



PRODUCTS IN THE DOOR AREA

MAFELEC AND TSL-ESCHA

CREATING TOGETHER SMART AND SUSTAINABLE INTERFACES

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.





DOOR AREA OF THE TRAIN INTERIOR AND EXTERIOR

The inner values are also important when it comes to trains. Train builders focus on good lighting, wear-resistant push buttons, durable warning buzzers and indicator devices in the interior of rail vehicles. All of this aims at enhancing passenger safety and comfort. The MAFELEC AND TSL-ESCHA product portfolio offers a wide range of application solutions for both new generation vehicles and modernization projects.

MAFELEC and TSL-ESCHA products offers diverse and comprehensive rail vehicle solutions, whether used for new vehicles or modernization projects. The door area on the outside of the train can be thoroughly equipped with different products: door opening push buttons, signal lights as well as optical and acoustic indicator devices.

The aim of our products is to give passengers a safe and comfortable feeling when using public transport. Seeing exactly what the door status is. Hearing exactly when the doors open or close. Feeling exactly how doors can be opened with the protruding push button. You can also customize push buttons or acoustic warning sounders to suit your vehicle, for example in terms of color or light and sound signals.

MAFELEC and TSL products for the door area of trains comply with the current railway standards and are also available in TSI-PRM compliant versions.

PRODUCT OVERVIEW

Push Buttons	PK52	PK	CK	MP	M-Door GM	M-Door VG
						
Nominal voltage	12 ... 110 VDC (depending on version)	24, 36, 72, 110 VDC	24, 36, 72, 110 VDC	24, 36, 72, 110 VDC	12 or 24 VDC	12, 24, 36, 72, 110 VDC
Operating temperature	-40 ... +80 °C	-40 ... +85 °C	-40 ... +70 °C			
Degree of protection	IP67	IP67	IP67	IP67	IP44 (inside), IP65 (outside)	IP65
Configurable light signals	yes	yes	yes	yes	yes	yes
Glass mounting possible	yes	yes	yes	no	yes, without drilling	no
Function double-sided	yes	yes	yes	no	yes	no
Material front bezel	stainless steel or plastic	plastic	stainless steel	plastic	plastic	plastic, metal
Application Area	interior, exterior	interior, exterior	interior, exterior	interior	interior, exterior	interior, exterior

Door Indicator Lights	MLS52	ML100	ML64	PKM	PKM52	M-Door Single side
						
Nominal voltage	24 VDC	12 ... 110 VDC	12 ... 110 VDC	24 VDC	24 VDC	12, 24, 36, 72, 110 VDC
Operating temperature	-40 ... +50 °C	-40 ... +80 °C	-40 ... +60 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +85 °C
Degree of protection	IP67	IP67	IP44	IP67	IP67	IP67
Display window	glass	glass	polycarbonate	polycarbonate	polycarbonate	polycarbonate
Backlighting	red	red	red	red, yellow or green	red	red, yellow, green, blue, amber, white
Mounting	front	front or back side	front	front or back side	front or back side	front or back side
Special feature	minimal installation depth of 25 mm	double-sided display	flat design	text and picto- gram with disap- pearing effect	high-quality stainless steel front panel	text and pictogram with disappearing effect
Application Area	interior, exterior	interior, exterior	interior	interior, exterior	interior, exterior	interior, exterior

Sounders	WM87	PKW21	SM87
			
Nominal voltage	24 ... 110 VDC	24 ... 110 VDC	24 ... 110 VDC
Degree of protection	IP67	IP67	IP20
Dimension	Ø87 or 100	Ø87	58 x 58 x 28
Sound level	up to 80 dB(A)	up to 75 dB(A)	depending on installation
Sound level adjustment	yes	yes	yes
Parameterization on site	yes	yes	yes
Material front cover	stainless steel	plastic	plastic
Application Area	interior, exterior	interior, exterior	interior

Alarm handle
Nominal voltage
Operating temperature
Degree of protection
Actuating force
Re-arming
Mounting
Special feature
Application Area

M-Door	M-Door Slim	M-Door single/RMS	Minitype	HST	TSG108	M-360
						
12, 24, 36, 72, 110 VDC	12, 24, 36, 72, 110 VDC	12, 24, 36, 72, 110 VDC	36 VDC	10 ... 24 VDC	24 VDC	12 or 24 VDC
-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-30 ... +80 °C	-30 ... +70 °C
IP67	IP67	IP67	IP67	IP40	IP40	IP40
yes	yes	yes	yes	yes	yes	yes
yes	no	no	no	no	no	no
yes	no	no	no	no	no	no
plastic, metal	plastic	-	metal	plastic	plastic	plastic
interior, exterior	interior, exterior	interior, exterior	interior, exterior	interior	interior	interior

LED Signal Lights

Nominal voltage
Operating temperature
Degree of protection
Luminous color
Special feature
Application Area

M-Door Slim



12, 24, 36, 72, 110 VDC
-40 ... +85 °C
IP67
polycarbonate
red, yellow, green, blue, amber, white
front or pole
low width
interior, exterior

Alarm handle



12..110 VDC
-30 ... +55 °C
IP00
5 to 9 daN
manual or electromagnetic
panel front or rear
adaption on customer need
interior



PL13	SLE161	SLK63	SLE63	SL63	TL83	VL30
						
24 VDC -25 ... +55 °C IP20	24 or 110 VDC -40 ... +70 °C IP 67 (optional IP44)	24 or 110 VDC -40 ... +80 °C IP67	24 or 110 VDC -40 ... +80 °C IP67	24 or 110 VDC -40 ... +80 °C IP67	24 VDC -40 ... +50 °C IP67	72 or 110 VDC -25 ... +70 °C IP54
red, yellow, green	red, yellow, green, blue or white	red, yellow, green, blue, white or red-green	red, yellow, green, blue, white or red-green	red, yellow, green, blue, white or red-green	red, blue or white	red, green or amber (bicolor optional)
light diffuser emits soft light	as side indicator E1, bicolor e.g. red/ green, adapter for retrofit	optimal lateral visibility due to the hemispheri- cal glass	installation for example in the door cove, door leaf or as a ramp light	ideal for low door frames	die-cast alu- minum housing	high luminance level (>400cd/m²)
interior	interior, exterior	interior, exterior	interior, exterior	interior, exterior	interior, exterior	interior

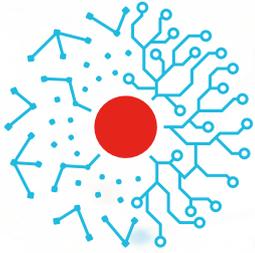


VL55	LS	SLR120	M-Door SL40SD	M-Door SL40D	M-Door SLV40	SLT92
24 VDC -25 ... +55 °C IP20 red, yellow, green and white combines door illumination and signaling interior	24 VDC -40 ... +85 °C IP67 red, yellow, green, blue adaptation to custo- mer-specific vehicles and door leaf contours possible interior, exterior	24 or 110 VDC -40 ... +80 °C IP67 red, green or bicolor red-green suitable for a com- bination of signal light and buzzer interior, exterior	24, 72, 110 VDC -40 ... +85 °C IP67 red, green or amber (bicolor optional) front or rear mounting interior, exterior	24, 72, 110 VDC -40 ... +85 °C IP67 red, green or amber (bicolor optional) front or rear mounting interior, exterior	24, 36, 72, 110 VDC -40 ... +85 °C IP65 red or amber (bicolor optional) rear mounting interior	24, 36, 72, 110 VDC -40 ... +85 °C IP65 red, yellow, green, blue or white (bicolor optional) high visibility in all directions exterior



LED Lights	EL50	ELK50
Nominal voltage	24 ... 36 or 110 VDC	24 ... 36 or 110 VDC
Operating temperature	-40 ... +50 °C	-40 ... +50 °C
Degree of protection	IP67	IP67
Luminous color	white	white
Special feature	flat glass cover, different beam angles, different white tones	front panel made of special frosted glass
Application Area	interior, exterior	interior, exterior

Crew switches	C22CS-5N	C22CS-10N	C22CS-30N
Nominal voltage	12..110 VDC	12..110 VDC	12..110 VDC
Operating temperature	-25 ... +70 °C (-40 °C optional)	-25 ... +70 °C (-40 °C optional)	-25 ... +70 °C (-40 °C optional)
Degree of protection (encapsulation on rear)	IP00 up to IP65	IP00 up to IP65/IP66	IP00 up to IP65/IP67
Mounting	panel front	panel front	panel front
Connection	6.35mm tabs, screw, cable molded	6.35mm tabs, screw, cable molded	6.35mm tabs, screw, cable molded
Maximum limit torque	5N	10N	30N
Application Area	interior, exterior	interior, exterior	interior, exterior



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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