



INDICATOR AND DISPLAY DEVICES

MAFELEC and TSL-ESCHA GmbH

MAFELEC develops control and signaling solutions for harsh environments. From push buttons to switches, from complete control panels to door control solutions, the company offers products that are best suited to the needs of our partners.

TSL stands for Touch, Signal and Light. Door opening push buttons, signal lights, sounders, indicator and display devices as well as LED lighting are part of the product portfolio. TSL-ESCHA develops, manufactures, and distributes individual customer solutions for public transportation.

Members of the MAFELEC TEAM

TSL-ESCHA based in Halver (Germany) and MAFELEC in Chimilin (France) are part of the MAFELEC TEAM. The owner-managed group of companies offers solutions for HMI, lighting and sensors and is active in the markets of bus and railway, industrial vehicle, industry, energy, defense, aerospace, and elevators.

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PASSENGER INFORMATION IN THE BOARDING AREA AND LAVATORIES OF TRAINS

TSL-ESCHA and MAFELEC indicator and display devices reliably provide timely information about defective vehicle doors or door status and function. Thanks to their robust construction, they are used on both the interior and exterior of trains, as they are resistant to weather and environmental impacts as well as vandalism. Large display fields with back-printed texts and pictograms as well as a bright and contrasting presentation ensure reliable passenger information in boarding area and in lavatories of trains.

- Usage in the door area of rail vehicles and buses, both on the inside and outside, as well as in lavatories
- Indicator lights in perfect combination with several push button series
- Reliable status information adapted to suit the place of usage
- Different shapes and light fields, a large selection of existing pictograms and different mounting versions



Large selection with high a information content.

PKM52

EYE-CATCHING AND HIGH QUALITY

The PKM52 indicator light was developed based on the tried-and-tested PK52 push button from TSL-ESCHA. Depending on the application area, the light leverages state-of-the-art LED technology to inform passengers about various statuses in the vehicle. Display rendered by lighting up various pictograms or individually configurable texts. In addition to indicating door out-of-order, the lights often also indicate the availability of the lavatories. As the icons are displayed on a surface with a diameter of 52 millimeter,

passengers can recognize the relevant status from a great distance.

Thanks to the optical design of TSL's PK52 pushbutton, the PKM52 LED indicator light fits harmoniously into the various application areas – be it next to a push button, a buzzer or a signal light. The robust stainless steel front panels can be manufactured in numerous color variations, giving the installation a consistent and appealing overall appearance.

- Backlit pictograms with a diameter of 52 millimeters
- Construction type similar to the PK52 push button series
- Robust housing technology, high degree of protection and wide operating temperature range
- Proven chemical resistance to many surface cleaners
- Can be mounted from the front or back side and comes equipped with a cable outlet for optional plugs
- Complies with the current standards for rail vehicles (page 6)



Nominal voltage	24 VDC
Nominal current	70 mA @ 24 VDC
Operating temperature	-40 ... +80 °C
Degree of protection	IP67
Visible external dimensions (D x H)	Ø87 x 11 mm



The robust and sealed housings feature good resistance to cleaning agents, vandalism, humidity and other environmental impacts.

ML INDICATOR LIGHTS IMMEDIATELY RECOGNIZED

Signal, indicate and display – TSL indicator lights meet these criteria. The displays of the indicator lights signal operating states quickly and clearly, for both the door area and the lavatories or for customized applications. The indicator lights can be mounted in different ways to allow each customer to choose the most suitable variant for their respective installation situation, thus ensuring that the indicator lights signal, indicate and display to perfection.

- Diverse selection of texts and pictograms
- Back-printed pictograms and texts ensure durable contrast
- Good readability
- Good resistance to cleaning agents and vandalism
- Comply with the current standards for rail vehicles (EN 50155, EN 45545-2 and EN 61373)

ML52

OPTIONALLY ALSO WITH SIGNAL TONE

- As an indicator light in the door area and lavatories
- Construction type similar to the CK70 push button series
- With stainless steel frame and display window made of polycarbonate
- Backlighting: red, red and green
- Icons: Ø52 mm
- Special feature: optional signal tone matching the visual display



Nominal voltage	24 VDC
Nominal current	60 mA @ 24 VDC
Operating temperature	-40 ... +50 °C
Degree of protection	IP67
Visible external dimensions (D x H)	Ø100 x 5 mm

MLS52

ONLY A MINIMUM MOUNTING DEPTH

- Installation in lavatories as well as on the interior and exterior door area of rail vehicles
- Round construction type; mounted from the front side
- With stainless steel frame and display window made of glass
- Backlighting: red
- Icons: Ø52 mm
- Special feature: minimal installation depth of 25 mm



Nominal voltage	24 VDC
Nominal current	80 mA @ 24 VDC
Operating temperature	-40 ... +50 °C
Degree of protection	IP67
Visible external dimensions (D x H)	Ø87 x 7 mm

ML63

DOUBLE-SIDED DISPLAY POSSIBLE

- Installation in lavatories as well as on the interior and exterior door area of rail vehicles
- Design similar to the SL63 signal light series
- Display window made of tempered glass
- Backlighting: red or yellow or green, red and green
- Icons: Ø63 mm
- Special feature: thanks to the double-sided display option, only one indicator light is required

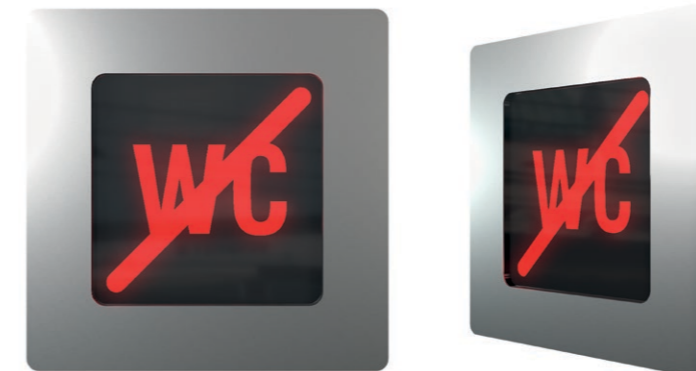


Nominal voltage	24 or 110 VDC
Nominal current	100 mA @ 24 VDC
Operating temperature	-40 ... +80 °C
Degree of protection	IP67
Visible external dimensions (D x H)	Ø100 x 6 mm

ML64

PARTICULARLY FLAT DESIGN

- Installation in the door area and lavatories of rail vehicles
- Rectangular construction type with stainless steel frame; mounted from the front side
- Display window made of polycarbonate
- Backlighting: red
- Icons (W x H): 64 x 64 mm
- Special feature: flat design



Nominal voltage	24 ... 110 VDC
Nominal current	50 mA @ 24 VDC or 80 mA @ 110 VDC
Operating temperature	-40 ... +60 °C
Degree of protection	IP44
Visible external dimensions (L x W x H)	100 x 100 x 3 mm

ML90 WITHOUT A VISIBLE FRAME

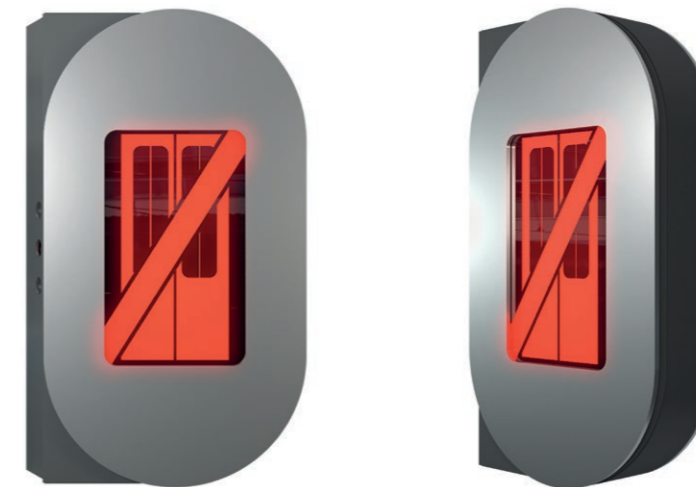
- Installation in the door area and lavatories of rail vehicles
- Rectangular construction type; mounted from the back side without a frame; with connection studs
- Display window made of polycarbonate
- Backlighting: red
- Icons (W x H): 62 x 62 mm
- Special feature: flush installation, without a visible frame



Nominal voltage	24 ... 110 VDC
Nominal current	50 mA @ 24 VDC oder 80 mA @ 110 VDC
Operating temperature	-40 ... +70 °C
Degree of protection	IP44
Visible external dimensions (L x W x H)	90 x 90 x 4 mm

ML100 DOUBLE-SIDED WITH LOW MOUNTING DEPTH

- Double-sided indicator light for installation in the glass surface of the door area
- Oval construction type
- Display window made of glass
- Backlighting: red
- Icons (W x H): 54 x 90 mm
- Special feature: double-sided display with extremely shallow installation depth



Nominal voltage	24 ... 110 VDC
Nominal current	200 mA @ 24 VDC
Operating temperature	-40 ... +80 °C
Degree of protection	IP67
Visible external dimensions (L x W x H)	182 x 100 x 3/29 mm

PKM

INFORMATIVE AND SIMPLE

The PKM indicator light's design is similar to the tried-and-tested PK push button from TSL-ESCHA. Depending on the installation situation, the illuminated pictograms inform passengers about various states.

This indicator and display device is often installed in the door area, where it indicates a door defect, for example. Text and pictograms are printed to allow for the disappearing effect. This means that they can only be read when they are activated and backlit.

The PKM fits perfectly into the door structure and has the same installation dimensions as a door opening push button. As with the push button, the PKM indicator light can also be installed on both sides of the glass door. The optional LED color variants round off the functions of the PKM.

- Backlit icons with a diameter of 28 mm
- Construction type similar to the PK push button series
- Robust housing technology, high degree of protection and wide operating temperature range
- Can be mounted from the front or back side and comes equipped with a cable outlet for optional plugs
- Text and pictogram with disappearing effect
- Complies with the current standards for rail vehicles



Nominal voltage	24 VDC
Nominal current	40 mA @ 24 VDC, depending on the LED color
Operating temperature	-40 ... +80 °C
Degree of protection	IP67
Visible external dimensions (D x H)	Ø87 x 10 mm

Thanks to the various mounting options, the M-Door indicator light can be integrated on the door leaf as well as on the side walls.

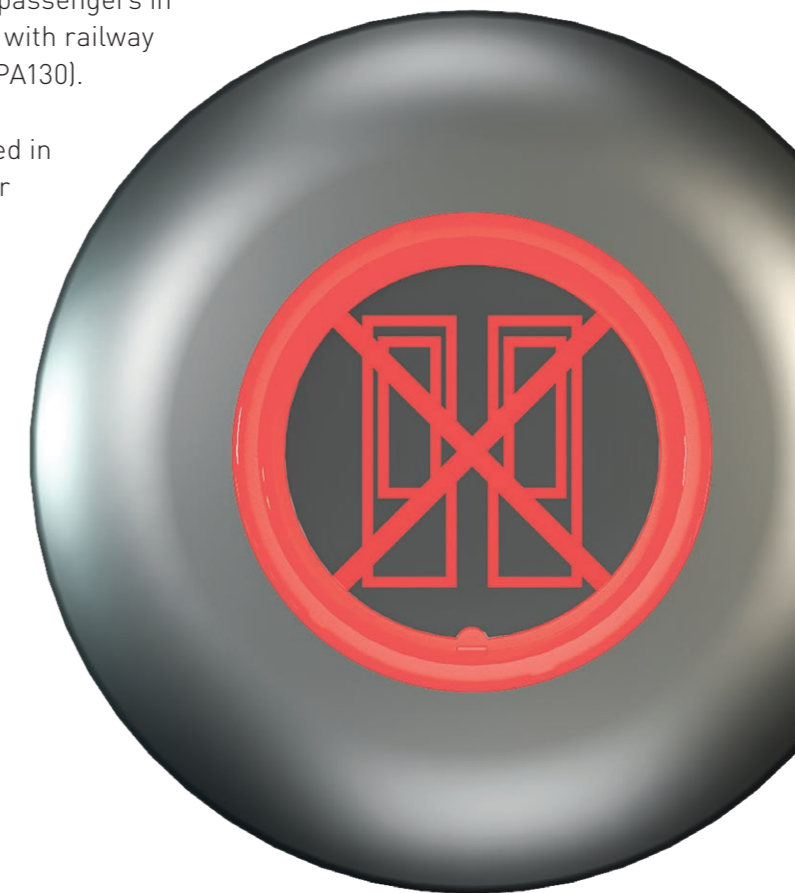


M-DOOR INDICATOR LIGHT FUNCTIONAL AND CUSTOMIZABLE

Easy and intuitive to install, the M-Door indicator light has been designed to communicate to all types of user information on the status of the systems on which they are installed like doors, toilets or bars. Its design is based on the M-Door push button range. It meets the expectations of passengers in terms of accessibility, comfort and safety, in compliance with railway standards (TSI PRM, EN 14752, EN 50155, EN 45545/NFPA130).

Its adaptability and robustness also allow it to be installed in other industrial sectors like public toilets, call stations or building access locks.

- Vandalism resistant design
- Various mounting options
- Customizable pictograms and LED lighting
- Wide choice of bezels
- Long life span over 50,000 h



Whatever your information needs, the M-Door indicator light will fit.

VARIETY OF M-DOOR INDICATOR LIGHT

OVERVIEW OF MOUNTING FORMS

The M-Door indicator light is available in three mounting options to suit the different environments in which it will be installed: front mounting with customizable bezel (standard or slim format) or rear mounting. The lighting surface, on which the backlit symbol or text is located, has a diameter of 40 millimeter.

Nominal voltage	12, 24, 36, 72 or 110 VDC
Operating temperature	-40 ... +85 °C according to cable type
Degree of protection	IP65/IP67 front side, IP65 rear side
Illuminated area	Ø40 mm

SINGLE SIDE FRONT MOUNTING



- Mounting via three M4 screws
- Front diameter including bezel 87 mm
- 19.5 mm depth from panel front side
- Large choice of bezels

SINGLE SIDE REAR MOUNTING



- Mounting via three M4 screws or threaded stud
- Front diameter 45 mm
- 28 mm depth from panel front side
- Rectangular body shape in option

SLIM PANEL MOUNTING



- Compact front mounting
- Horizontal or vertical installation
- 21 mm depth from panel front side
- Mounting via two anti-vandal screws

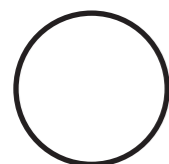
CUSTOMIZE YOUR M-DOOR INDICATOR LIGHT

SELECTION POSSIBILITIES

Like the push buttons of the M-Door range, the M-Door indicator is fully customizable. To discover all available options please check our Product Configuration. The bezels are only adaptable on the single side front mounting variant.

BEZEL FORMS

Round



Square



Triangular



BEZEL COLORS



BEZEL MATERIAL

The round bezel can be either in UV-resistant plastic material, painted metal or decorative chrome. The square bezel is only in painted metal or decorative chrome. The triangular bezel exists only in plastic material.

PICTOGRAMS

MAFELEC offers a large number of different pictograms. Here we show only a small selection.

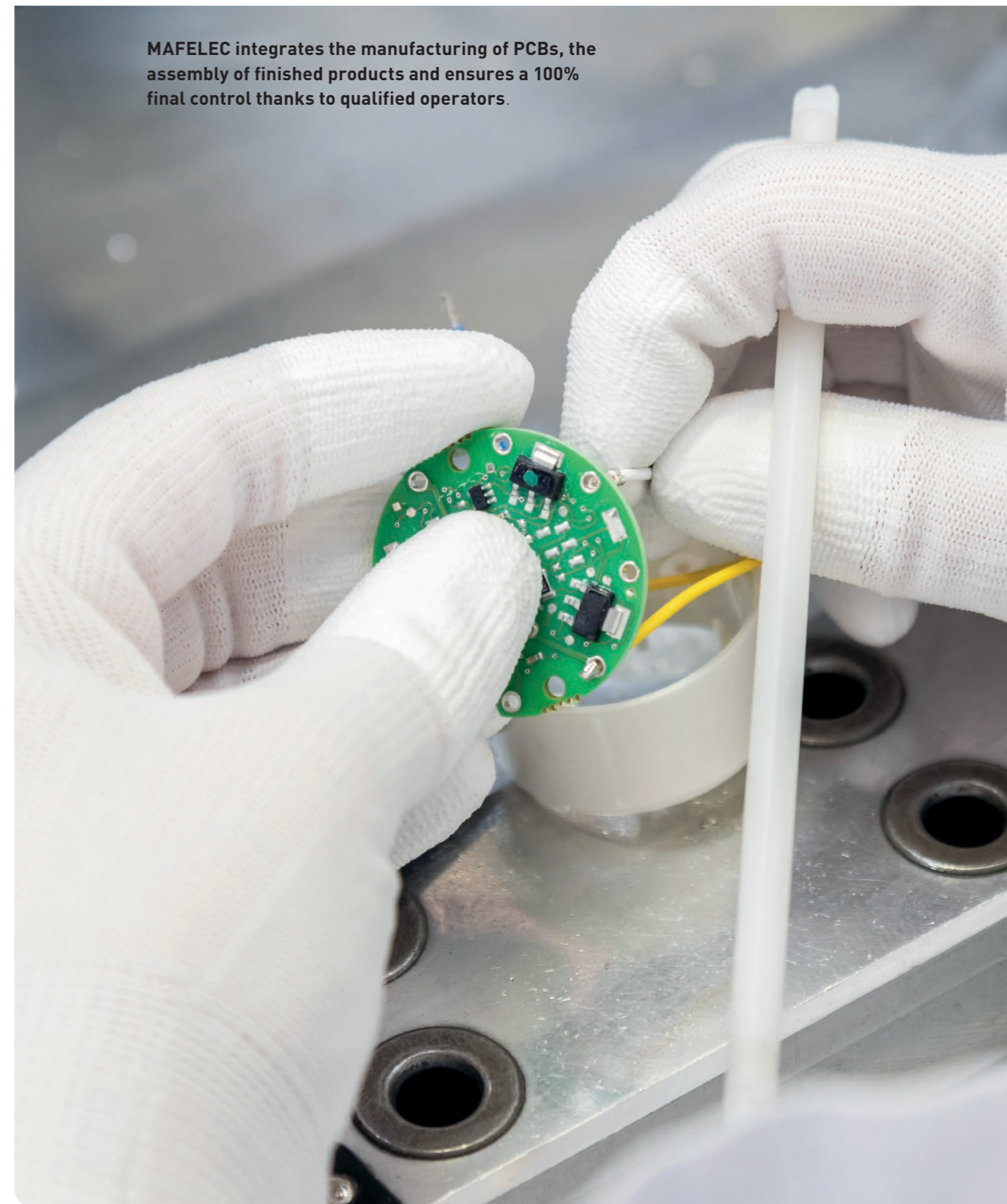
The pictogram can also be used with the smoke option to hide the pattern when the lighting is not activated (disappearing effect).

LED BACKLIGHTING

The color of the M-Door light can be yellow, amber, red, blue, green or white.

The M-Door light can be single or dual color. A flashing option is also available.

MAFELEC integrates the manufacturing of PCBs, the assembly of finished products and ensures a 100% final control thanks to qualified operators.



X80 INDICATOR LIGHT

EFFICIENT AND ECONOMIC

X80 indicator light is a square LED display light. It is designed to be installed in the toilets of trains, to inform about their status and can integrate several states or information separately. Its lighting surface allows having a visible information from far, this one can be a pictogram or a text.

The backlighting can be bicolored, fixed or flashing, the color being customizable. With the smoke option, it is possible to make the pattern only visible when the lighting is activated (disappearing effect). Mounted from the rear, the fixing points are not visible. Of course, it meets the requirements of the railways (EN 50155, EN 45545).

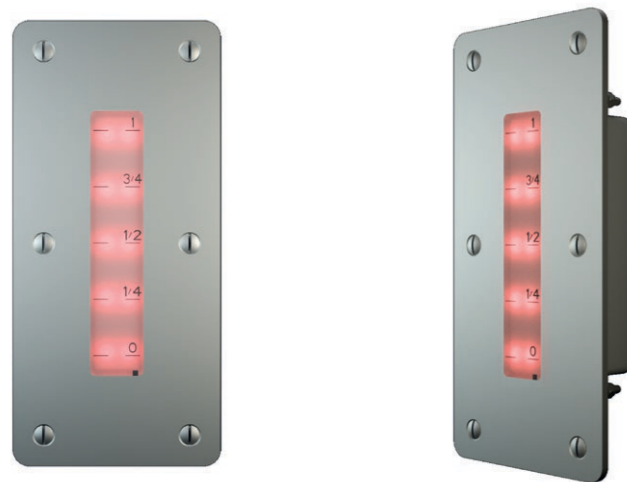
- Bicolor square indicator
- Up to three indications
- Steady illumination or blinking
- Customizable pictogram and/or text
- Rear mounting
- Compliance with railway standards



Nominal voltage	24 or 72 VDC
Degree of protection	IP40 front side
Visible external dimensions (L x W)	80 x 80 mm

WATER LEVEL INDICATOR LIGHT SIMPLE AND ROBUST

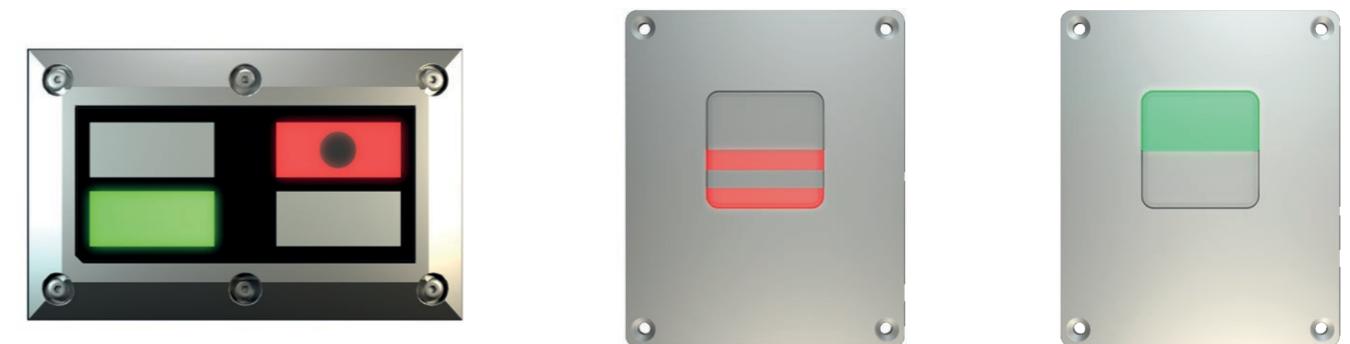
- Integration in toilets for indication of water level
- Red LED backlighting
- Lit area: 100 x 20 mm
- Resistant plastic cover with level engraved
- Stainless steel plate
- Indications and colors can be adapted



Nominal voltage	110 VAC +25 %/-30 %, 50 Hz
Maximum current	15 mA
Degree of protection	IP66 front
Visible external dimensions (L x W)	168 x 78 mm

BRAKE INDICATOR SAFE AND MODERN

- Integration on railway coaches to indicate brake status
- Single or dual indication, customizable serigraphy and colors
- Marking to guarantee correct visibility for visibly impaired people
- High reliability adapted to safety function
- Tempered glass and painted aluminum plate
- IP66 degree of protection and IK06 impact resistance



Nominal voltage	72 VDC or 110 VDC
Nominal current	35 mA @ 72 VDC
Operating temperature	-25 ... +70 °C
Visible external dimensions	Depending on configurations

BSI COMPACT AND CUSTOMIZABLE

Installed on a railway driver desk or an electrical panel, the BSI is an LED indicator that provides centralized information signalling through illuminated pictograms. The number of boxes is adapted to the customer's needs. Many formats exist, up to 32 boxes: 3 x 3, 4 x 4, 2 x 6, 2 x 8, 6 x 4, 6 x 5, 4 x 8. Other formats are also available on request. The boxes are equipped with white LEDs. The evolution or

maintenance of the indicator is made easy by the possibility of changing only the serigraphy. The separation of the boxes ensures that there is no light interference with adjacent boxes.

The integration of the BSI is harmonious thanks to its low protrusion on the front. The BSI meets the requirements of the railway and marine industries.

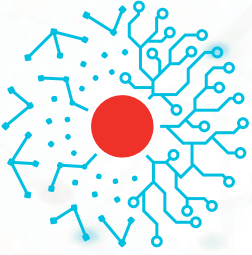


Nominal voltage
Maximum current
Degree of protection
Visible external dimensions (L x W)

110 VAC +25 %/-30 %, 50 Hz
15 mA
IP66 front
168 x 78 mm



- Customizable number of cases
- Customizable pictograms
- No light interference between indications
- High reliability
- Easy maintenance
- Possible integration of a seven-segment-display



MAFELEC TEAM

CREATING SMART AND SUSTAINABLE INTERFACES

HMI INTERIOR AND EXTERIOR

- DOOR EQUIPMENT
- PASSENGER COMFORT
- SANITARIES
- DRIVER DESK
- SAFETY SOLUTIONS

DETECTION & PROTECTION

- VOLTAGE & CURRENT SENSORS
- CIRCUIT BREAKERS
- INSULATORS AND BUSHINGS
- POWER SWITCHES

LIGHTING INTERIOR AND EXTERIOR

- FRONT LIGHTING
- INTERIOR LIGHTING
- EXTERIOR LIGHT SIGNATURE



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