Engineering Design Show</td>
<td>16.–17.10.2019</td>
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<td>IREE</td>
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<td>New Delhi, India</td>
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<td>FMBI</td>
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<td>Bad Salzungen, Germany</td>
<td>26.–28.11.2019</td>
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<td>SPS / IPC / Drives</td>
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<td>Nuremberg, Germany</td>
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<td>Bauoma</td>
<td>16.–17.10.2019</td>
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<tr>
<td>Epcos, India</td>
<td>11.–14.12.2019</td>
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Rugged and configurable EAO HMI’s for heavy duty and special vehicles.
New Series 09
Rugged CAN Keypads.

Rugged, modular and reliable – The robust control units with flexible illumination are ideally suited for use in heavy duty and special vehicle applications.

High reliability and functional safety are crucial to controlling safety-related applications in vehicles and machines – whether in construction machinery, construction vehicles, agricultural machinery or in special and commercial vehicles of various types. Harsh environments and low back panel depth require a robust and compact product design. The actuators and indicators must also be precisely configured, both mechanically and electronically, to suit the respective application. The new high-quality Rugged CAN Keypad and Rugged CAN Rotary Cursor Controller meet these requirements with cutting-edge system integration.

Typical applications
- Roadmaking vehicles and roller compactors
- Loaders, dozers and excavators
- Cranes, dump trucks and crawler drills
- Fire-fighting and rescue vehicles
- Road sweepers, cleaning vehicles and refuse trucks
- Snow removers and groomers
- Agricultural vehicles and equipment

Robust, innovative design – Robust and innovative construction is a feature of the Rugged CAN Keypad design. The up to IP67 protected actuators and indicators work reliably at operating temperatures from −40 °C to +85 °C. The low back panel depth and robust clip-in or screw-in mounting allows easy, flexible installation, either vertically or horizontally. These high-quality devices also offer excellent tactile feedback, and are clearly visible in daylight and at night thanks to the powerful RGB LED halo and LED symbol illumination. Attractive and configurable 4-segment halo button illumination is integrated as standard. The customisable illumination provides the operator with excellent visual feedback, and is combined with a unique, contemporary design.

Advantages
- Individual 4-segment and RGB halo ring illumination
- Designed for functional safety*: ISO 26262 and ISO 13849
- Intelligent HMI’s with CAN bus integration
- Robust, innovative, ergonomic design sealed up to IP67 protection
- Interchangeable ISO 7000 range of symbols or customised symbols

Functional safety* and CAN bus integration – The Rugged CAN Keypads feature high reliability and are designed for functional safety in accordance with EN ISO 13849 PLD and ISO 26262 ASIL B standards. Put simply, functional safety means that the system monitors whether the safety-related function is working properly. If a function error occurs, the system promptly informs the operator. Thanks to the CAN bus integration, the devices are intelligently and easily integrated into a CAN system – the devices are fitted with a Deutsch DT Series connector.

More than an expert. A partner of the automotive industry. As a global partner to major automotive manufacturers and suppliers, we provide our customers with high-quality, products and services. Through many decades of commitment and consultation with the automotive industry, EAO is an established global supplier of operator control panels, sub-assemblies, switches, buttons and indicators.

Further information is available at www.eao.com/09

Series 09 CAN Module with interchangeable ISO 7000 or customised symbols.
Serie 09 CAN Modules.
* Functional safety with CANopen Safety* and ASIL B according to ISO 26262 and PLD according to DIN EN ISO 13849 are available from 2020 onwards.

Characteristics and advantages.

<table>
<thead>
<tr>
<th>Illumination</th>
<th>Sealing protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modern, trendy, innovative RGB 4-segment halo ring illumination in unlimited variety of colours and visual effects</td>
<td>Robust, resistant to weather and harsh environments, IP67 seals out dust, water, mud, salt, sand, oil</td>
</tr>
<tr>
<td>Modularity</td>
<td>Symbols</td>
</tr>
<tr>
<td>Control units can be combined into an array of modules</td>
<td>Interchangeable inserts with laser etch LED backlit ISO 7000 range of symbols or customised symbols</td>
</tr>
<tr>
<td>Safety level</td>
<td>Mounting option</td>
</tr>
<tr>
<td>Designed for functional safety*: ISO 26262 and ISO 13849</td>
<td>Flexible vertical and horizontal installation as well as user-friendly clip-in and screw-in mounting</td>
</tr>
<tr>
<td>Communication protocols</td>
<td>Design</td>
</tr>
<tr>
<td>Intelligent HMI with J1939, CANopen and CANopen Safety* integration</td>
<td>Smart, optimally ergonomic design with low panel depth mounting</td>
</tr>
<tr>
<td>Feedback</td>
<td></td>
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<tr>
<td>Tactile and audible product feedback with haptic design</td>
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Further information is available at www.eao.com/09
Series 04 – Versatile. Robust and reliable.

Intuitive, ergonomic controls promote safety in rail transport – EAO’s versatile Series 04 has proven its value in modern rail vehicles by fulfilling a variety of application requirements and international standards.

Thanks to their modern design, safe and ergonomically friendly operation, and pronounced tactile feedback, the Series 04 has become an established feature of driver desks in particular. The extensive range of Series 04 products offer options in either square or round styles and standard or flush mount styles.

Typical applications
- Driver desks
- Control units
- Control cabinets

Each Human Machine Interface (HMI) Function can be designed precisely to meet the required specification for the given application. For instance, standardised or customised markings in the form of text or symbol engravings provide seamless and intuitive operation. Precision, speed and reliability in operation makes Series 04 suitable for machinery control applications such as control cabinets and main operator panels, too.

HMI functions
- Pushbuttons and illuminated pushbuttons
- Indicators
- Selector switches and illuminated selector switches
- Key insert switches
- Lever switches
- Emergency stop switches

Front bezels made of black or silvered plastic, as well as natural or black anodised aluminium, give these actuators and indicators a design that is as modern as it is robust.

Slow make and snap-action switching elements offer a choice of screw, ring cable shoe, single or double plug-in terminals as well as an intuitive option of push-in terminals (PIT) that does not require the need of any additional tools.

Advantages
- Modular construction for a wide range of applications
- Ideal for driver desks
- Modern, long-lasting and intuitive design
- Safe in use with its distinct haptic feedback
- Compliant with international industry standards

Series 04 offers a modular design that easily allows up to three switching elements which enables multiple configurations to suit a variety of end-user functions.

Universal Series 04 components are used in public transportation applications throughout the world. Their compliance to international approvals along with relevant standards and directives fulfill strict requirements from the railway industry as well as the mechanical engineering industry and many others markets.

Further information is available at www.eao.com/04

The proven Series 04 can be used for a wide range of applications.
Series 61 adapters.

**Series 61 mounting adapter** – Quick and easy mounting for Ø 22.3 mm mounting cut-outs.
The Series 61 mounting adapter allows the 16.2 mm diameter emergency stop switch compact to also be used for standard mounting cut-outs of 22.3 mm diameter (as per DIN EN 60947-5-1).

The adapter allows the device to be mounted to the front plate quickly and safely. It protects the switch against twisting once mounted. This accessory can be combined with the Series 61 PCB adapter.

**Advantages of the mounting adapter**
- E-Stop compact even for 22.3 mm diameter applications
- Quick and safe to mount
- Provides anti-rotation protection to meet the needs of current industry requirements
- Very low back panel depth

Further information is available at www.eao.com/61-e-stop

**Series 61 E-Stop compact PCB adapter** – For flexible and safe PCB assembly.
This PCB adapter enables the advantages of the Series 61 emergency stop switch compact to be combined with those of a constructed printed circuit board. As a solid connection, the PCB plug-in base can be quickly and easily mated between the emergency stop switch and the PCB.

This method of assembly reduces the back panel depth to a minimum (26 mm) and allows wiring errors to be prevented. The PCB adapter is especially well-suited for use in space restrictive applications.

**Advantages of the PCB adapter**
- Simple, flexible and quick to mount
- Prevents wiring errors
- Very low back panel depth
- Easy separation for maintenance purposes

Further information is available at www.eao.com/61-e-stop

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**Sales office relocation.**

**EAO is pleased** to announce the relocation of its sales office in Shanghai Hongqiao CBD.

The new location is close to the train station and Shanghai Hongqiao airport making it easily accessible for customers from all over China. This is part of our customer centric approach that is the key to building long term and successful relationships with our customers and business partners.

We look forward to welcoming you to our new office.

**Follow us.**
We are on LinkedIn!
**EAO creates possibilities. Since 1947.**

[Visit our LinkedIn profile](https://www.linkedin.com/company/eao/)

**Come take a look at our LinkedIn profile today! Be sure to give us a follow so that you can fully interact with us.**

www.eao.com

Your Expert Partner for Human-Machine Interfaces
Fast and flexible switching.

Fast and flexible switching with plug & play solutions from the EAO Benelux assembly department.

EAO production facilities can reduce your workload and improve efficiency in your company.

EAO offers
- Engineering and technical drawings
- Switches with cables and connector
- Complete panels
- PCB panels
- “Black box” solutions
- Separate packaging of HMI’s provided with your part number

Follow us.
We are now on YouTube!

Come take a look at our YouTube profile today! Be sure to give us a follow so that you can fully interact with us.

https://www.youtube.com/user/eaoswitches

Enjoy a ride with IKEBUS in Tokyo!

IKEBUS, designed by Mitooka, runs with EAO switch and buzzer at Ikebukuro, Tokyo, Japan. Customers around the world place their trust in our HMI products. Photo by Hiroyuki Mayuzumi.

IKEBUS runs with EAO switch and buzzer at Ikebukuro, Tokyo.
Stop Switch vs. E-Stops – What makes the difference?

Rugged, sealed, and internationally approved – When it comes to safety, the selection of the right stop control device can make the difference. EAO offers emergency stop switches that provide extra assurance with "fail-safe" operation for use in critical applications.

Machines covered by the Machinery Directive (2006 / 42 / EC) must be equipped with at least one emergency stop actuator that can prevent an imminent or occurring hazard. According to the standards, an emergency stop actuator must have, among other things, the following:

- A red actuator head with yellow background
- Unlocking arrows in the same colour as the actuator, i.e. red, if unlocking happens by rotating the actuator
- No symbols or text on the actuator or background (with the exception of the ISO 13850 symbol according to IEC 60417-5638
- Optional yellow label with ISO 13850 symbol
- Positive opening contacts

Why red and not white arrows?

With a twist release, the direction of the twist move must be visible in accordance with DIN EN 60947-5-5. For this reason, white arrows were often attached on the actuator until 2016. However, these high-contrast white arrows on the red actuator could be misunderstood as the direction of actuation. To avoid this, DIN EN 13850 states that the unlocking arrows must be designed with a low-contrast colour that is preferably identical to the background.

Positive opening and fool-proof security

Contact separation must be a direct result of a movement of the operating part and must not depend on a spring. For identification purposes, each positive opening contact is marked with the following symbol.

All EAO emergency stop devices are tested according to EN 60947-5-1 and EN 60947-5-5, and are suitable for applications according to DIN EN ISO 13850 and EN 60204-1.

EAO emergency stop devices are always fool-proof. This means that no contact may open before the mechanical latching has taken place, but must then open immediately. The standard describes that the emergency stop device must not lock without generating an emergency stop signal (EN 60947-5-5, section 6.2.1).

The robust EAO emergency stop switches with positive opening function (according to DIN EN ISO 13850 and EN 60204-1) are fool-proof. This means that after the emergency actuation process has been carried out, the switching element is safely actuated and the actuator engages. Resetting is possible only through a deliberate unlocking. Restarting is made possible only with the release.

What is the difference between emergency stop and stop switches?

Stop switches do not have to fully comply with the standards and specifications mentioned above and therefore have a less sophisticated design. For example, they do not have to be fool-proof, i.e. the contact can open before the mechanical locking has taken place. The unlocking may lead to a restart of a machine with the stop switch. This is why the stop switch is often used as an on/off button. In addition, the colours of the actuators do not have to be red and the background does not necessarily have to be yellow. Stop switches can also have snap-action switching elements. A positive opening contact is not mandatory. The EAO stop switch range offers a wide choice of actuator colours to meet all design requirements.

Further information is available at www.eao.com

How does fail-safe work?

- If the E-Stop actuator is mechanically separated from the “fail-safe” contact block, the equipment is immediately stopped.
- The act of dislodging the switch contact block opens the closed “fail-safe” contact, effectively breaking it.
- A correctly fitted fail-safe E-Stop always has a closed contact in addition, regardless of the actuation state.
- EAO is able to supply a fail-safe or self-monitoring contact block for its Series 04 and Series 45 emergency stops.