



MAFELEC TEAM

CREATING **TOGETHER** SMART AND
SUSTAINABLE INTERFACES

SOLUTIONS FOR BUSES





MAFELEC AND TSL-ESCHA

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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.

USER-FRIENDLY PRODUCTS

MORE COMFORT AND SAFETY

INSIDE AND OUTSIDE OF THE BUS

Both city buses and intercity buses are optimized to meet two main requirements: high transport capacity and fast passenger transfer. This makes wide entry and exit doors essential. Products from MAFELEC and TSL-ESCHA help passengers get on and off the bus smoothly. Push buttons in the door area on the outside of the bus help passengers open the doors and meet the normative requirements for handicapped passengers. Braille and tactile pictograms are available. All products are offered in a wide variety of colors and pictograms.

The interior of a bus is designed to be as functional as possible. Push buttons are mounted on numerous hand rails, helping passengers signal a stop request. This makes the passengers ride as comfortable as possible. For bus interiors, MAFELEC and TSL-ESCHA offer user-friendly components such as push buttons, hand rail buttons, door control units and LED signal lights. They help passengers board and disembark in greater comfort and safety. The stop request buttons give you a very durable product to use in your vehicle, as underlying inscriptions and pictograms are protected by scratch-resistant polyamide. This ensures that the push buttons always look good.

MAFELEC TEAM has additionally auxiliaries for the driver desk, the engine compartment and for energy conversion in its portfolio.

MAFELEC TEAM solutions meet bus regulatory requirements as ECE R107, R10 and R118.



PRODUCT OVERVIEW

INTERIOR OF BUSES



Push Buttons	PK5x	PK2x	CK	M-Door GM	M-Door Single	M-Door Slim
Nominal or operating voltage	12 ... 110 VDC (depending on version)	24, 36, 72, 110 VDC	24, 36, 72, 110 VDC	12 ... 24 VDC	12, 24 VDC	12, 24 VDC
Operating temperature	-40 ... +80 °C	-40 ... +80 °C	-40 ... +80 °C	-40 ... +85 °C	-40 ... +85 °C	-40 ... +85 °C
Degree of protection	IP67	IP67	IP67	IP44 (inside), IP65 (outside)	IP67	IP67
Configurable light signals	yes	yes	yes	yes	yes	yes
Glass mounting possible	yes	yes	yes	yes, without drilling	yes	no
Function double-sided	yes	yes	yes	yes	yes	no
Touchless option	yes	no	yes	yes	no	no
Material front bezel	plastic	plastic	stainless steel	plastic	plastic, metal	plastic
Hand Rail Buttons	HST	TSG101	TSG108	M-360	M-Door X-Slim	
Nominal or operating voltage	10 ... 24 VDC	24 VDC	24 VDC	12, 24 VDC	12, 24 VDC	
Operating temperature	-40 ... +85 °C	-30 ... +80 °C	-30 ... +80 °C	-30 ... +70 °C	-25 ... +70 °C	
Degree of protection	IP40	IP40	IP40	IP40	IP40	
Ø Handrails	Ø30, 32, 35, 40	Ø30, 32, 34, 35	Ø30, 35	Ø30, 34, 35	Ø30, 32, 34, 35	
Backlighting	red, green	yellow, red, green, white	yellow, red, green, white	amber, red, blue, green, white	amber, red, blue, green, white	
Vibration feedback	optional	no	no	no	no	
Special features	different series e.g. touch protection, vibration, acoustic, illumination	mounting on flat surfaces with a wall adapter	compact and robust construction type	1, 2 or 3 actuators	backlit pole adapter	
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 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			
Energy Conversion	Insulators	Bushings	Current sensors	Circuit Breakers		
Main features	<ul style="list-style-type: none">Hexagonal, cylindrical or umbrella shapeHeight from 15 mm up to 100 mmMale or female inserts, M4 to M14	<ul style="list-style-type: none">Male or female inserts, M8 to M14Height : 82 or 84 mm	<ul style="list-style-type: none">Current measurement from 20 A up to 40 000 AClosed or open loopOperating temperature up to 85°C	<ul style="list-style-type: none">AC or DC applications, up to 50 AMagnetic-thermicFlush-mounted, pluggable or DIN Rail mounting		

PRODUCT OVERVIEW

EXTERIOR OF BUSES

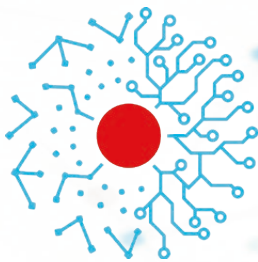


LED Signal Light	SLE16n	LS
		
Nominal voltage	24 or 110 VDC	24 VDC
Operating temperature	-40 ... +70 °C	-40 ... +85 °C
Degree of protection	IP 67 (optional IP44)	IP67
Luminous color	yellow, red, blue, green, and white	red, green, blue, white and mixed colors from these
Number of LEDs	10 or 20	individual
Special feature	as side indicator E1, bicolor e.g. red/green, adapter for retrofit	adaptation to customer-specific vehicles and door leaf contours possible

Door Indicator Lights	M-Door Single	M-Door Slim
		
Nominal voltage	12, 24 VDC	12, 24 VDC
Operating temperature	-40°...+85°C	-40°...+85°C
Degree of protection	IP67	IP67
Luminous color	yellow, amber, red, blue, green, white	yellow, amber, red, blue, green, white
Symbol	any symbol on request	any symbol on request
Mounting	front or rear	front or pole

Engine compartment	Starting Switch	Power Socket	VLP12 Indicator
			
Nominal voltage	24 VDC	24 VDC	24 VDC
Operating temperature	-40°...+120°C	-40°...+120°C	-25°...+70°C
Degree of protection	up to IP69K	up to IP69K on rear side	IP69K
Mounting	front	front	front
Connection	connector	connector	M8
Special features	300 000 cycles	protective cover	single or tricolor light, 300 h salt spray test

Driver Desk	C22 Emergency Push Button	C22 Joystick
		
Operating voltage	12 ... 24 VDC	12 ... 24 VDC
Operating temperature	-25°...+70°C	-25°...+70°C
Endurance lifetime	100 000 cycles	300 000 cycles
Degree of protection	IP66	IP66
Mounting	rear	rear
Special features	finger guard; in option, connectorized	in option, connectorized



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MAFELEC TEAM is a family of nine entities located in different countries: France, Germany, Poland, China and United Kingdom. MAFELEC TEAM is specialist in development and design of solutions for harsh environments and demanding markets such as railway, aeronautics, defense, energy, industry and buses.

Continuously expanding and always looking to the world's future, MAFELEC TEAM is today a key player with international recognition in its various markets.



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



Oststraße 7 | 58553
Halver | Deutschland
T +49 2353 66796-0
info@tsl-escha.com
www.tsl-escha.com

MEMBERS OF THE MAFELEC TEAM

