

EAO – Your Expert Partner for  
**Human Machine Interfaces**



**Heavy-Duty Lifting and Moving Equipment**

**HMI Systems and Components**

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# Lifting and Moving

Machinery controls from a leading human machine interface manufacturer



EAO developed the world's first illuminated pushbutton in 1958. It became a cornerstone of the company's future and quickly set the standard for an entire industry. Since then, EAO has developed into a world-leading expert partner for Human Machine Interfaces (HMI). Through experience and innovation, it now designs, manufactures and distributes one of the broadest ranges of high-reliability HMI components.

These strengths have led it to the forefront of HMI system design. Many of the world's top industrial companies now benefit from EAO's skill, knowledge and experience of HMI technology in the development of tailor-made operator controls for their products.

EAO's range of rugged, dependable products and its HMI competencies are especially well-suited to the tough, dynamic requirements of the lifting and moving industries. Full-featured pendant controls, wireless remotes, LCD and touchscreen displays as well as pushbuttons can be designed for any type of lifting and moving application, whether a construction crane, heavy-duty vehicle, forklift or hydraulic platform.

EAO customers receive expert advice from product specialists who have a clear understanding of the industry's requirements. EAO examines technical considerations, benchmark technologies, operating environments, ergonomics and commercial specifications. The operating equipment is carefully aligned to task, to enable users and technologies to work in complete harmony. This results in higher-quality, more functional and easier to use human machine interfaces.



## HMI Component Manufacturing Expertise

EAO manufactures one of the world's largest ranges of rugged pushbuttons, indicators, emergency-stops, keylocks, lever, selector and rotary switches, all to the highest of Swiss standards. With their undisputed reliability, robust design and oil/watertight qualities, wide choice of mounting sizes and excellent tactile response, these components form a solid base for effective HMI systems.

As a global manufacturer, EAO's expertise in prototyping, tooling, plastics moulding, plating, electrical design, automation and precision-parts assembly is unsurpassed. Customer benefit from a strong, proven, global source of switch control products that meet industry standards, which are manufactured within stringent quality-assurance procedures. EAO manufactures to CE, UL, cUL, RoHS, VDE among others and is approved to ISO 9001:2008 and ISO 14001:2004.



## HMI Systems Engineering

The starting point for a successful human machine interface is a thorough understanding of the user application and operating environment. Technical advice and HMI development is then aligned to the best design practices, ergonomics and manufacturing standards.

Customers use EAO's expertise in these areas to complement their core capabilities for designing and integrating HMI control systems. More than a contract manufacturer, EAO becomes an extension of their design team, allowing them to gain design capacity and quicker turnaround times.

Supported by a global network of manufacturing and engineering centres, EAO's highly experienced team of technical salespeople will help customers through the challenges of designing an advanced human machine interface. They advise on the most appropriate interface technologies, devices and materials while observing applicable standards, ensuring the solution meets strict industry standards.



## Proven Industrial Experience

EAO's products are used on almost every type of lifting and moving equipment including

- Construction cranes
- Vehicle-mounted cranes
- Heavy-duty vehicles (excavators, dump trucks, cement mixers)
- Scissor lifts, aerial lifts, and boom trucks
- Support vehicles (airport/roadside)
- Hydraulic platforms, trailers and trailer mounted forklifts
- Gantry cranes (freight)
- Warehouse overhead cranes
- Forklifts and small lifting vehicles



# HMI Technology

Bringing expert interface design to every project



Modern lifting and moving machinery needs advanced control panels. Pushbuttons, joysticks and stop switches now share the same interface with data displays delivering real-time information. With an ever-increasing pool of technology, a new approach and understanding of HMI design and interaction is needed.

EAO thoroughly examines the technical, environmental and commercial specifications of each project, applying the most appropriate technology to create highly usable interfaces.

Examples include:

- Simple pushbutton controls for a hydraulic platform.
- Wireless bi-directional remote control in a rubberised fibreglass shell for the construction industry.
- Operator controls with touchscreen and J1939 connectivity for heavy-duty vehicles.

This flexible use of technology enables EAO to develop highly efficient, safe, dependable and affordable human machine interfaces.





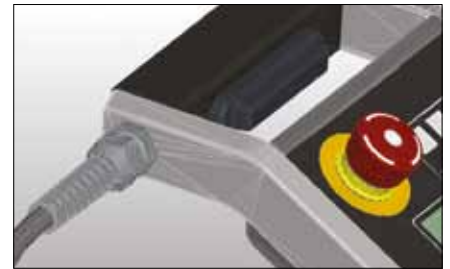
## Components

Rugged pushbuttons, selectors, keylocks, lever switches, emergency-stops, membranes and tact switches. Protective shrouds, flip guards and silicon covers.



## Displays & Touchscreens

Rugged displays with touchscreen interfaces and software.



## Rapid Prototyping

Design becomes reality through rapid solid modelling using 3D printing and stereolithography.



## Positioning Devices

Rubberised joysticks, paddles, wheels or any other device - trackballs, rotary switches and optical encoders.



## Serial bus Interfaces

J1939 and CAN bus modules and drivers for vehicle interfaces. Other bus types available, e.g. DeviceNet, FoundationFieldbus, PROFIBUS, Ethernet.



## Illumination & Legends

Laser engraving, metal inserts and membranes. Custom lighting techniques, e.g. back-lighting, halo, hidden legends.



## Rugged Keypads

Standard or customised keypads using metal, plastic or rubberised membranes. Back-lighting and sealing up to IP67.



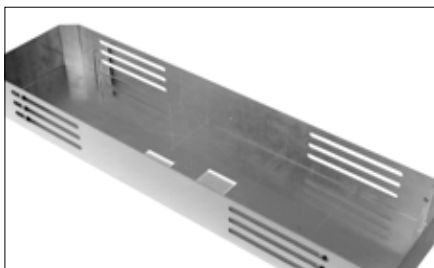
## Wireless Controls

Radio transmission, 802.11 wireless Ethernet networks, or IP-based cellular networks.



## Custom Assembly

Connections, cable crimping, harnessing and full/partial assembly.



## Panels & Enclosures

Tough, light, ergonomically-moulded housings in plastic, fibreglass or metal. Impact, water and oil resistant to IP standards.



## PCB Design

Surge protection and safety circuits, PCB design and manufacturing, SMT placement, assembly and inspection.



## Approvals & Certificates

Manufacturing products in accordance with ISO 9001, UL, VDE, SEV, ASE, DEMCO, SEMCO or specified standard.



# Application Engineering

Meeting the individual needs of this demanding industry



EAO understands that every operating environment provides a unique set of challenges. It will tailor a solution to the precise application requirements, whether it's construction cranes or warehouse robotics, heavy duty vehicles, gantry cranes or forklifts.

For harsh environments, EAO develops rugged controls which are water- and oil-proof, impact resistant and easy to clean. Special attention is paid to ergonomic design and functional ease, particularly in changing light and environmental conditions, and for gloved operators.

On-board controls for heavy duty machinery have a different set of needs – GUI displays of real-time data information in combination with keypads, membranes and discreet switches. They typically have embedded interfaces that link them with the larger system through serial communications connections.

EAO has extensive experience with touch-screen integration, on-board microcontrollers and real-time operating systems as well as a variety of Serial Bus communication protocols.



## Cranes

Radio remotes are a primary form of control on today's construction cranes. Operators can see the load moving in real time and get a corresponding display. They are typically compact, shock resistant and lightweight.



## Scissor and Aerial Lifts

Fixed control units typically feature large rubberised joysticks/positioning paddles alongside oil and watertight pushbuttons. Special attention is paid to functional ease of use for gloved operators and visibility in changeable light conditions.





## Forklifts

Modern forklift operator panels often feature data-entry key-logging keypads and membrane controls. They typically have embedded interfaces that link them with the larger system through serial communications.



## Container Lifting (airport/freight)

Container handling is an important industry, particularly at airports and transport hubs. Operator controls are used inside and outside the vehicles. EAO designs intuitive and easy to use controls, ensuring the containers are placed in the most precise, safe and efficient manner.





## Heavy-Duty Vehicles

Heavy-duty vehicles require combination interfaces - resistant, non-tactile keypads inside with rubberised side-of-vehicle control panels. Special attention is paid to ergonomics, visibility in changeable light conditions, and functional ease of use for gloved operators.



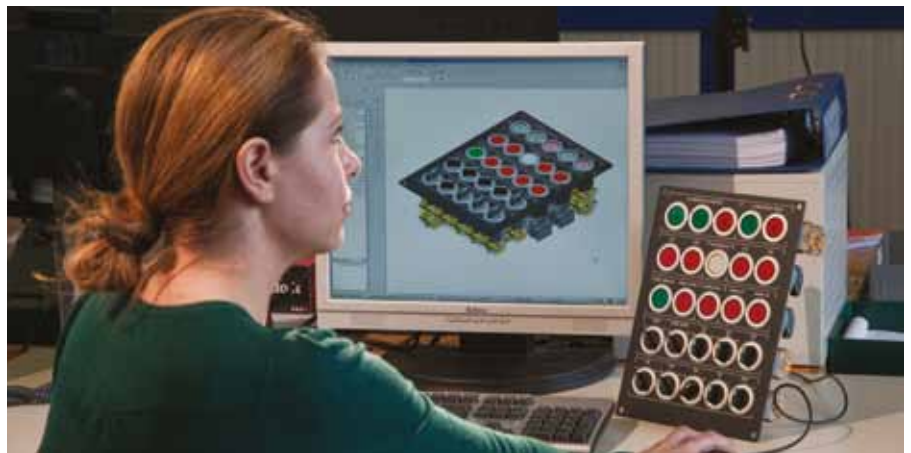
## Portable Wireless Controls

These controls allow the operator to freely move around the crane, maintaining load visibility at all times. Units must be light, comfortable to wear, and very durable. Wireless technology is a normal requirement.



# Comprehensive Services

From concept to delivery, EAO is the expert partner for human machine interfaces



A partnership with EAO offers global expertise in the following areas:

- HMI system design and layout that is functional and intuitive.
- Knowledge of all safety, ergonomic, industry, and international standards.
- Modern design-to-manufacturing methods such as 3D CAD/CAM/CAE (Solid Edge, AutoCAD, Pro/ENGINEER and SolidWorks).
- Rapid prototyping techniques for plastic components and short-run PCBs.
- On-board microcontrollers, real-time operating systems, encryption technology and Serial Bus communication protocols.
- Planned production processes to ensure just-in-time delivery.
- An international supply chain provider – service and procurement of parts on a global level.

EAO has a dynamic Total Quality Management system linked to all aspects of its business and is certified and managed to ISO 9001:2008, ISO 14001:2004 and other standards as required.

04



14



44



51



61



70



71



82



84



# HMI Components

Serien	04	14	44	51	61	70	71	82	84
<b>Range</b>									
Pushbutton	■	■	■	■	■	■	■	■	■
Indicator	■	■	■	■	■	■	■	■	■
Selector Switch	■	■	■	■	■		■		
Key Switch	■	■	■	■	■		■		
Emergency-Stop	■		■		■				■
Stop switch	■		■	■					
Buzzer		■							
Lever switch	■								
<b>Mounting</b>									
Flush	■	■	■	■	■	■	■	■	■
Raised	■	■	■	■	■				■
<b>Mounting hole</b>									
16mm Ø				■	■			■	
19.2mm Ø								■	
22.5mm Ø	■	■	■	■	■		■		■
30.5mm Ø	■	■	■						
square, rectangular	■			■	■	■	■		
<b>Switch rating max.</b>									
42 VAC/100mA						■			■
240 VAC/1.5 A									■
250 VAC/3 A							■		
250 VAC/5 A		■		■	■			■	
500 VAC/10A	■								
660 VAC/6A			■						
<b>Terminals</b>									
Solder		■		■				■	
Solder/Plug-in		■		■	■				■
Plug-in	■							■	
Screw	■		■		■			■	
Ribbon cable									■
PCB		■		■		■	■		■
PCB-Terminal available		■		■	■				
Push-in terminal (PIT)	■								
<b>Front protection degree</b>									
IP 40		■							
IP 65	■		■	■	■	■	■	■	■
IP 67	■	■	■			■			■
IP 68 (with protective cap)	■	■	■	■	■		■		■
<b>Suitable applications</b>									
Indoor	■	■	■	■	■	■	■	■	■
Outdoor	■	■	■	■	■	■	■	■	■



