MAFELEC

TSL-ESCHA

SOLUTIONS FOR 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 and/or EN14752 compliant versions.

Push Buttons

	PK5x	PK2x	CK	MP	M-Door GM	M-Door Single	M-Door Slim	M-Door Single/RMS	Minitype	HST	TSG108	M-360
Nominal or operating 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	12, 24, 36, 72, 110 VDC	12, 24, 36, 72, 110 VDC	36 VDC	10 ... 24 VDC	24 VDC	12 or 24 VDC
Operating temperature	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-30 ... +80 °C	-30 ... +70 °C
Degree of protection	IP67	IP67	IP67	IP67	IP44 (inside), IP65 (outside)	IP67	IP67	IP67	IP67	IP40	IP40	IP40
Configurable light signals	yes	yes	yes	yes	yes	yes, without drilling	yes	yes	yes	yes	yes	yes
Glass mounting possible	yes	yes	yes	no	no	yes						
Function double-sided	yes	yes	yes	no	yes	yes	no	no	no	no	no	no
Touchless option	yes	no	yes	no	yes	yes	no	no	no	no	no	yes
Material front bezel	plastic	plastic	stainless steel	plastic	plastic	plastic	plastic, metal	plastic	metal	plastic	plastic	plastic
Application Area	interior, exterior	interior, exterior	interior, exterior	interior	interior, exterior	interior, exterior	interior, exterior	-	interior, exterior	interior, exterior	interior, exterior	interior

LED Signal Lights

	PL13	SLE16n	SLK63	SLE63	SL63	TL83	VL30	VL55	LS	HL18	HL22	SLR120	M-Door SL40SD	M-Door SL40D	M-Door SLV40	SLT92
Nominal voltage	24 VDC	24 or 72 VDC	24 or 110 VDC	24 or 110 VDC	24 or 110 VDC	24 VDC	72 or 110 VDC	24 VDC	24 VDC	24 VDC	24 VDC	24 or 110 VDC	24, 72, 110 VDC	24, 72, 110 VDC	24, 36, 72, 110 VDC	24, 36, 72, 110 VDC
Operating temperature	-25 ... +55 °C	-40 ... +70 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +50 °C	-25 ... +70 °C	-40 ... +85 °C	-25 ... +55 °C	-40 ... +70 °C	-40 ... +70 °C	-40 ... +80 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
Degree of protection	IP20	IP 67 (optional IP44)	IP67	IP67	IP67	IP67	IP54	IP20	IP67	IP67	IP54	IP67	IP67	IP67	IP65	IP65
Luminous color	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)	red, yellow, green and white	red, green, blue, white and mixed colors from these	red, green and white	red, green or amber, white (upon customer request)	red, green or bicolor red-green	red, green or amber (bicolor optional)	red, green or amber (bicolor optional)	red or amber (bicolor optional)	red, yellow, green, blue or white (bicolor optional)
Special feature	light diffuser emits soft light	as side indicator E1, bicolor e.g. red/green, adapter for retrofit	optimal lateral visibility due to the hemispherical glass	installation for example in the door cove, door leaf or as a ramp light	ideal for low door frames	die-cast aluminum housing	high luminance level (>400cd/m²)	combines door illumination and signaling	adaptation to customer-specific vehicles and door leaf contours possible	for installation or retrofitting in handrails	installed directly into the handrail	suitable for a combination of signal light and buzzer	front or rear mounting	front or rear mounting	rear mounting	high visibility in all directions
Application Area	interior	interior, exterior	interior, exterior	interior, exterior	interior, exterior	interior, exterior	interior, exterior	interior	interior	interior, exterior	interior	interior, exterior	interior, exterior	interior, exterior	interior	exterior

Door Indicator Lights

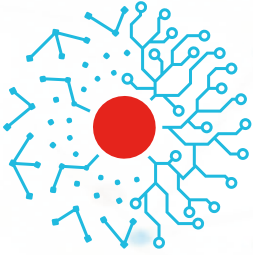|	MLS52	ML100	ML64	PKM	PKM52	M-Door Single	M-Door Slim
Nominal or operating voltage	24 VDC	12 ... 110 VDC	12 ... 110 VDC	24 VDC	24 VDC	12, 24, 36, 72, 110 VDC	12, 24, 36, 72, 110 VDC
Operating temperature	-40 ... +50 °C	-40 ... +80 °C	-40 ... +60 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +85 °C	-40 ...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

LED Lights

	EL50	ELK50
Operating 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

Sounders

	WM87/WSM87	PKW21	SM87
Operating voltage	24 ... 110 VDC	24 ... 110 VDC	24 ... 110 VDC
Operating temperature	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C
Degree of protection	IP67	IP67	IP20
Dimension	Ø87 oder 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

	Alarm handle
Nominal voltage	12..110 VDC
Operating temperature	-30 ... +55 °C
Degree of protection	IP00
Actuating force	5 to 9 daN
Re-arming	manual or electromagnetic
Mounting	panel front or rear
Special feature	adaption on customer need
Application Area	interior

Crew switches

	C22CS-5N	C22CS-10N	C22CS-30N
Operating 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 rear	panel rear	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

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CREATING **TOGETHER** 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

MAFELEC

MAFELEC
471, Route de la Cuisinière | 38490 Chimilin | France
T +33 4 763 207 33 | contact@mafelec.com
www.mafelec.com

TSL-ESCHA

TSL-ESCHA GmbH
Post office box 1134 | 58541 Halver | Germany
T +49 2353 66796-0 | info@tsl-escha.com
www.tsl-escha.com

MEMBERS OF THE MAFELEC TEAM

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FULL ELECTRONIC SYSTEM

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