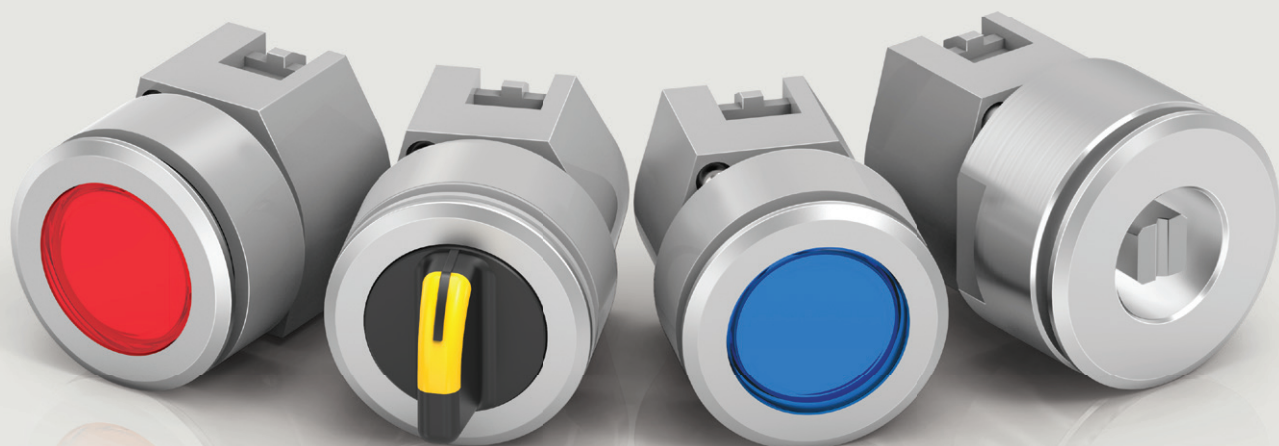


Series

04

Versatile. Robust and reliable.

www.eao.com/04



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 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 engraved text or symbols 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.

Functions

- Pushbutton
- Illuminated pushbutton
- Mushroom-head pushbutton
- Selector switch
- Keylock switch
- Key-insert switch
- Lever switch
- Indicator
- Flasher
- Buzzer
- Potentiometer
- Stop switch
- Emergency stop switch
- Emergency call switch

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 any additional tools.

The Series 04 offers a modular design that easily allows up to three switching elements, thereby enabling 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 fulfil strict requirements from the railway industry as well as the mechanical engineering industry and many other markets.

Materials

- Switching elements
 - Material of contacts: Hard silver, gold-silver, silver-palladium (for aggressive environments)
 - Housing: plastic
- Actuators
 - Front bezel: plastic, aluminium or stainless steel
 - Mounting flange: plastic, metal
 - Actuator housing: plastic
- Buzzer
 - Buzzer case: plastic
 - Front cap: aluminium, plastic, nickel-plated brass

Mechanical characteristics

Actuator

- Actuating force (pushbuttons)
 - Mounting style square flush 6.2N
 - Other mounting styles 8N
- Actuating travel
 - Approx. 5.8 mm ± 0.2 mm

Mechanical lifetime

(with 1 switching element)

- Pushbutton ≤ 3 million cycles of operation
- Selector switch ≤ 2.5 million cycles of operation
- Stop switch ≤ 50 000 cycles of operation
- Fool proof E-stop ≥ 50 000 cycles of operation
- Keylock switch ≤ 50 000 cycles of operation
- Key insert switches ≤ 250 000 cycles of operation

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

Electrical characteristics

The switches comply with the "Standards for low-voltage switching devices" DIN EN 60947-5-1.

Protection degree

- Front side
 - IP65
 - IP67

Ambient conditions

- Actuators, switching elements, buzzer and lamp block:
 - Storage temperature: $-40^{\circ}\text{C} \dots +85^{\circ}\text{C}$
 - Operating temperature: $-40^{\circ}\text{C} \dots +55^{\circ}\text{C}$
- Dual lamp block
 - Storage temperature: $-40^{\circ}\text{C} \dots +85^{\circ}\text{C}$
 - Operating temperature: $-40^{\circ}\text{C} \dots +60^{\circ}\text{C}$

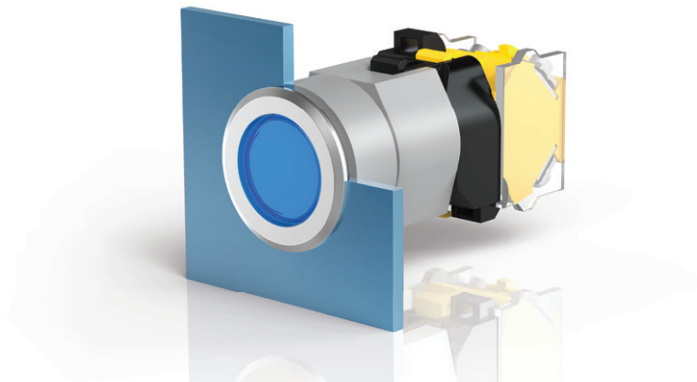
Standards and directives

- Approvals
 - CB (IEC 60947)
 - cULus
 - DNV
 - GOST
 - NFF 16-102
 - VDE
- Conformities
 - CE
 - EN 45545
 - ECE R 118
 - 2006/42/EU (MD)
 - 2011/65/EU (RoHS)
 - REACH
 - CCC
 - UKCA

Further information and the Online Product Configurator are available under www.eao.com/04



Firmly established.
Universal in use.



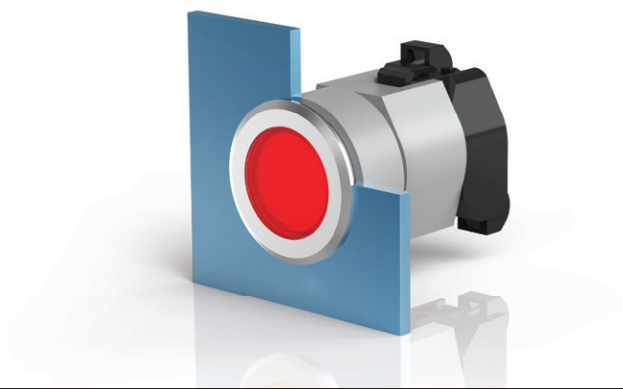
Illuminated pushbuttons

These actuators enable unique, tactile feedback upon switching and allow for safe operation in any situation. That is why renowned manufacturers of rail vehicles all across the world trust the Series 04 illuminated pushbuttons as the reliable choice in HMI controls. New versions of the illuminated pushbutton that utilise a reduced actuation force of 3 N are ideal for antifatigue, safe switching necessary in driver cabs.

The virtually flush front mounting of the round or square switches offered in different colours, made of plastic or metal, allows for tamper-proof operation and provides a design that is as modern and long-lasting as it is robust (IP65).

Advantages

- Versions with reduced actuation force
- Modern, long-lasting and robust design
- Large selection of materials, colours and symbol plates
- Operating temperature from -40°C ... $+55^{\circ}\text{C}$
- Virtually flush front mounting
- IP65 front protection



Indicators

Series 04 indicators can be easily and individually marked with intuitive text and symbols.

Combined with vibrant LED illumination, a broad operating voltage range, and conformity with the EN 50155 and IEEE 1476 standards, Series 04 indicators are ideal for use in harsh conditions often found within public transportation applications.

Whether the lenses are flush or raised, round or square, red, yellow, green, blue or simply transparent – these versatile indicators are an impressive asset in almost any application with their modern, long-lasting, robust design (IP65).

Advantages

- Modern, long-lasting and robust design
- A wide range of available LEDs, voltages and colours (including bi-colour version)
- Easy customised marking with text or symbols
- Large selection of text and symbol plates
- Operating temperatures of -40°C ... $+55^{\circ}\text{C}$
- IP65 front protection

Robust.
Tactile and long-lasting.



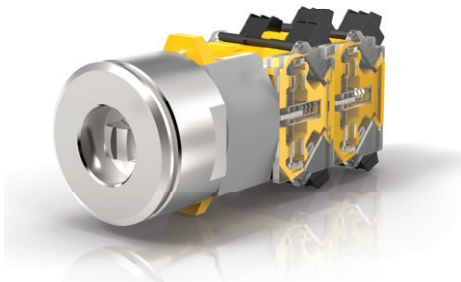
Illuminated selector switches

Thanks to a high degree of IP65 protection, optional LED illumination, and a modern design that complies with all ergonomic requirements to conform to the standard DIN 5566-1, Series 04 illuminated selector switches are ideal for a variety of rail vehicle applications. Homogeneous illumination in various colours provides a clear indication of changes in switch position, regardless of the lighting conditions. Safe, intuitive and efficient operation is a result of the sleek, ergonomic design that also helps reduce risk of injury thanks to the ergonomically smooth, rounded edges of the actuator handle.

These actuators are designed for at least 1.25 million switching cycles, offering two or three switching positions, and feature a flexible combination of maintained and momentary actions. Series 04 selector switches ensure safe and reliable function, even at temperatures between -40°C ... $+55^{\circ}\text{C}$.

Advantages

- Bright, single or bi-colour LED illumination
- Modern design with ergonomic, rounded edges (conforms to DIN 5566-1)
- IP65 front protection
- Variety of combinations including maintained and momentary action
- Short and long levers
- Long service life



Key insert switches

EAO key insert switches are used internationally within the public transportation market. They prevent the unauthorised activation or deactivation of restricted systems and unauthorised access to vehicle compartments or toilet facilities.

Advantages

- Suitable for indoor or outdoor use (IP67)
- Customer-specific key insert profiles
- Usable down to -40°C
- Various switch positions
- Very long service life of mechanical and electrical components
- Variety of combinations including maintained and momentary action



Lever switches

Lever switches are robust and versatile. They are available with up to five switch positions and a variety of maintained and momentary action. They are used worldwide, predominantly in the cockpits of road and rail vehicles, and on the bridge controls of ships.

Advantages

- Very robust design
- Visible switch positions
- Large selection of levers
- Very long service life of mechanical and electrical components
- Also suitable for switching larger currents
- Variety of configuration possibilities due to modular construction

Safe.
For every application.



Dual LED lamp block

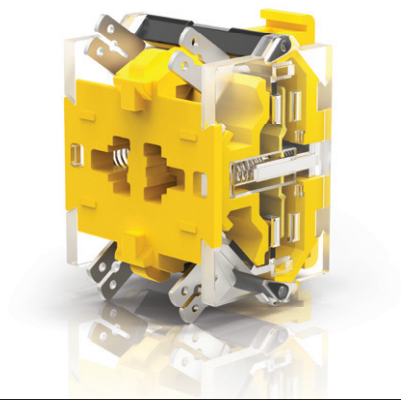
EAO's proven Series 04 includes an innovative lamp block that integrates two LEDs to provide dual redundancy and reliable, safe illumination.

This reliable illumination accessory is designed for all Series 04 illuminated devices in order to enhance operating safety in the driver's cab and on the control panel by way of intuitively quick, visual recognition.

The lamp block allows one device to display different states in a unique way. Thanks to the pulsed control of the two inputs for the dual LED display, the user gets quick, positive feedback of proper operation. Or, if one input signal fails (0VDC), the LED display flashes a warning. The pulsed inputs need to be generated by an upstream, external control. This modern LED technology allows for a long service life and homogeneous illumination that is clearly visible – even in strong sunlight and low light conditions. The dual LED lamp block can be combined with all Series 04 illuminated devices.

Advantages

- Allows one device to display different states
- Dual indication safely signals the failure of one input signal
- Designed for all illuminated devices of the proven Series 04
- Reliable LED technology enables long service life
- Two separate LED's in a single lamp block



Switching elements

EAO's Series 04 rely on a wide variety of switching elements. From the self-cleaning snap-action variants that provide a distinct tactile and acoustic feedback when actuated and reliable switching in low-level applications, to the slow-make switching element suitable for high switch ratings and a must for emergency pushbuttons, EAO covers all application needs with the Series 04.

Both types are provided with silver, silver/gold and silver/palladium contacts and can be equipped with different types of terminals for a range of installation and application needs.

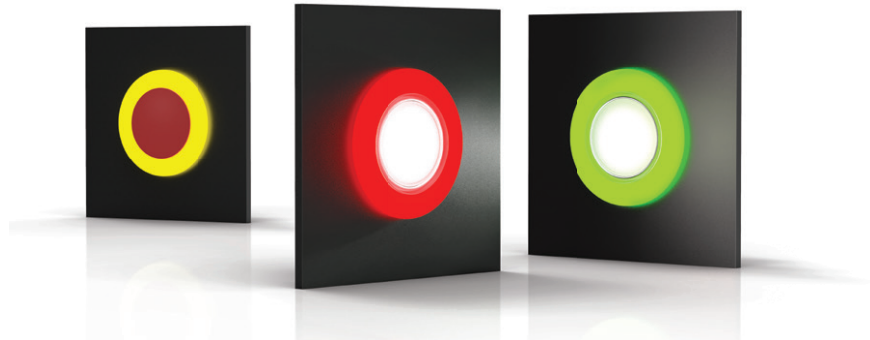
Multiple switching elements can be snapped-on based on the application.

Advantages

- Snap-action switch element with self-cleaning contacts and unique tactile switching
- Slow-make switching element with larger contact distance suitable for higher switch ratings and emergency pushbuttons
- Five different types of terminals available (screw terminal, screw for ring cable shoe, single and double plug-in terminal, push-in terminal)
- Different contact materials available for different applications

To complete the product portfolio, standard rotary switching elements are provided with up to 12 positions in a variety of momentary and maintained actions.

Reliable.
Functional and flexible.



Halo ring illumination

Finding and pressing an important switch at night time or when the lighting changes rapidly can be a problem in the driver's cab. When driving into a tunnel from bright sunshine, the driver's cab quickly becomes a dark area. A clear ring of halo illumination helps users to rapidly locate important switch functions in such situations.

LED halo ring illumination is available for the robust and reliable pushbuttons and selector switches of the established Series 04 and 14. The addition of ring illumination is available for both the standard and PCB mounted illuminated models. With its warm, amber light, the single LED version is ideal for easily locating HMIs under adverse lighting conditions. An optional light sensor also enhances usability by adapting the intensity of the light to the given ambient conditions.

Typical applications

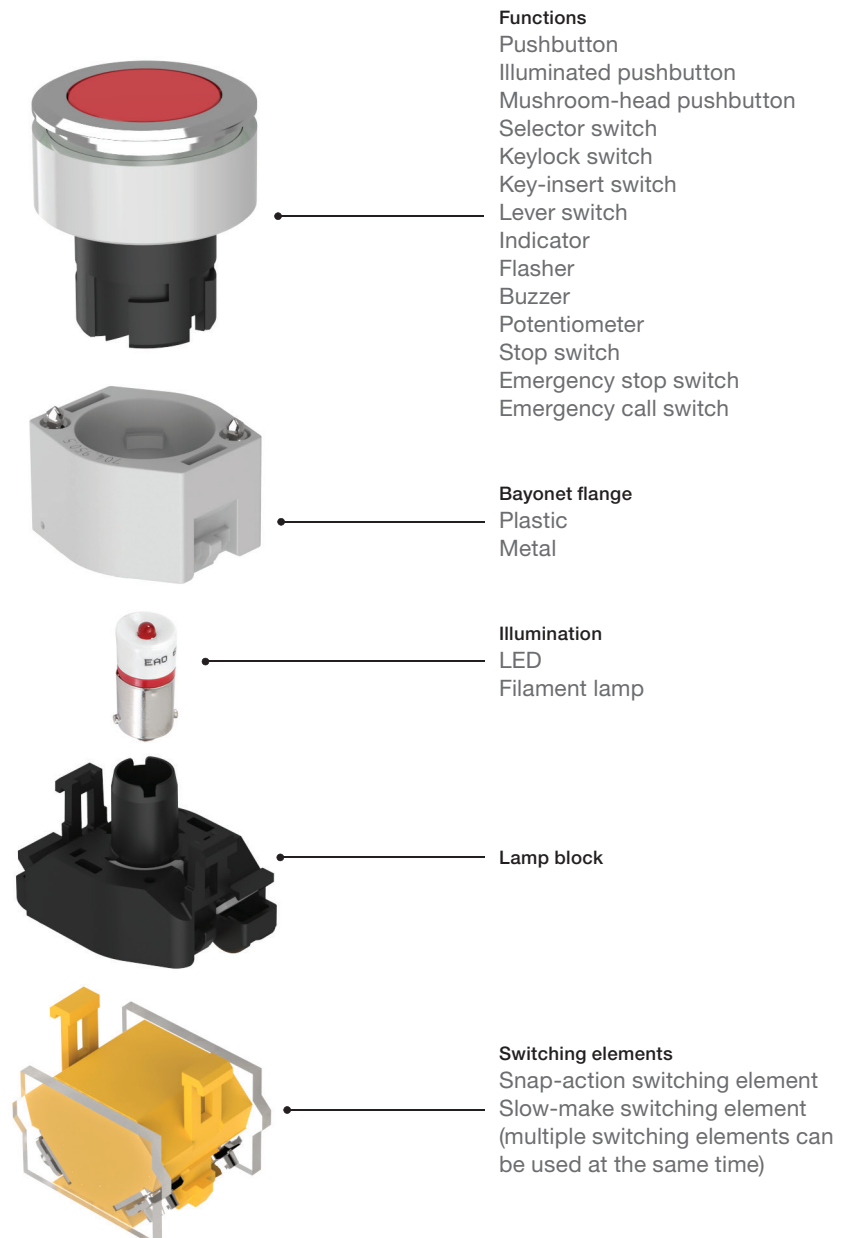
- Driver's cabs and control cabinets
- Machinery
- Industrial automations
- Boats and ships

The RGB LED halo version offers greater application flexibility by allowing end users in different spaces to communicate via the lighting on interconnected HMIs. For example, if a remotely located operator takes action on a piece of equipment by pushing a button, the other remote user is notified of this via the HMI by a change in illumination colour – in this case the halo ring also lights up red, either continuously or flashing.

Advantages

- Versatile use thanks to additional ring illumination
- Easy to find, even under adverse lighting conditions
- Dimmable single or RGB LEDs (optionally flashing)
- For (illuminated) pushbuttons and (illuminated) selector switches
- Reliable status indicators thanks to clear RGB ring illumination

Product structure of Series 04.



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