



## Case Study

# World Leading Train Builder uses EAO System Capabilities for TSI-PRM Compliant Door Controls

### Company Profile

**Customer:**

UK division of global train builder

**Industry name:**

Transportation

**EAO Series:**

Series 04 lever switch, Series 56 pushbuttons

**Application:**

Control panel for door locking/unlocking of on-board toilet module

### Business Challenge

The European Technical Specification for Interoperability for Persons with Reduced Mobility (TSI-PRM) came into force in July 2008, making it easier for disabled travellers to use trains by setting standards for passenger access and on-board information. It applies to all heavy rail vehicles (trains) used on the interoperable rail system, which comprises the major lines of the mainline rail system in Europe. In the UK, all vehicles must be fully accessible no later than January 1st, 2020. While all new fleets are designed to be fully compliant, older vehicles which have an economic life beyond 2020 are being refurbished where the non-compliances truly prevent disabled people from accessing rail vehicles.

The impact of TSI-PRM can be seen, heard and literally felt throughout the modern passenger environment, from the level of the audible 'door opening' alarm and the intensity of vestibule lighting, to the height of door access controls and the amount of force required to operate a switch.

On-board toilet facilities are an important area within the passenger environment and are therefore within the scope of these regulations. All the controls which allow access to the toilet, door locking, toilet flushing and washing must be compliant.

# EAO – Your Expert Partner for Human Machine Interfaces



Custom-built aluminium level switch



The customer received a complete, fully-wired aluminium panel, ready to install

## Solution

As an expert in the field of Human Machine Interfaces and a leading HMI supplier to the rail industry, EAO has advised and collaborated with train builders in the design and integration of control panels which satisfy international rail standards and provide the human touch that is so desirable in passenger environments. Regulations, ergonomics and human factors are fundamental to the successful design of toilet module control panels, particularly when ensuring easy access and use by disabled customers. Among the list of TSI-PRM requirements is this: “A visual and tactile (or audible) indication shall be given to indicate when a door has been locked”. It also specifies that it must be operable by a force of no more than 20 Newtons.

Working closely with the customer, in this case the largest train builder in the UK, we designed toilet access and locking controls for Class 172 vehicles. Rethinking the previous design, we developed a new solution comprising an anodised aluminium front plate with Series 56 pushbuttons to open/close the door and a custom-designed lever switch for the door-locking mechanism. Featuring:

- Lever switch with physical left-to-right / right-to-left switching action.
- Large-handled aluminium lever connected to an extremely robust Series 04 key insert switch.
- Lever switch operating force of 6 – 9 Newtons, meeting the TSI-PRM.
- ‘Lock’ and ‘Unlock’ LED illuminated signs, controlled by a rear-mounted PCB.

- Three sealed Deutsch connectors for easy “Plug and Play” installation.

EAO designed the lever switch to complement the Series 56 pushbuttons, with their bright yellow bezel, LED ‘halo’ illumination and Braille markings. Matching the aesthetics to the panels already in use on passenger doors was an important consideration for our design team.

## Customer Benefits

Our solution address the needs of both passengers and service providers. To improve comfort and privacy, passengers require a clear, reassuring indication that the door is locked when the facility is in use. The customer preferred the lever switch over a simple door-lock pushbutton for the added level of reassurance. It must be intuitive, attractive and easy to use by both able-bodied passengers and less able-bodied. Our solution requires minimal maintenance and delivers a long life-cycle cost benefit. As well as meeting the PRM TSI directive, it is resistant to heat, shock, vibration and a level of vandalism expected of public environments. The customer received a complete, fully-wired aluminium panel, ready to install.

EAO is a global manufacturer of high-quality HMI Components and Systems. Founded in 1947, EAO has established a global reputation for being an expert partner for HMI in transportation, machinery, telecommunications, process control, lifting and moving, and automotive industries.