



M-DOOR

Open the world



MAFELEC

Creating control and signalling solutions for harsh environments

M-DOOR range

Specialist in control and signalling equipment for harsh environments, MAFELEC has the know-how to develop electronic and electro-mechanical solutions for the Railway industry and commercial vehicles.

In the last 10 years, MAFELEC has been designing and creating innovative equipment for driver cabs, door controls, tail lights, displays, emergency stops and switches, etc.

The M-DOOR range comprises aesthetic, ergonomic, robust and adaptable products.

Designed to comply with railway and commercial vehicle standards, the new M-DOOR range of control and signalling devices developed by MAFELEC, can be used in many applications and markets. Product types are distinguished between **Front mount, Rear mount, Pole mount, Slim type, Double type** while a wide choice of actuation lenses and front bezels, both plastic and/or metal can be supplied.

Innovative solutions of the M-DOOR range :

- **ACTUATOR AREA : 40 mm**
- **BACKLIT SINGLE OR DUAL COLOR LEDS**
- **TACTILE FEEDBACK**
- **BRILLE OR RAISED PICTOGRAMS**
- **RAILWAY STANDARDS**
- **PATENDEED SOLUTIONS**
- **FAST MOUNTING (Double sided type)**

Characteristics *	Buttons (Single & Double sided)	Indicators (Single & Double sided)	Buzzer
Anti-vandal design	⊙	⊙	⊙
Modularity for button & front ring	⊙	⊙	⊙
Operating temperature : - 40°C / +85°C (depending on the cable)	⊙	⊙	⊙
Protection : IP65/67 - IK07	⊙	⊙	⊙
Customisation : Mafelec know-how expertise	⊙	⊙	⊙
Inscription in Braille possible on metal version	⊙	⊙	⊙
Actuator area : Ø 40mm	⊙	⊙	
Ring and center area backlit (low consumption-LED)	⊙	⊙	
Fire / Smoke : NFF 16 101 / 102	⊙	⊙	⊙
Conception : EN 14752 & 2008/164/CE (TSI PRM) & 2001/85/CE & RVAR	⊙	⊙	⊙
Cable : EN 50306-4	⊙	⊙	⊙
Reinforced EMC : EN 50155	⊙	⊙	⊙
High service life	⊙	⊙	⊙
Tactile effect	⊙		
Mounting from front side or from rear side	⊙	⊙	⊙
Pole mount for Slim version with adapter	⊙		
Choice of pictograms	⊙	⊙	
High luminosity : 8 LEDs (on request)	⊙	⊙	

* Depending on the version

Characteristics Table

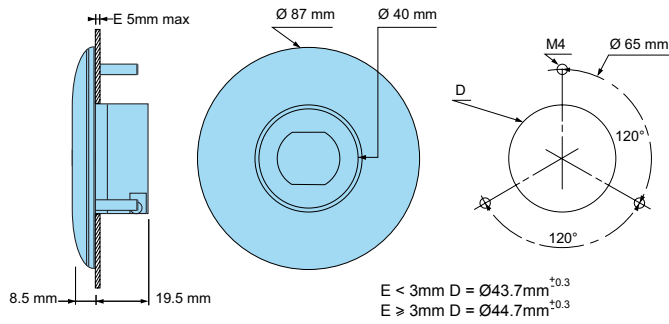
Portfolio products (button only)

Tests	Standards	Description
Functional	EN 14752 EN 50155 NF F 31-054	$F < 15N$ $\varnothing 40 \text{ mm}$ $U_n +25\% -30\%$
Insulation resistance	EN 14752 EN 50155	$500V_{DC} / 60s$ $R > 100M\Omega$
Dielectric strength	EN 14752 EN 50155	$24V : 500V_{AC} / 60s$ $110V : 1000V_{AC} / 60s$ Supply between earth & all the pins $R > 100M\Omega$
Electrical fast transient / burst immunity	EN 14752 EN 50155 CEI / EN 61000	Level 3 : 2kV, 5kHz
Electrostatic discharge immunity	EN 14752 EN 50155 EN 50121 CEI / EN 61000	Discharge to contact = 6kV, 2Hz, 5s Discharge in the air = 8kV, 2Hz, 5s
Surge immunity	EN 14752 EN 50155 EN 50121 CEI / EN 61000	1.8kV, Tr/TH = 1.2 / 50 μs
Susceptibility to the radioelectric disturbances	EN 14752 EN 50155 EN 50121 CEI / EN 61000	3Vrms, AM @ 1kHz 80% from 150 kHz to 80MHz
Susceptibility to the radioelectric interferences	EN 14752 EN 50155 EN 50121 CEI / EN 61000	20V/m, AM @ 1kHz 80% from 80 kHz to 1GHz
Mechanical impact (hammer test)	CEI / EN 62262 CEI / EN 60068	IK07
Durability	CEI / EN 60947	Durability under nominal supply voltage 5 pushing points > 3M
Extreme cold	EN 50155 CEI / EN 60068	16h at -40°C
Dry Heat	EN 50155 CEI / EN 60068	16h at +85°C
Cyclic damp heat	EN 50155 CEI / EN 60068	48h cycles (+55°C/90%) / (+25°C/95%)
Cold/Heat-Cyclic damp heat-Durability Cumulative tests	CEI / EN 60068 CEI / EN 60068 CEI / EN 60947	-40°C - 10h / +85°C - 10h / 10 cycles +55°C - 90% - 9h / +25°C - 95% - 9h / 6 cycles > 3M
Salt mist	EN 50155 CEI / EN 60068	ST4 : 96h / +35°C / 5%NaCl
Random vibrations (Railway standard)	EN 50155 CEI / EN 61373	5h per axis, 3 axis 7.90m/s ²
Shocks (Classic and Railway standard)	EN 50155 CEI / EN 61373 CEI / EN 60068	50m/s ² , 30ms, 3 axis Semi-sinusoidale wave
Protection	EN 50155 CEI / EN 60529	IP65 / IP67
Fire / Smoke	NF F 16-101/102	Ex. 2

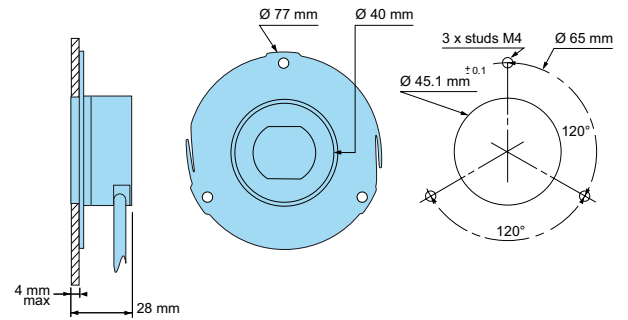


Dimensions

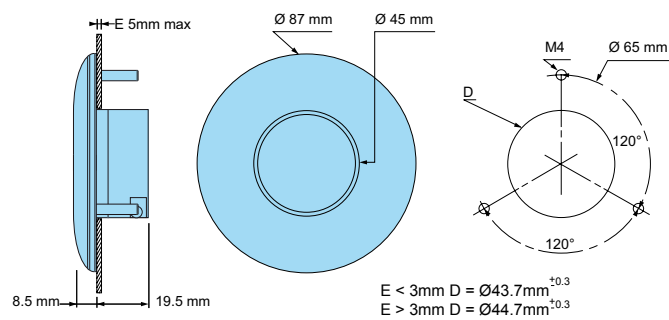
Button, Plastic actuator : Front mounting



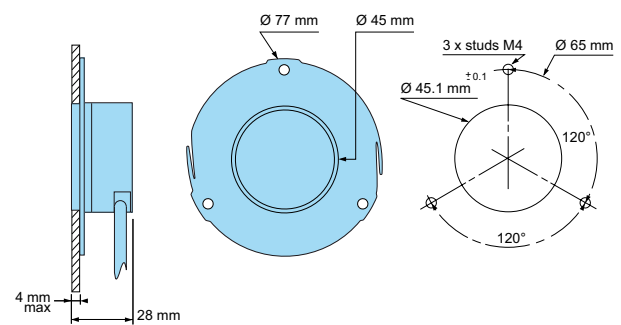
Button, Plastic actuator : Rear mounting



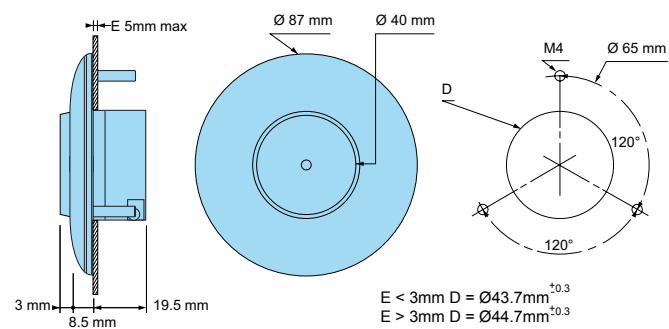
Indicator : Front mounting



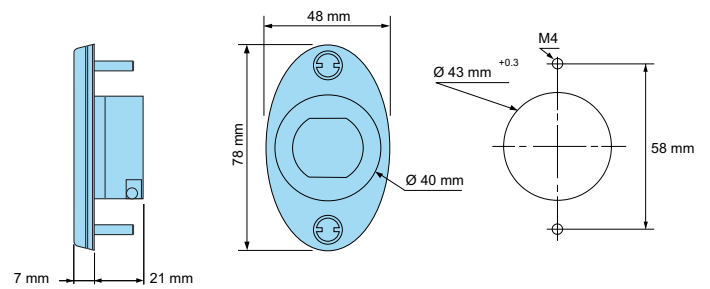
Indicator : Rear mounting



Button, Metal actuator

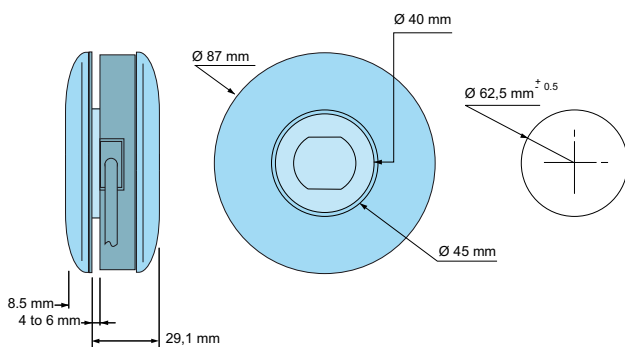


Slim type button



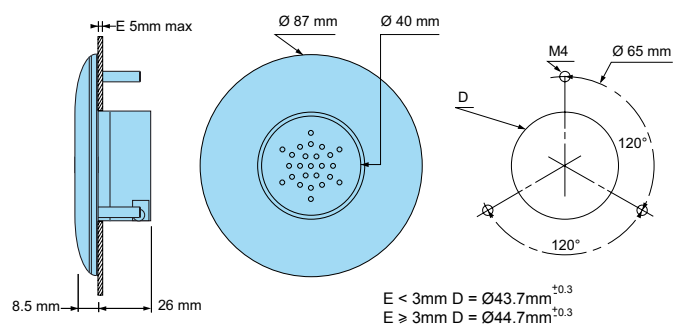
Button or Indicator, Double sided

- Easy & Fast (tool less) mounting
- Automatic thickness adaptation



Buzzer

- TSI PMR compliant
- 8 tones / 4 wires
- Approx. 70 dB at 1.5 m



Pictograms

Plastic actuators



Metal actuators
with or without LED insert in the center
raised or flush version



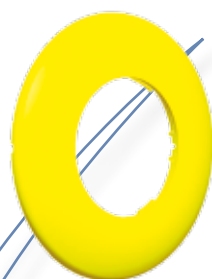
Indicator
with or without text or symbols



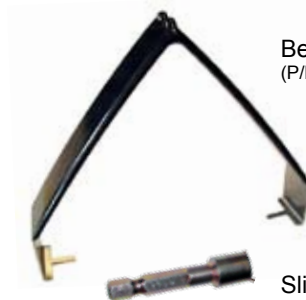
Other versions on request

Front Bezel

- Plastic / Metal
- Round
- External Ø 87 mm
- Internal Ø 45 mm
- Thickness : 8.25 mm

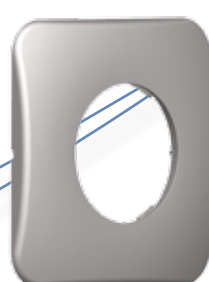


- Metal with raised symbol or Braille
- Round
- External Ø 87 mm
- Internal Ø 45 mm
- Thickness : 8.25 mm



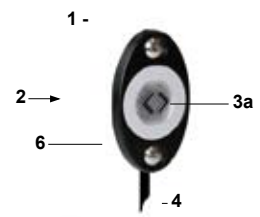
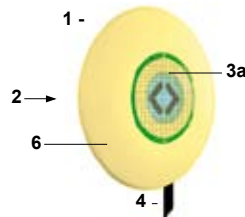
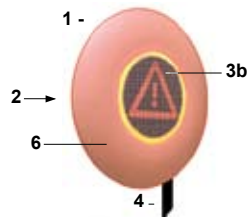
Bezel disassembly tool
(P/N: TPN0236A1)

Slim bezel disassembly tool
(P/N: OEZ497A1)



- Metal
- Square
- External Ø 87 mm
- Internal 45 mm
- Thickness : 8.25 mm

Definition chart



1 - M-Door product

☐ Indicator

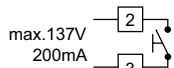
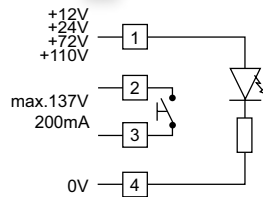
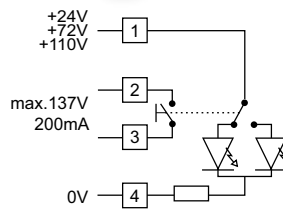
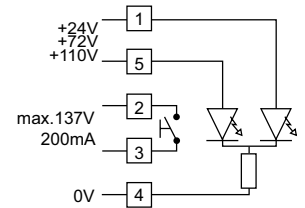
☐ Single sided button

☐ Slim button
(only for indoor application)

2 - Electronical layout

Voltage : ☐ 12 V (layout n°1 or 2) ☐ 24 V ☐ 72 V ☐ 110 V ☐ Other

Electrical layout number : Only for button

☐ N°1

☐ N°2

☐ N°3

☐ N°4


LED color (button : 2 colors max; Indicator : 1 color) : ☐ Green ☐ Red ☐ Blue (layout n°2 in 12 & 24V) ☐ None ☐ Other

Luminosity (only for button) : ☐ Standard ☐ High

3a - Actuator (only for button P/N)

Material : ☐ Plastic flush

☐ Flush symbol

☐ Raised symbol

or ☐ Metal

☐ Flush actuator

☐ With lit hole

☐ Flush symbol

☐ Raised actuator

☐ Without lit hole

☐ Raised symbol

Color : ☐ Green ☐ Red ☐ Dark blue ☐ Yellow ☐ Grey light

Symbol : ☐ No symbol


☐ WC

☐ Other symbol

3b - Indicator

Symbol : ☐ No symbol


☐ Other symbol

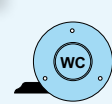
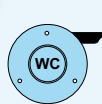
4 - Cable position

Standard lenght = 170 mm
Connector on request

☐ 1 = 0°

☐ 2 = 90°

☐ 3 = 180°

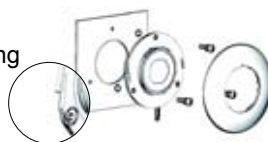
☐ 4 = 270°


5 - Mounting

Single sided button or Indicator : ☐ Front mounting

☐ Rear mounting

Slim button : Front mounting



6 - Bezel

Shape : ☐ Plastic round

☐ Metal round

☐ Metal square

Color indicator & single sided button :

☐ Green

☐ Red

☐ Dark blue

☐ Light blue

☐ Yellow

☐ Light grey

☐ Dark grey

☐ Orange

☐ Decorative chrome
(only for metal version)

Color Slim button :

☐ Green

☐ Red

☐ Orange

☐ Yellow

☐ Black

Other versions on request (Buzzer, Double sided button, Double sided indicator, Panel mount button, Braille, ...)