MAFELEC

TSL-ESCHA

PK5x
PUSH BUTTONS

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.

CONTENTS

PK5x PUSH BUTTONS

PK5x SERIES
INDIVIDUAL AND VERSATILE SETTING OF PARAMETERS

The PK5x series of TSL stands out within the Presskey family in terms of its external features: an extremely large touch surface, very good lateral recognition of the status display and an acoustic orientation signal.

These are just a few examples that facilitate the awareness of TSL-ESCHA's PK5x push buttons and greatly simplify safe operation. Braille and self-explanatory pictograms also support tactile and visual recognition. The improved operational characteristics are particularly helpful for passengers with reduced mobility in buses and trains.

- Versatile, individual setting of parameters
- Large active touch surface
- Fast and easy to recognize
- Tactile switching feel
- Complies with the current standards for rail vehicles (TSI-PRM, EN 14752, EN 50155, EN 45545-2 and EN 61373)

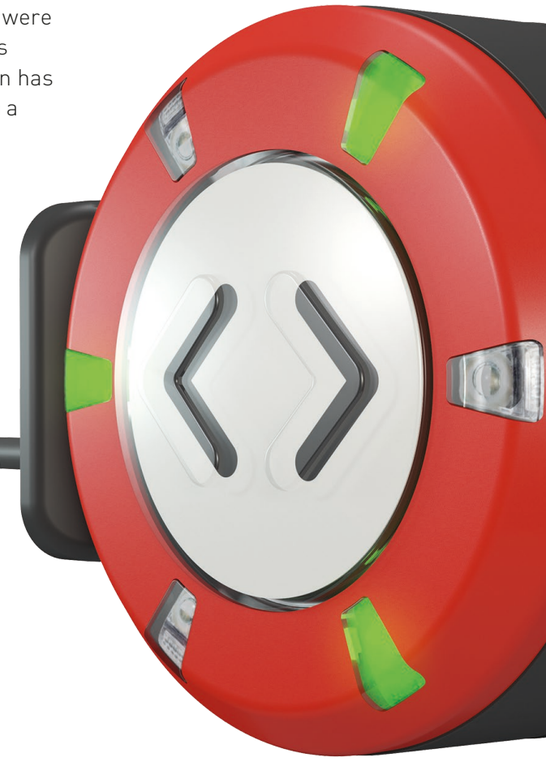
Intuitive operation and clear recognition even for passengers with limited mobility.

In this manufacturing process of the PK5x series, the housing and the touch surface are ultrasonically welded.

PK5x PUSH BUTTONS
CUSTOMIZED SOLUTION

The individual needs of door manufacturers and vehicle operators were also taken into account during development. Therefore, the PK5x is available in different variants. The most frequently selected version has a nominal voltage of 24 VDC with sound (2 to 5 kHz). A version with a nominal voltage of 12 to 24 VDC is available without sound.

Another variant of the PK5x series can realize almost all functions and special requirements regarding light signals and sound signals (nominal voltage 24 to 110 VDC, with sound from 2 to 5 kHz). Thanks to the integrated microprocessor, the functions can be customized and adjusted individually to meet customer requirements.



- Large active touch surface (Ø52 mm) with plane or tactile protection cap
- Invisible fastening elements, enhanced protection against manipulation by unauthorized persons
- Robust plastic bezel
- Double-sided variant for installation in glass doors (photo right)
- Touchless function available

Customized products can be configured using various functions.

PK5x VARIANTS AT A GLANCE
EVERY PUSH BUTTON A HIGHLIGHT

The PK5x push button series offers a great variety.

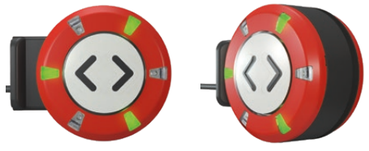
The PK5x series push buttons of TSL are also available for the installation in glass doors of buses and trains. The variant with a spacer ring that adapts to different door profiles is available with double-sided function and single-sided function with a blind cover. The push buttons in the PK5x series can also be used as emergency push buttons, for example in lavatories, by combining them with a triangular plate. The TSL push buttons thus complie with the EN 16683 standard.

More detailed information about touch surfaces and LED variants as well as dimensions can be found on our website.

PK5X CONSTRUCTION TYPE 1

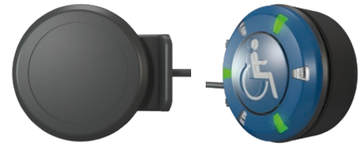
- Function one-sided
- Application area: wall panel or door profil
- Screws covered by plastic front bezel
- Front bezel with text printing and/or Braille

PK5X CONSTRUCTION TYPE 2



- Function double-sided
- Application area: glass door
- Mounting from front side in the back side cover housing
- The following angles are available for adapting the housing to the door profile slope: 0°/6°/10°/15°/25°

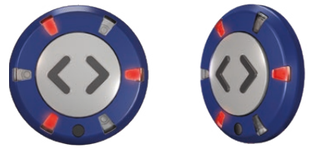
PK5X CONSTRUCTION TYPE 3



- Function one-sided
- Application area: glass door
- Mounting of push button in the back side cover housing
- The following angles are available for adapting the housing to the door profile slope: 0°/6°/10°/15°/25°

PKT55 WITH TOUCHLESS FUNCTION

M-SAFE



- Function one or double-sided
- Application area: wall panel or door profil
- Screws covered by plastic front bezel
- Hybrid using: tactile actuation and M-Safe touchless activation

SPECIAL CONSTRUCTION TYPE (CFAD)

- Function one-sided
- Application area: lavatories, car PRM area
- Mounting from back side with cover housing/or installation from front side
- TSI-PRM and EN 16683: CFAD = call for aid device

NEW

PK55 TECHNOLOGY OF THE FUTURE, DESIGN OF THE PRESENT

With the latest edition of the PK5x series, TSL-ESCHA and MAFELEC are focusing on proven quality and advanced functionality. The PK55 embed tactile activation which ensures reliable and haptic feedback to comply with PRM requirements. But in addition, the new version offers M-Safe touchless activation option, which provides hygienic benefits.

Another highlight is the integrated 8 mm plug connection on the back of the push button for 24 VDC applications. This connector provides a high level of reliability for a simple 3 to 5-pole connection and reduces the number of connections in the door profile. This simplifies installation and reduces maintenance and repair work.

The expansion of the proven PK5x door opening push button series offers a high level of convenience, safety and efficiency to meet the needs of passengers.

The new PKT55 Touchless push button enables touchless operation through the integrated sensor protected behind the black lens.

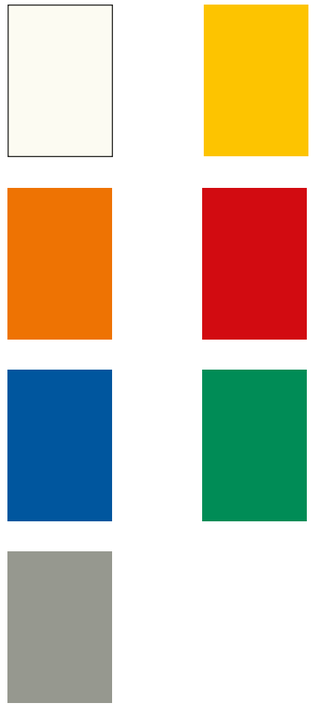
Many bright colors - here is an overview of the color selection for front bezels.

INDIVIDUAL
COLOR AND PICTOGRAM SELECTION

The colors of the bezels and the pictograms can be matched to your vehicle design. If the desired color or a motif of the pictogram is not available in our large selection, individual custom-made products are also possible from a certain quantity.

BEZEL

The bezel is available in stainless steel or plastic. Here is a selection of different colors. Braille and printing are also possible.



PICTOGRAMS

TSL-ESCHA offers over 140 pictograms for the PK5x. Here we show only a small selection. A complete overview is available on our website.

SEE AND HEAR
INDIVIDUAL PUSH BUTTON FUNCTIONS

The functions of the push buttons from the PK5x series can be individually parameterized according to customer requirements. This is a combination of freely definable light signals, sound signals and additional control functions.

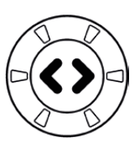
The push buttons have an integrated microprocessor in which the desired light and sound signals and the individual control functions are stored.

LIGHT SIGNALS

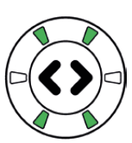
The push buttons from the PK5x series have a variety of individual light signals. With the light image combination L1 (release for actuation) and L2 (confirmation of activity), the light change complies with the requirements of EN 14752. The red LEDs can be replaced by yellow ones.

TSL also offers the additional function with a timer setting for the light signals, the so-called sand-glass effect. When the door is released, the green LEDs light up. However, as soon as the push button is pressed, all red LEDs light up, which then turn off one after the other in a defined cycle. This happens while the gap bridging extends from the door to the platform and the door remains closed. Thus bridging the time between pushing the button and the opening of the door.

L0



L1
Four green LEDs



L2
Six green LEDs

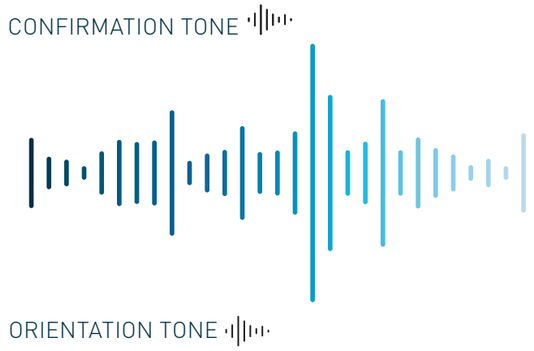
L3
Three green LEDs

L4
Two red LEDs

L5
Four red LEDs

L6
Six red LEDs

L7
Three red LEDs



TONE SIGNALS

Different acoustic variants can be selected for the push buttons in the PK5x series for the actuated and non-actuated state. Customers can also specify sound frequencies.

Tone signal A	Frequency	Duration	Interval	Functional duration	Description
A0	–	–	–	–	without tone
A1	3,5 kHz	0,5 Sec.	0,5 Sec.	0,5 Sec.	Confirmation tone
A2	3,8 kHz	0,05 Sec.	2 Sec.	∞	Orientation tone
AX	individual	individual	individual	–	–

PK5x series meets the common standards for rail vehicles (EN 14752, EN 50155, EN 45545-2 and EN 61373) as well as the TSI-PRM.

THE DETAILS
TECHNICAL DATA

SWITCHING PRINCIPLE

- 3-point contact thanks to three micro buttons
- Tactile switching and tactile surfaces
- Operating force complies with TSI-PRM and EN 14752

SIGNALING

- 6 LED displays
- LED displays can be controlled in groups
- Luminous colors: red, green
- Orientation, confirmation or warning tones (individually parameterized)
- Orientation tone and confirmation tone as continuous or intermittent tones max. 53 dB(A)

ELECTRICAL DATA

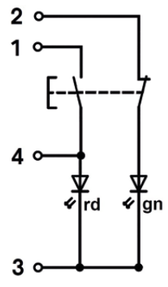
• Nominal voltage	12 ... 110 VDC, depending on the version
• Nominal current	50 mA @ 24 VDC, 110 mA @ 24 VDC with sound
• Switching current	Max. 200 mA, depending on the version
• Switching function	Normally open (NO), PNP or NPN, potential-free variant available

ENVIRONMENTAL CONDITIONS

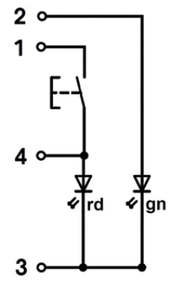
• Switching cycles	> 7 Mio.
• Operating temperature	-40 ... +80 °C
• Degree of protection	IP67

Further technical details on the probe assembly can be found in our checklist at www.tsl-escha.com.

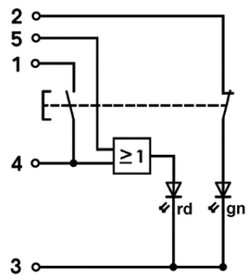
CIRCUIT DIAGRAMS OF THE BASIC FUNCTIONS



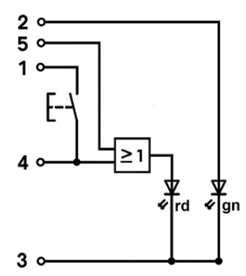
4 pole green off



4 pole



5 pole green off



5 pole

TSL-ESCHA and MAFELEC offer customers a wide range of different push buttons.

MAFELEC TEAM
LARGE VARIETY OF PUSH BUTTONS

The numerous possible combinations within the push button series result in an almost infinite variety of solutions for TSL-ESCHA and MAFELEC customers. Push buttons of the MAFELEC TEAM can be found everywhere on buses, trams, metros or trains. Whether on the exterior, interior or in the lavatories.

- Intuitive operation and clear recognition, even for passengers with restrictions thanks to touch surfaces and acoustic signals
- Designed for railway applications for public transport and accordingly conceived for harsh environments
- Developed to meet the market requirements of transport companies and the expectations of their passengers

TSL-ESCHA AND MAFELEC
OVERVIEW PUSH BUTTON SERIES

PK5x

- Large visible plane or tactile touch surface (Ø52 mm); tactile switching feel, with touchless option
- Invisible fastening elements, enhanced protection against manipulation by unauthorized persons
- Solid stainless steel or plastic bezel
- Versatile and individual parameter setting
- One- and double-sided function, suitable for glass doors (4-13 mm glass thickness)

PK2x

- Possibility of different switching functions, touch surfaces,mounting rings, LED colors and pictograms
- Eight construction types
- Hermetically sealed due to one-piece housing design
- Space-saving installation
- One- and double-sided function

CK7x

- Particularly flat design
- Seven construction types allow versatile use
- Robust stainless steel front panel
- One- and double-sided functions
- Optional: CK Touchless with contactless and tactile activation

MP

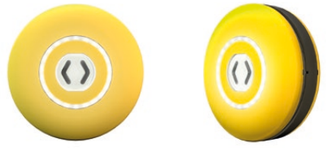
- Sealed one-piece push button
- Smallest push button series of TSL-ESCHA
- Switches wear-free and withstanding extreme conditions
- Selection of different colors for the inside ring and LED
- Often used in high speed trains

M-DOOR GM

PATENTED PRODUCT

- No glass drilling, 3 to 20 mm glass thickness compatible
- Single or double-sided mounting
- No pairing, inside/outside buttons auto-synchronization
- Each LED area individually configurable
- M-Safe Touchless activation option

M-DOOR DOUBLE



- Large illuminated area
- Single or double sided push buttons
- Easy and fast tool-free mounting
- Automatic glass thickness adaptation from 4 to 6 mm
- Large customization, plastic or metal bezel and actuators, several schematics

M-DOOR SINGLE

- Large illuminated area
- Haptic feedback
- Standard panel front or rear mounting
- Large customization, plastic or metal bezel and actuators, several schematics
- Orientation or confirmation tone

M-DOOR SLIM

- Slim ovale shape housing
- Wall or pole mounting Ø30 mm to Ø35 mm with 2 vandalproof screws
- Vertical or horizontal orientation
- Large customization, bezel color, plastic or metal actuator, several schematics
- Orientation and confirmation tone

MAFELEC TEAM

CREATING **TOGETHER** SMART AND
SUSTAINABLE INTERFACES

1000196 . 05_06-2024-EN . Printed in Germany

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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