

# Series 09

*Rugged. Modular. Reliable.*

<https://eao.com/09>



# 09 Information about the Series

## Rugged Keypads

### Advantages

- Individual 4-segment and RGB halo ring illumination
- Designed for functional safety: ISO 26262 & ISO 13849
- Intelligent HMIs with CAN bus integration
- Robust, innovative, ergonomic design sealed up to IP67 protection
- Interchangeable ISO 7000 range of symbols or customised symbols

### Typical application areas

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- Roadmaking vehicles and roller compactors
- Loaders, dozers and excavators
- Cranes, dump trucks and crawler drills
- Fire-fighting and rescue vehicles
- Road sweepers, cleaning vehicles and refuse trucks
- Snow removers and groomers
- Agricultural vehicles and equipment

### HMI Functions

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- Rugged Keypad
- Rugged Rotary Cursor Controller

### Degree of protection

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- IP67 protection (front and rear side)
- IP67 protection (panel/screw-in)
- IP54 protection (panel/clip-in)

### Operating voltage

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- 8-32 VDC

### Standards

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Information on the availability of the fully validated and certified product according to ASIL B ISO 26262 and PL d ISO 13849 with CANopen Safety can be found at:  
[www.eao.com/09-status](http://www.eao.com/09-status)

## Joysticks

### Advantages

- Mechanical and electrical customisation is possible
- Front protection to IP65 or IP67
- Standard joysticks available from stock
- Low back panel depth for hall effect and conductive plastic sensors

### Typical application areas

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- Commercial vehicles
- Special vehicles
- Marine, rail and electric vehicles
- Machinery
- Medical technology
- Numerous other applications

### Functions

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- Joystick
- Koordinatenschalter

### Design

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- Flush
- Raised

### Front protection

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- IP40
- IP65
- IP67

### Operating voltage

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- 5 VDC
- 8 ... 36 VDC
- 30 VDC
- 250 VAC
- 500 VAC

### Terminal

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- Screw terminal
- Soldering terminal
- Minitec plug
- Dubox plug
- Molex micro
- Cable

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# 09 Overview of Modules

## *Rugged Keypads. Optimal for your application.*

### Series 09 variants




The Series 09 Keypads and Rotary Cursor Controllers are available in a range of different variants. They all have the flexibility of interchangeable legends, but come with a choice of different halo illumination features, communication protocols and connector types for example.

This wide choice allows designers to specify only the HMI features they actually need for their vehicle application, therefore minimising hardware costs and optimising the scope of their software development – optimal for your application.

Variants	Symbol backlight	Halo ring illumination	Communication protocol	Switching element	IP protection	Connector	Switching function/s	Functional safety standard
<b>PREMIUM</b> 	White LED	4-segment RGB, freely configurable	CANopen Safety	Electro-mechanical switching element	IP6K7 frontside and rear-side	Deutsch DT04-6P	Pushbutton	Functional safety ISO 26262 ASIL B and ISO 13849 PL d certified*
<b>SUPER</b> 	White LED	4-segment RGB, freely configurable	CANopen, J1939	Electro-mechanical switching element	IP6K7 frontside and rear-side	Deutsch DT04-6P	Pushbutton	Design for functional safety: ISO 26262 ASIL B and ISO 13849 PL d
<b>PLUS</b> 	White LED	Red LED (other colours on request)	CANopen, J1939	Electro-mechanical switching element	IP6K7 frontside and rear-side	Deutsch DT04-6P	Pushbutton	Fulfil ASIL QM (B) according to ISO 26262
<b>BASIC</b> 	White LED	Red LED (other colours on request)	N.A. (hardwired)	Electro-mechanical switching element	IP6K7 frontside	Würth Elektronik WR-MPC3, 16 pins	Pushbutton	Fulfil ASIL QM (B) according to ISO 26262

\* Available at a later date, see: [www.eao.com/09-status](http://www.eao.com/09-status)



Variants	Symbol backlight	Halo ring illumination	Communication protocol	Switching element	IP protection	Connector	Switching function/s	Functional safety standard
<b>PREMIUM</b> 	White LED	4-segment RGB (push-button), freely configurable	CANopen Safety	Electro-mechanical switching element	IP6K7 frontside and rear-side	Deutsch DT04-6P	Pushbuttons: push RCC*: push, rotate, proportional input	Functional safety ISO 26262 ASIL B and ISO 13849 PL d certified*
<b>SUPER</b> 	White LED	4-segment RGB (push-button), freely configurable	CANopen, J1939	Electro-mechanical switching element	IP6K7 frontside and rear-side	Deutsch DT04-6P	Pushbuttons: push RCC*: push, rotate, proportional input	Design for functional safety: ISO 26262 ASIL B and ISO 13849 PL d
<b>PLUS</b> 	White LED	Red LED (push-buttons)	CANopen, J1939	Electro-mechanical switching element	IP6K7 frontside and rear-side	Deutsch DT04-6P	Pushbuttons: push RCC*: push, rotate, proportional input	Switching function with diagnostic capability for ASIL QM (B) acc. to ISO 26262

\* Functional safety certification applies to the switching signal of the two keypad pushbuttons.

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# 09 Overview of Modules

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## Rugged. Modular. Reliable. *New Series 09 Rugged Keypads.*





Designed for E1 applications with functional safety and CAN bus integration.

- Individual 4-segment and RGB halo ring illumination
- Designed for functional safety: ISO 26262 and ISO 13849
- Intelligent HMIs with CAN bus integration
- Robust design sealed up to IP67 protection
- Interchangeable ISO 7000 or customised symbols

## Customer-specific product diversity.

Series 09 In-Cabin Keypads with 6 pushbuttons are available in SUPER, PLUS and BASIC variants. These differ in terms of illumination options and the communication interface. The hard-wired BASIC product variant is available, as an additional option, in a 2-pushbutton version.

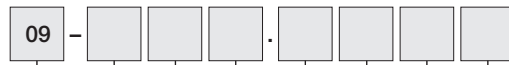
With this wide range of variants, customers can choose between a CAN bus connection or hard-wired version depending on their application, and they can further customise their keypad thanks to a variety of illumination options and interchangeable custom or ISO 7000 symbols – for optimal integration of the HMI in the vehicle interior.

Product	Variant	Symbol illumination	Halo-ring illumination	Communication protocol	IP protection class	Plug	Switching action	Safety
 Keypad 6PB	SUPER	White LED	RGB, freely configurable	CANopen, J1939	IP5K4	TYCO 1745000-3	Pushbutton	Diagnostic switching action for ASIL QM (B) in accordance with ISO 26262
 Keypad 6PB	PLUS	White LED	Red LED (other colours on request)	CANopen, J1939	IP5K4	TYCO 1745000-3	Pushbutton	Diagnostic switching action for ASIL QM (B) in accordance with ISO 26262
 Keypad 6PB	BASIC	White LED	Red LED	n/a (hard-wired)	IP5K4	TYCO 1745000-3/ 1745000-4	Pushbutton	Diagnostic switching action for ASIL QM (B) in accordance with ISO 26262 (with NAMUR)
 Keypad 2PB	BASIC	White LED	Red LED	n/a (hard-wired)	IP5K4	TYCO 1745000-3	Pushbutton	Diagnostic switching action for ASIL QM (B) in accordance with ISO 26262 (with NAMUR)

# 09 Numbering structure

## Part number structure Rugged Keypads Modules

Part No. module (12 digits)



Series number  
09

Module number  
00- IP6K7 Keypad  
10- IP6K7 RCC

Communication protocols  
1- J1939  
2- CANopen  
3- CANopenSafety (Button-Stuck 10 Seconds)  
4- CANopenSafety (Button-Stuck 5 Seconds)  
5- CANopenSafety (Button-Stuck 3 Seconds)  
6- CANopenSafety (Button-Stuck 1 Second)  
7- I/O

Mounting type  
1- Clip-in (1 mm panel)  
2- Clip-in (2 mm panel)  
3- Clip-in (3 mm panel)  
4- Clip-in (4 mm panel)  
5- Screw-in

Halo ring illumination  
1- RGB  
2- LED red

CAN  
1- LoadDump B  
2- LoadDump A  
Hardwired  
3- 12V  
4- 24V  
5- 12V diagnosable switching contact  
6- 24V diagnosable switching contact

Type of module  
1- 6 Pushbuttons  
2- 2 Pushbuttons + RCC  
(rotation + push + proportional Joystick)  
3- 8 Pushbuttons\*

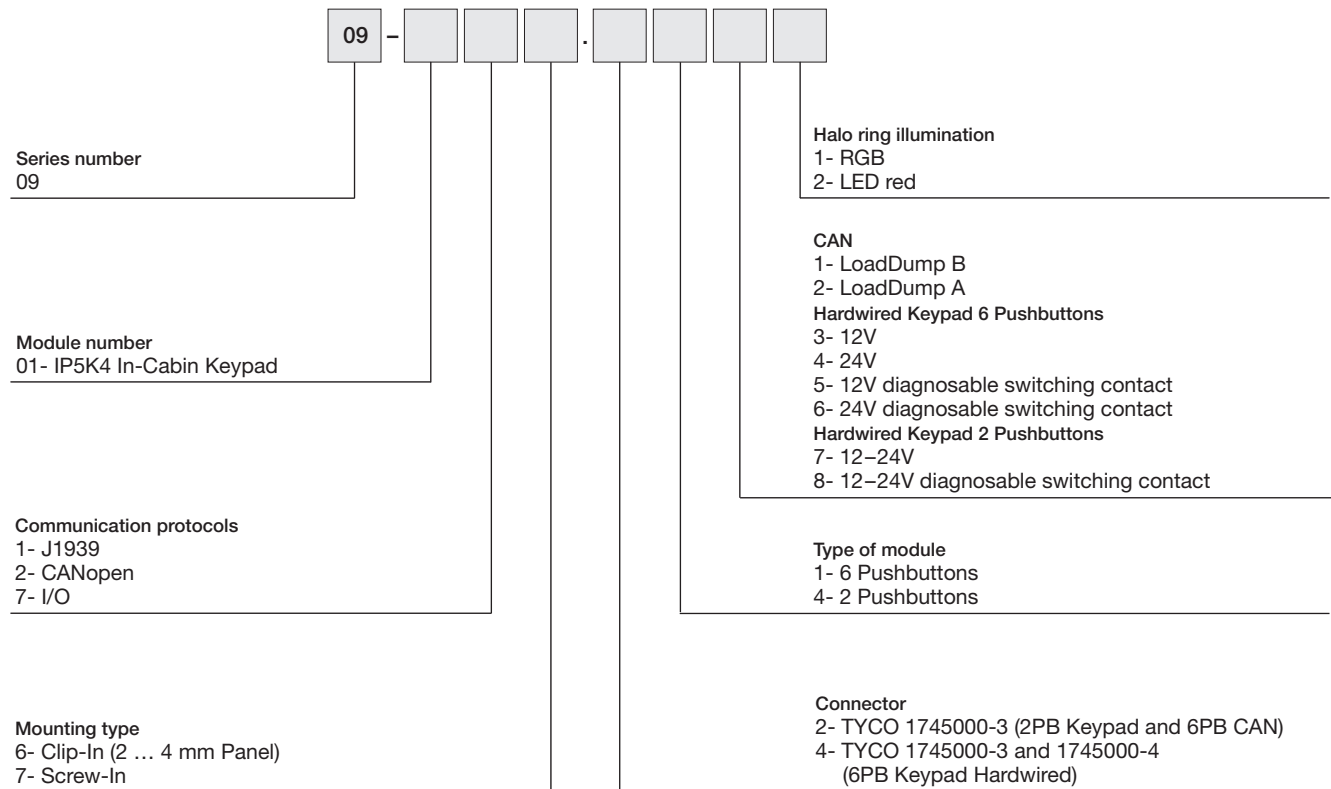
Connector  
1- DT04 - 6P  
3- Würth Elektronik  
WR-MPC3 16 pins  
(for BASIC only)

\* available at a later date



## Part number structure In-Cabin Keypads Modules

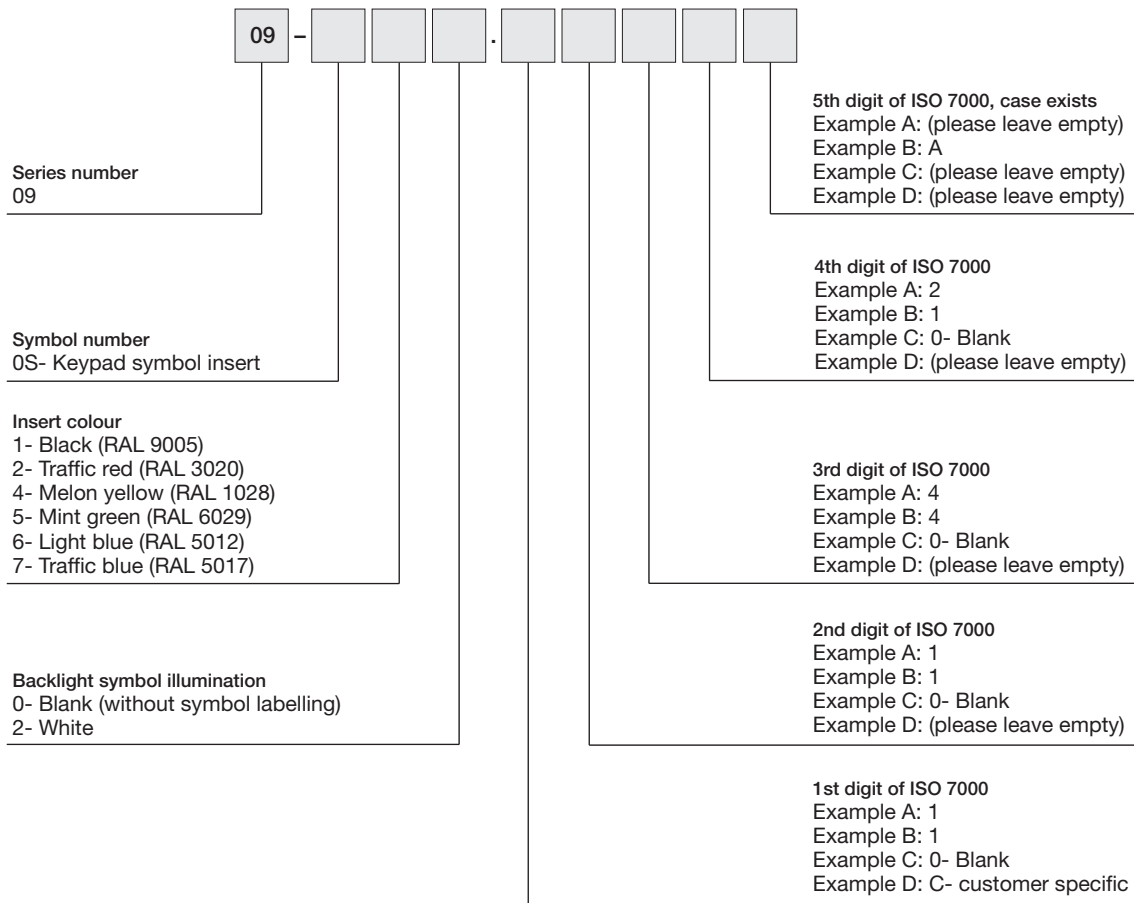
Part No. module (12 digits)



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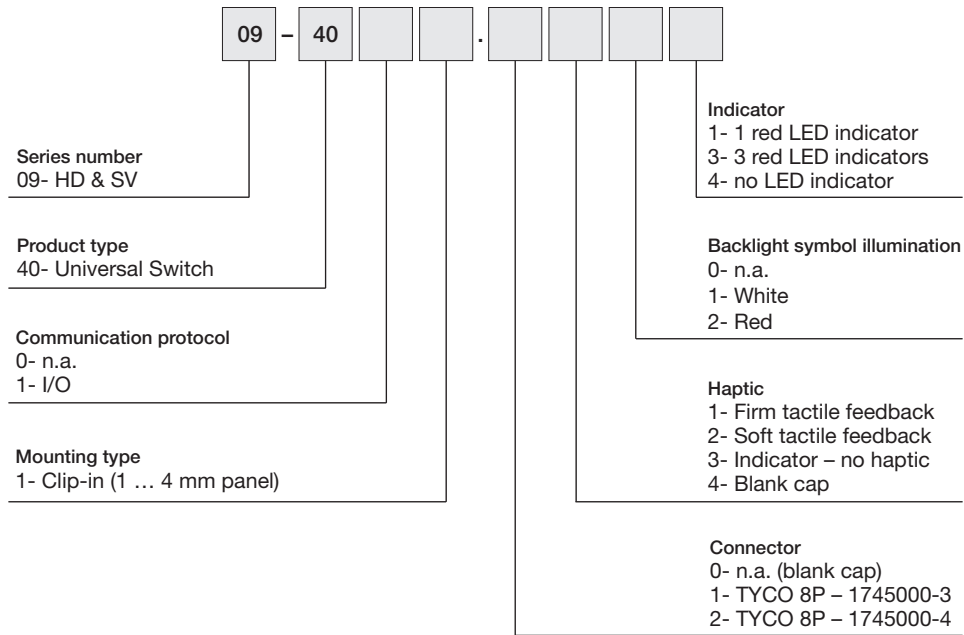
# 09 Numbering structure

## Part No. symbols



## Part number structure Universal Switch

Part No. Universal Switch



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# 09 Numbering structure

Part No. Caps



Series number  
09- HD & SV

5th digit of ISO 7000, case exists  
Example A: (please leave empty)  
Example B: A  
Example C: (please leave empty)  
Example D: (please leave empty)

Symbol number  
4S- Symbol caps

4th digit of ISO 7000  
Example A: 2  
Example B: 1  
Example C: 0- Blank  
Example D: (please leave empty)

Cap colour  
1- Black (RAL 9005)

3rd digit of ISO 7000  
Example A: 4  
Example B: 4  
Example C: 0- Blank  
Example D: (please leave empty)

Backlight symbol illumination  
0- Blank  
1- Red  
2- White

2nd digit of ISO 7000  
Example A: 1  
Example B: 1  
Example C: 0- Blank  
Example D: (please leave empty)

1st digit of ISO 7000  
Example A: 1  
Example B: 1  
Example C: 0- Blank  
Example D: C- customer specific

Symbol direction  
0- Blank  
1- 0 degrees  
2- 90 degrees  
3- 180 degrees  
4- 270 degrees

Indicators  
0- No LED indicator  
1- 1 LED Indicator  
3- 3 LED indicators

## Keypad PREMIUM\*



### Mechanical characteristics

- Actuation force: approx. 6.5 N
- Overload: 250 N
- Mechanical lifetime: 250 000 cycles of operation (under specific conditions of functional safety)
- Impact resistance: IK07

### Electrical characteristics

- Operating voltage range 8–32 VDC

### Illumination

- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  - Colour: white
  - Luminance: max. approx. 20 cd/m<sup>2</sup>, dimmable
- LED halo ring illumination with four freely configurable segments
  - Multi-colour: RGB
  - Luminance: approx. 1 500 cd/m<sup>2</sup>
  - Illumination: steady lighting, flashing, pulses, rotations, colour changes

### Symbols

- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Connections/interfaces

- CAN interface (ISO 11898)
- CANopen Safety\* (EN 50325-5),
- Baud rate 250 kBd and 500 kBd (software configurable)
- Connector Deutsch DT04-6P

### Ambient conditions

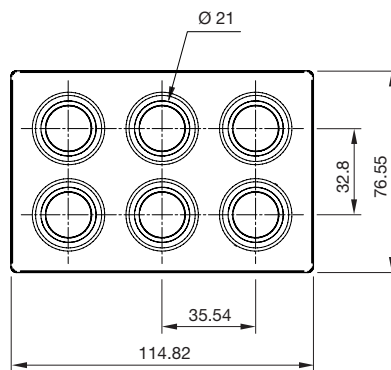
- Operating temperature: –40°C ... +85°C
- Storage temperature: –40°C ... +85°C

### Protection degree

- IP6K7 (front and rear side)
- Up to IP6K7 (panel/screw-in)
- Up to IP5K4 (panel/clip-in)

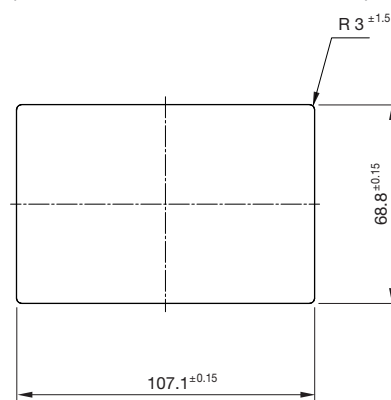
### Dimensions

(All dimensions in mm)



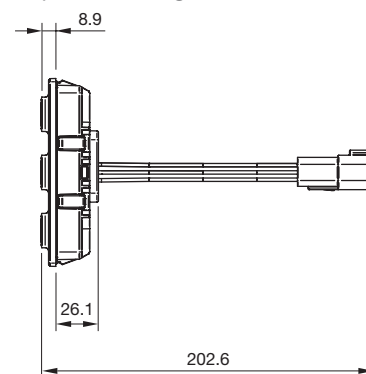
### Mounting cut-out

(Panel thickness 1.0 mm ... 4.0 mm)

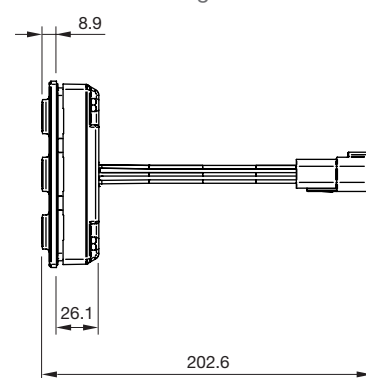


### Mounting

#### Clip-in mounting



#### Screw-in mounting



\* Information on the availability of the fully validated and certified product acc. to ASIL B ISO 26262 and PL d ISO 13849 with CANopen Safety can be found at: [www.eao.com/09-status](http://www.eao.com/09-status)

# 09 Rugged Keypad Modules

## Keypad SUPER



### Mechanical characteristics

- Actuation force: approx. 6.5 N
- Overload: 250 N
- Mechanical lifetime: 250 000 cycles of operation (under specific conditions of functional safety)
- Impact resistance: IK07

### Electrical characteristics

- Operating voltage range: 8–32 VDC

### Illumination

- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  - Colour: white
  - Luminance: max. approx. 20 cd/m<sup>2</sup>, dimmable
- LED halo ring illumination with four freely configurable segments
  - Multi-colour: RGB
  - Luminance: approx. 1 500 cd/m<sup>2</sup>
  - Illumination: steady lighting, flashing, pulses, rotations, colour changes

### Symbols

- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Connections/interfaces

- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939
- Baud rate 250 kBd and 500 kBd (software configurable)
- Connector Deutsch DT04-6P

### Ambient conditions

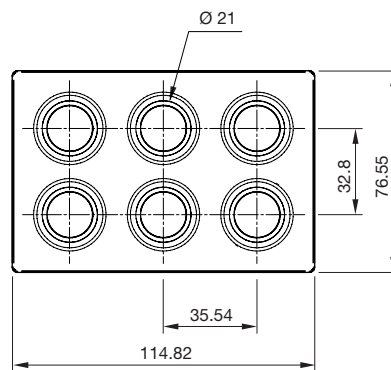
- Operating temperature: –40 °C ... +85 °C
- Storage temperature: –40 °C ... +85 °C

### Protection degree

- IP6K7 (front and rear side)
- Up to IP6K7 (panel/screw-in)
- Up to IP5K4 (panel/clip-in)

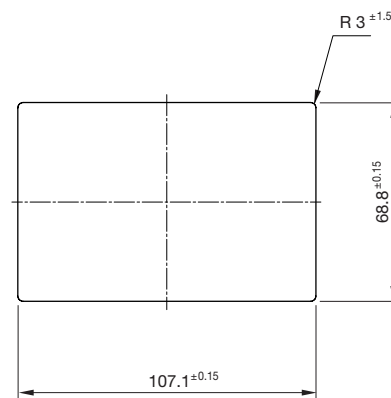
### Dimensions

(All dimensions in mm)



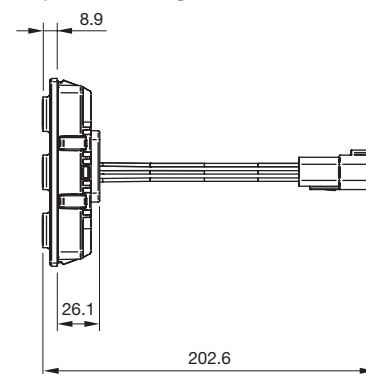
### Mounting cut-out

(Panel thickness 1.0 mm ... 4.0 mm)

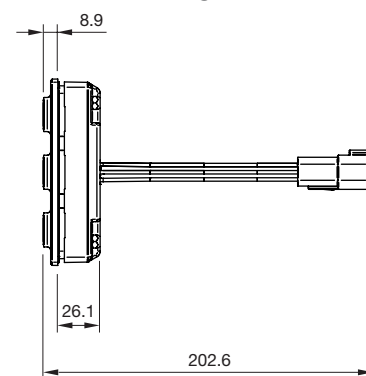


### Mounting

#### Clip-in mounting



#### Screw-in mounting



## Keypad PLUS



### Mechanical characteristics

- Actuation force: approx. 6.5 N
- Overload: 250 N
- Mechanical lifetime: 250 000 cycles of operation (under specific conditions of functional safety)
- Impact resistance: IK07

### Electrical characteristics

- Operating voltage range: 8–32 VDC

### Illumination

- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  - Colour: white
  - Luminance: max. approx. 20 cd/m<sup>2</sup>, dimmable
- LED halo ring illumination
  - Colour: red
  - (other colours on request)
  - Luminance: approx. 1 500 cd/m<sup>2</sup>

### Symbols

- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Connections/interfaces

- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939
- Baud rate 250 kBd and 500 kBd (software configurable)
- Connector Deutsch DT04-6P

### Ambient conditions

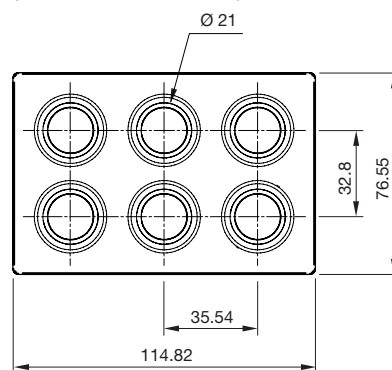
- Operating temperature: –40°C ... +85°C
- Storage temperature: –40°C ... +85°C

### Protection degree

- IP6K7 (front and rear side)
- Up to IP6K7 (panel/screw-in)
- Up to IP5K4 (panel/clip-in)

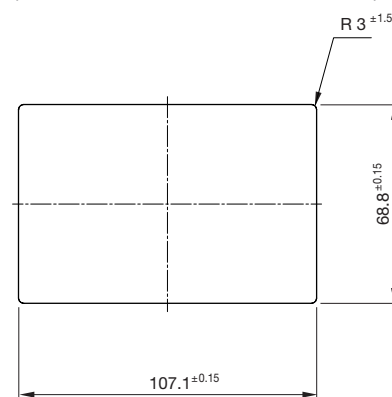
### Dimensions

(All dimensions in mm)



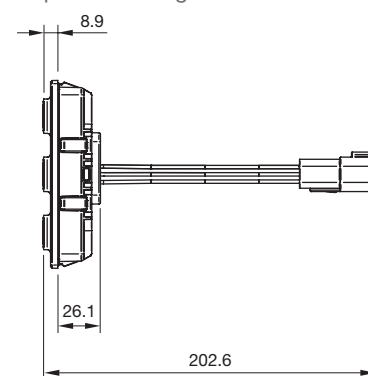
### Mounting cut-out

(Panel thickness 1.0 mm ... 4.0 mm)

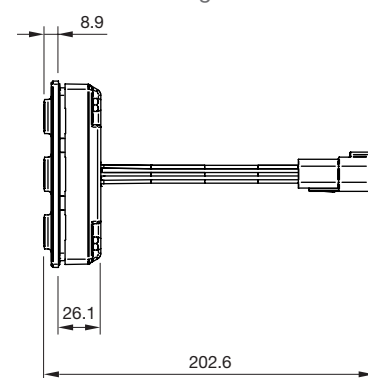


### Mounting

#### Clip-in mounting



#### Screw-in mounting



# 09 Rugged Keypad Modules

## Keypad BASIC



### Mechanical characteristics

- Actuation force: approx. 6.5 N
- Overload: 250 N
- Mechanical lifetime: 250 000 cycles of operation (under specific conditions of functional safety)
- Impact resistance: IK07

### Electrical characteristics

- 8–18VDC or 18–32VDC for operating voltage of the illumination for use in 12V or 24V applications. Optionally available with switch contacts with diagnostic capability

### Illumination

- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  - Colour: white
  - Luminance: max. approx. 20 cd/m<sup>2</sup>, dimmable
- LED halo ring illumination
  - Colour: red (other colours on request)
  - Luminance: approx. 750 cd/m<sup>2</sup>

### Symbols

- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Connections/interfaces

- Connector: Würth Elektronik WR-MPC3, 16 Pins

### Ambient conditions

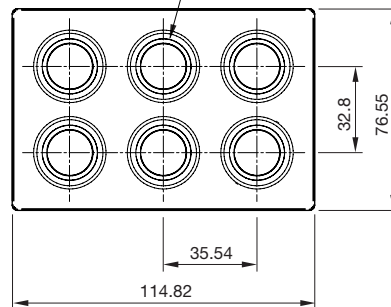
- Operating temperature: –40 °C ... +85 °C
- Storage temperature: –40 °C ... +85 °C

### Protection degree

- IP6K7 (front side)
- IP20 (rear side)
- Up to IP6K7 (panel / screw-in)

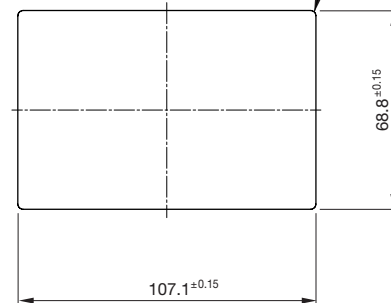
### Dimensions

(All dimensions in mm)



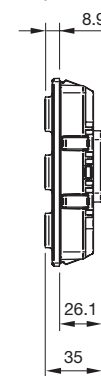
### Mounting cut-out

(Panel thickness 1.0 mm ... 4.0 mm)



### Mounting

Clip-in mounting



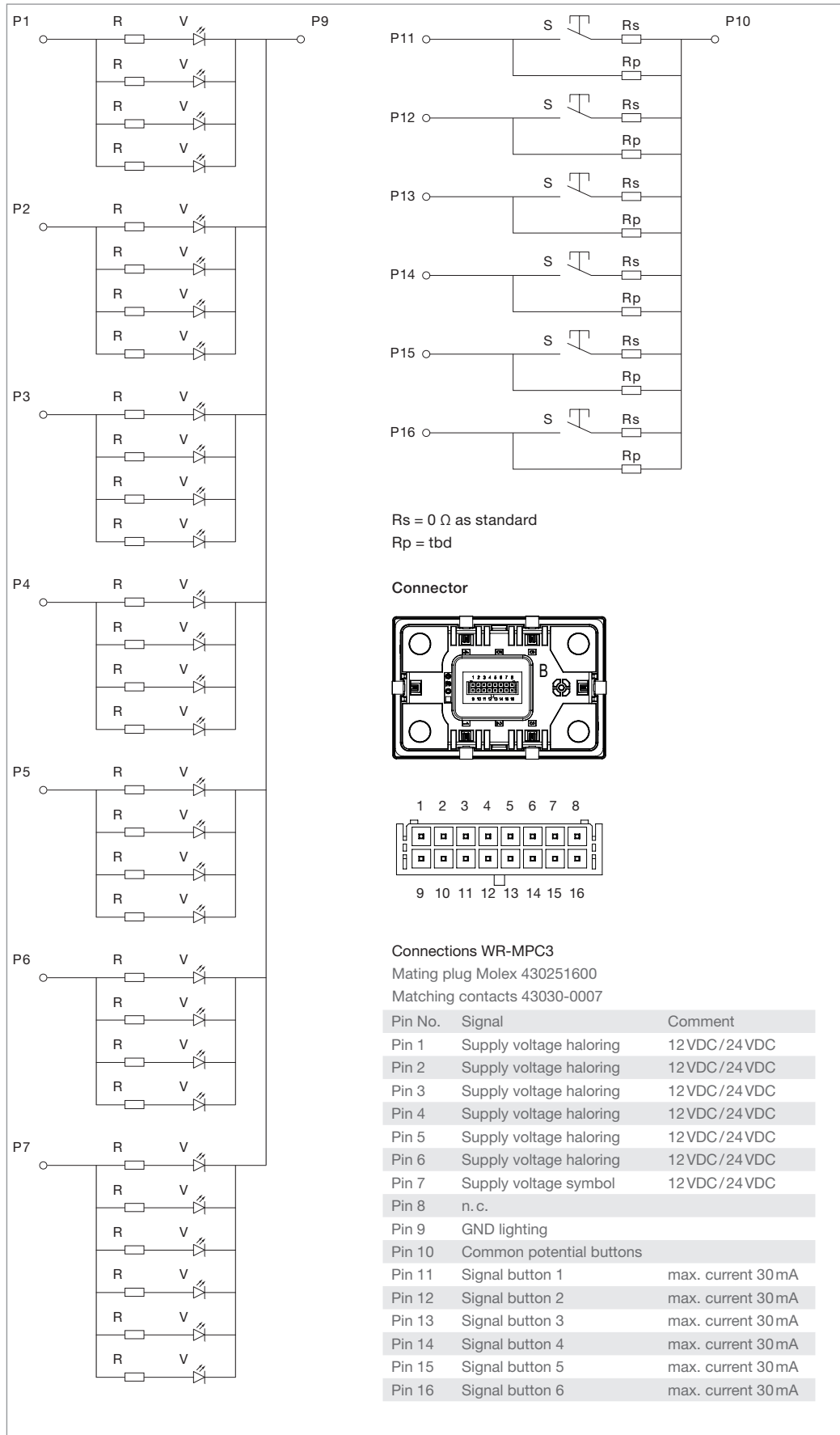
Screw-in mounting





## Wiring diagram, connector

### Wiring diagram



# 09 Rugged Keypad Modules

## Rotary Cursor Controller PREMIUM\*



### Rotary Cursor Controller Functions

- Joystick functions
  - With proportional input
  - Digital input can be configured via CAN interface
- Rotary function
  - 20 maintained positions
  - Continuous rotation with no stop position
- Push function
  - Momentary action with click-dome

### Mechanical characteristics

- Overload: 250N
- Actuation forces:
  - approx. 6.5 N pushbuttons
  - Turning the rotary cursor controller approx. 3 N
  - Pressing the rotary cursor controller approx. 11 N
- Mechanical lifetime:
  - 250 000 cycles of operation (under specific conditions of functional safety)
  - Joystick Rotary Cursor Controller: up to 3 million rotation cycles (60 million detents)
  - up to 1 million actuations (press)
  - Rotation function: Haptic with precise detent
  - Joystick function: operating angle ~ 5°

### Electrical characteristics

- Operating voltage range: 8–32VDC

### Illumination

- Halo ring and symbol illumination can be configured independently of each other
- LED symbol illumination
  - Color: white
  - Luminance: max. approx. 20cd/m<sup>2</sup> (dimnable)
- LED halo ring illumination with four freely configurable segments
  - Multi-color: RGB
  - Luminance: approx. 1500cd/m<sup>2</sup> (pushbutton)
- Illumination: steady lighting, flashing, pulses, rotations, colour changes

### Symbols (on pushbuttons, RCC without symbol)

- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Connectivity

- CAN interface (ISO 11898)
- CANopen Safety\* (EN 50325-5),
- Baud rate 250 kBd and 500 kBd (software configurable)
- Connector Deutsch DT04-6P

### Ambient conditions

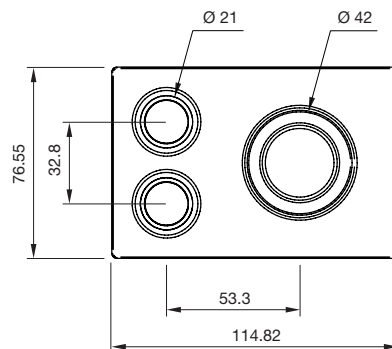
- Operating temperature
  - 40°C ... +85°C
- Storage temperature
  - 40°C ... +85°C

### Protection degree

- IP6K7 (front and rear side)
- Up to IP6K7 (panel/screw-in)
- Up to IP5K4 (panel/clip-in)

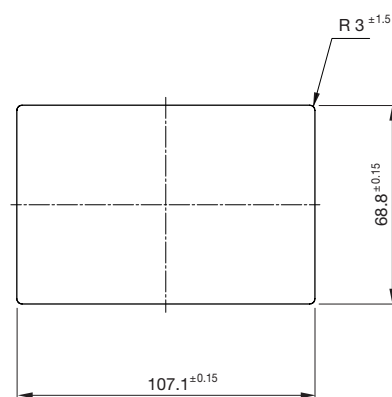
### Abmessungen

(Alle Abmessungen in mm)



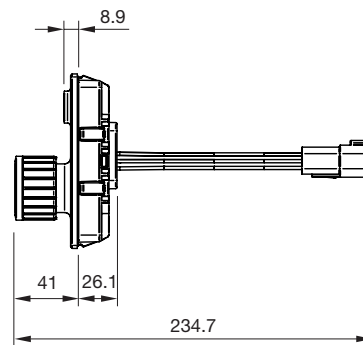
### Einbauöffnungen

(Paneldicke 1,0 mm ... 4,0 mm)

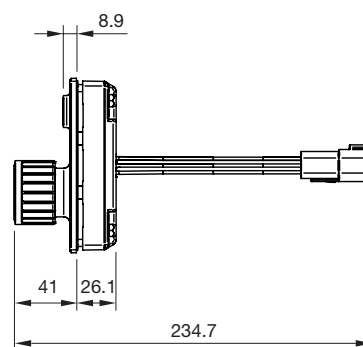


### Montage

Einrastbefestigung



Schraubbefestigung



## Rotary Cursor Controller SUPER



### Rotary Cursor Controller Functions

- Joystick function
  - With proportional input
  - Digital input can be configured via CAN interface
- Rotary function
  - 20 maintained positions
  - Continuous rotation with no stop position
- Push function
  - Momentary action with click-dome

### Mechanical characteristics

- Overload: 250N
- Actuation forces:
  - approx. 6.5N pushbuttons
  - Turning the rotary cursor controller approx. 3N
  - Pressing the rotary cursor controller approx. 11N
- Mechanical lifetime:
  - Pushbutton: up to 7 million cycles of operation (under ideal conditions)
  - Joystick Rotary Cursor Controller: up to 3 million rotation cycles (60 million detents)
  - up to 1 million actuations (press)
  - Rotation function: Haptic with precise detent
  - Joystick function: operating angle ~ 5°

### Electrical characteristics

- Operating voltage range: 8–32VDC

### Illumination

- Halo ring and symbol illumination can be configured independently of each other
- LED symbol illumination
  - Color: white
  - Luminance: max. approx. 20cd/m<sup>2</sup> (dimnable)
- LED halo ring illumination with four freely configurable segments
  - Multi-color: RGB
  - Luminance: approx. 1500cd/m<sup>2</sup> (pushbutton)
- Illumination: steady lighting, flashing, pulses, rotations, colour changes

### Symbols (on pushbuttons, RCC without symbol)

- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Connectivity

- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939
- Baud rate 250kBd and 500kBd (software configurable)
- Connector Deutsch DT04-6P

### Ambient conditions

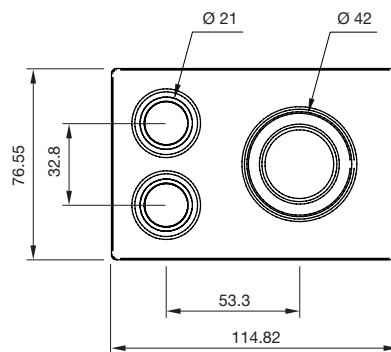
- Operating temperature: -40°C ... +85°C
- Storage temperature: -40°C ... +85°C

### Protection degree

- IP6K7 (front and rear side)
- Up to IP6K7 (panel/screw-in)
- Up to IP5K4 (panel/clip-in)

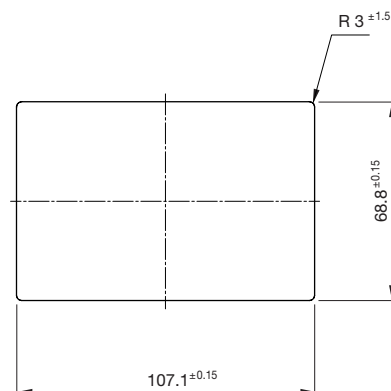
### Dimensions

(All dimensions in mm)



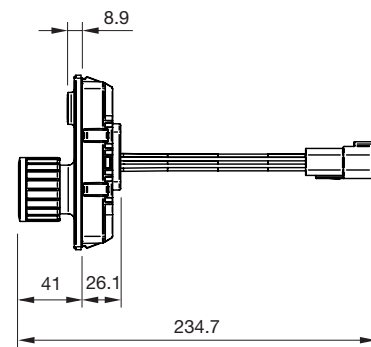
### Mounting cut-out

(Panel thickness 1.0 mm ... 4.0 mm)

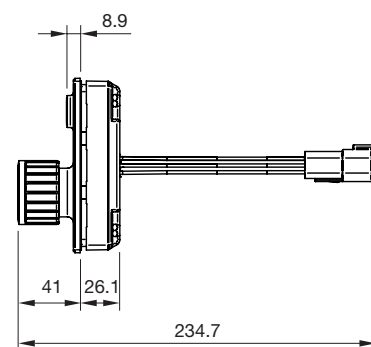


### Mounting

Clip-in mounting



Screw-in mounting



# 09 Rugged Keypad Modules

## Rotary Cursor Controller PLUS



### Rotary Cursor Controller Functions

- Joystick function
  - With proportional input
  - Digital input can be configured via CAN interface
- Rotary function
  - 20 maintained positions
  - Continuous rotation with no stop position
- Push function
  - Momentary action with click-dome

### Mechanical characteristics

- Overload: 250N
- Actuation forces:
  - approx. 6.5N pushbuttons
  - Turning the rotary cursor controller approx. 3N
  - Pressing the rotary cursor controller approx. 11N
- Mechanical lifetime:
  - Pushbutton: up to 7 million cycles of operation (under ideal conditions)
  - Joystick Rotary Cursor Controller: up to 3 million rotation cycles (60 million detents)
  - up to 1 million actuations (press)
  - Rotation function: Haptic with precise detent
  - Joystick function: operating angle  $\sim 5^\circ$

### Electrical characteristics

- Operating voltage range: 8–32VDC

### Illumination

- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  - Colour: white
  - Luminance: max. approx. 20cd/m<sup>2</sup>, dimmable
- LED halo ring illumination
  - Colour: red (other colours on request)
  - Luminance: approx. 1500cd/m<sup>2</sup>

### Symbols (on pushbuttons, RCC without symbol)

- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Connectivity

- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939
- Baud rate 250 kBd and 500 kBd (software configurable)
- Connector Deutsch DT04-6P

### Ambient conditions

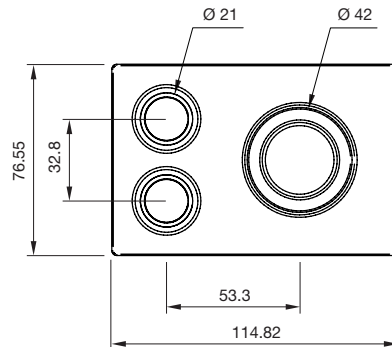
- Operating temperature:  $-40^\circ\text{C} \dots +85^\circ\text{C}$
- Storage temperature:  $-40^\circ\text{C} \dots +85^\circ\text{C}$

### Protection degree

- IP6K7 (front and rear side)
- Up to IP6K7 (panel/screw-in)
- Up to IP5K4 (panel/clip-in)

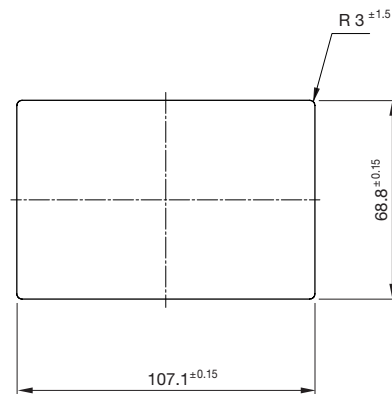
### Dimensions

(All dimensions in mm)



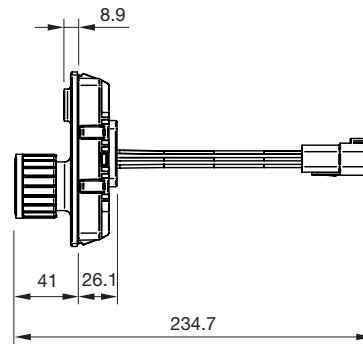
### Mounting cut-out

(Panel thickness 1.0 mm ... 4.0 mm)

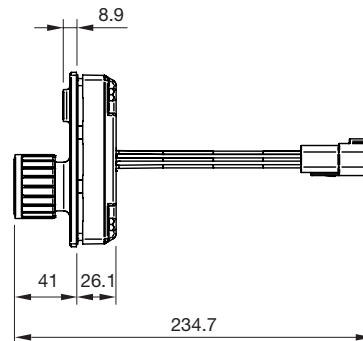


### Mounting

Clip-in mounting



Screw-in mounting



## 6-pushbutton Keypad SUPER



### Mechanical characteristics

- Actuating force: approx. 6 N
- Overload force: 250 N
- Lifecycle: up to 250 000 cycles of operation
- Impact resistance: IEC 62262 IK07

### Electrical characteristics

- Operating voltage range 8-32 VDC
- LoadDump A or B

### Illumination

- Halo-ring and symbol illumination can be configured independently of one another
- Halo-ring effects: flashing, pulsing, colour change
- LED symbol illumination
  - Colour: white
  - Luminance: approx. 20 cd/m<sup>2</sup> (dimnable)
- LED halo-ring illumination
  - Colour: multi-colour RGB
  - Luminance: approx. 500 cd/m<sup>2</sup> (dimnable\*)

\*depending on the respective colour

### Symbols

- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Connections/interfaces

- CAN interface (ISO 11898)
- CAN protocols: CANOpen (CiA 401), CAN J1939
- Baud rate 125, 250, 500, 1000 kBit/s (configurable through software)
- Integrated plug recess, compatible with TE 8P-1745000-3

### Protection degree

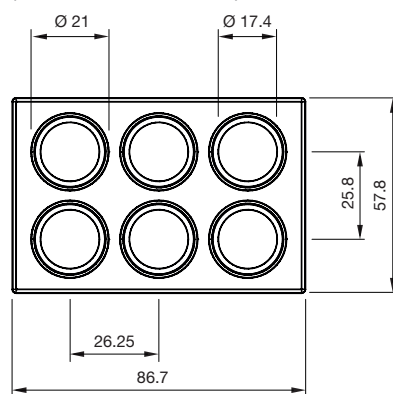
- IP5K4 in accordance with ISO 20653 (front side in installed state)
- IP20 in accordance with ISO 20653 (rear side)

### Ambient conditions

- Operating temperature -40°C ... +85°C
- Storage temperature -40°C ... +85°C

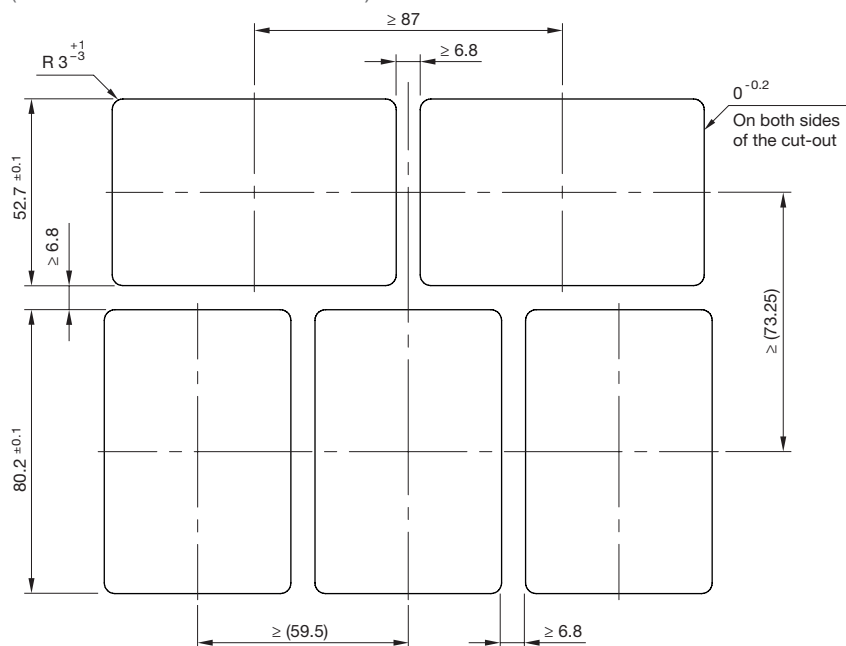
### Dimensions

(All dimensions in mm)



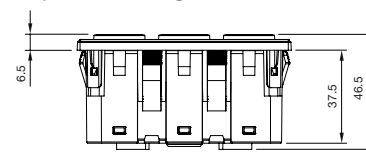
### Mounting cut-out

(Panel thickness 1.0 mm ... 4.0 mm)

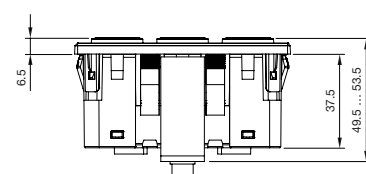


### Mounting

Clip-in mounting



Screw-in mounting



The keypad can be mounted into front plate thicknesses between 1 and 4 mm. A front plate of at least 2 mm thickness is recommended. Non-compliance with these specifications may lead to damage to the locking tongue.

# 09 In-Cabin Keypad Modules

## 6-pushbutton Keypad PLUS



### Mechanical characteristics

- Actuating force: approx. 6 N
- Overload force: 250 N
- Lifecycle: up to 250 000 cycles of operation
- Impact resistance: IEC 62262 IK07

### Electrical characteristics

- Operating voltage range 8-32 VDC LoadDump A or B

### Illumination

- Halo-ring and symbol illumination can be configured independently of one another  
Halo-ring effects: flashing, pulsing, colour change
- LED symbol illumination
  - Colour: white
  - Luminance: approx. 20 cd/m<sup>2</sup> (dimnable)
- LED halo-ring illumination
  - Colour: red (other colours on request)
  - Luminance: approx. 500 cd/m<sup>2</sup> (dimnable)

### Symbols

- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Connections/interfaces

- CAN interface (ISO 11898)
- CAN protocols: CANOpen (CiA 401), CAN J1939
- Baud rate 125, 250, 500, 1000 kBit/s (configurable through software)
- Integrated plug recess, compatible with TE 8P-1745000-3

### Protection degree

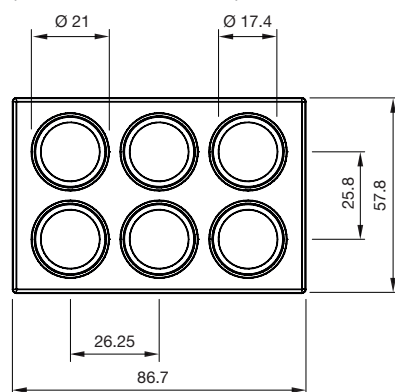
- IP5K4 in accordance with ISO 20653 (front side in installed state)
- IP20 in accordance with ISO 20653 (rear side)

### Ambient conditions

- Operating temperature -40°C ... +85°C
- Storage temperature -40°C ... +85°C

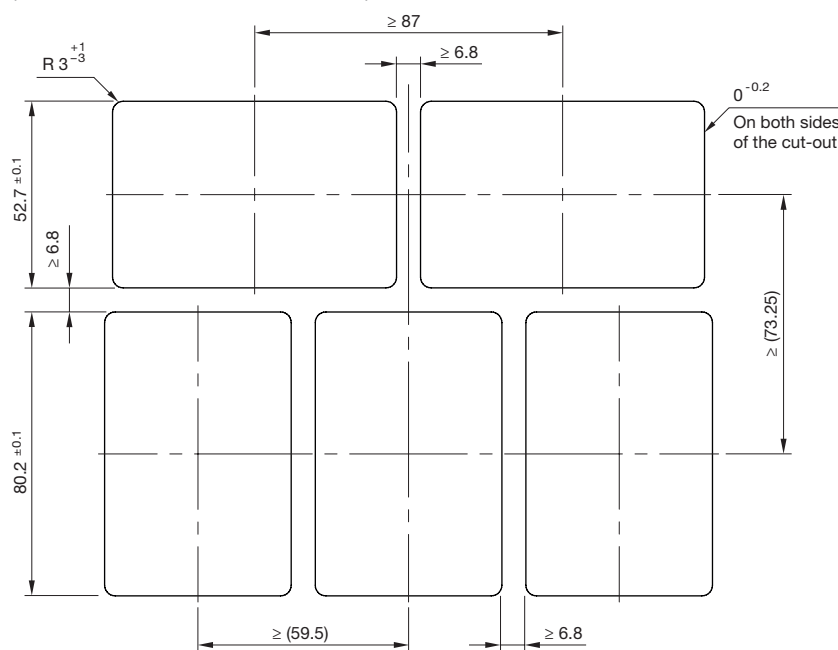
### Dimensions

(All dimensions in mm)



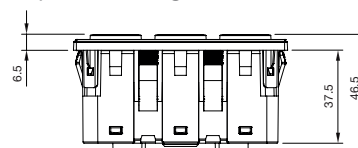
### Mounting cut-out

(Panel thickness 1.0 mm ... 4.0 mm)

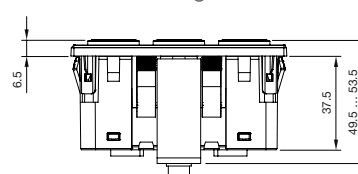


### Mounting

Clip-in mounting



Screw-in mounting



The keypad can be mounted into front plate thicknesses between 1 and 4 mm. A front plate of at least 2 mm thickness is recommended. Non-compliance with these specifications may lead to damage to the locking tongue.

## 6-pushbutton Keypad BASIC



### Mechanical characteristics

- Actuating force: approx. 6 N
- Overload force: 250 N
- Lifecycle: up to 250 000 cycles of operation
- Impact resistance: IEC 62262 IK07

### Electrical characteristics

- Operating voltage range: 8 – 18VDC or 18 – 32VDC  
Operating voltage of illumination for use in 12V or 24V applications. Available with the option of diagnostic switching contacts
- Max. power: 1 W (without NAMUR)  
0.25 W (with NAMUR)
- Max. current: 30 mA
- Min. current: 2 mA
- Max. voltage: 32 V
- Contact resistance (unactuated): > 2 M $\Omega$  (without NAMUR)  
1 k $\Omega$   $\pm$  4 % (with NAMUR)
- Contact resistance (actuated): < 10  $\Omega$  (without NAMUR)  
110  $\Omega$   $\pm$  10  $\Omega$  (with NAMUR)

### Illumination

- Halo-ring and symbol illumination can be configured independently of one another
- LED symbol illumination
  - Colour: white
  - Luminance: approx. 20 cd/m<sup>2</sup> (dimnable)
- LED halo-ring illumination
  - Colour: red (other colours on request)
  - Luminance: approx. 500 cd/m<sup>2</sup> (dimnable)

### Symbols

- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Connections/interfaces

- Integrated plug recess, compatible with TE 8P-1745000-3/8P-1745000-4, 8-pin

### Protection degree

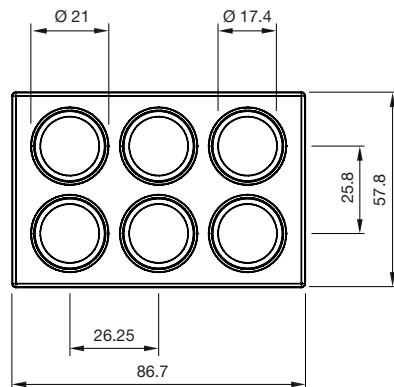
- IP5K4 in accordance with ISO 20653 (front side in installed state)
- IP20 in accordance with ISO 20653 (rear side)

### Ambient conditions

- Operating temperature –40°C ... +85°C
- Storage temperature –40°C ... +85°C

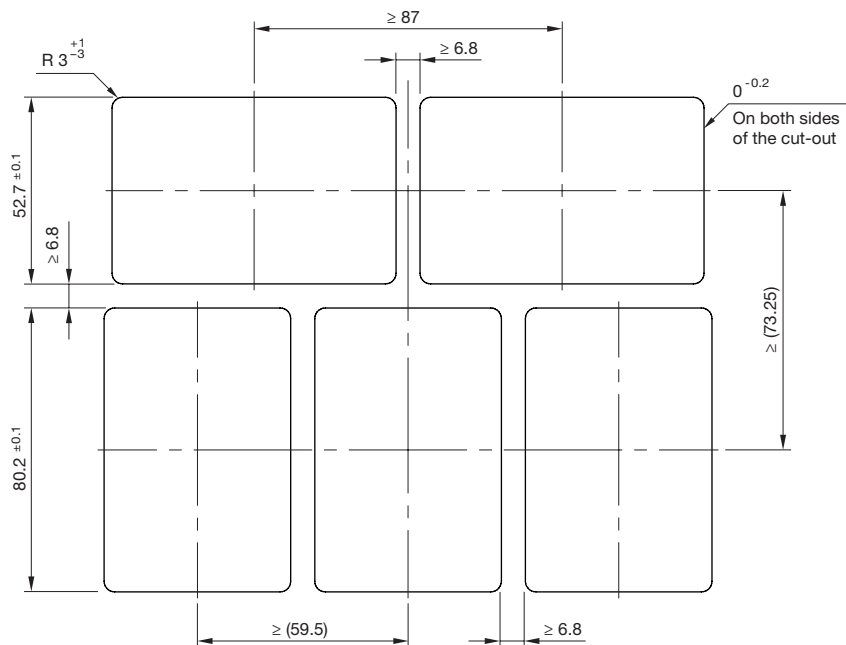
### Dimensions

(All dimensions in mm)



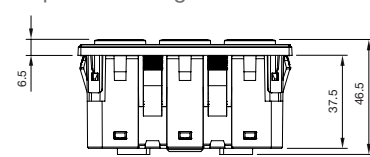
### Mounting cut-out

(Panel thickness 1.0 mm ... 4.0 mm)

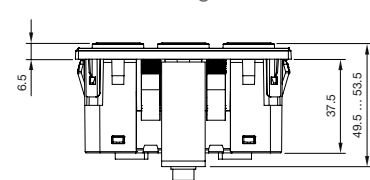


### Mounting

Clip-in mounting



Screw-in mounting



The keypad can be mounted into front plate thicknesses between 1 and 4 mm. A front plate of at least 2 mm thickness is recommended. Non-compliance with these specifications may lead to damage to the locking tongue.

# 09 In-Cabin Keypad Modules

## 2-pushbutton Keypad BASIC



### Mechanical characteristics

- Actuating force: approx. 6 N
- Overload force: 250 N
- Lifecycle: up to 250 000 cycles of operation
- Impact resistance: IEC 62262 IK07

### Electrical characteristics

- Operating voltage range 8 – 32 VDC  
Available with the option of diagnostic switching contacts (NAMUR)
- Max. power:  
1 W (without NAMUR)  
0.25 W (with NAMUR)
- Max. current:  
30 mA
- Min. current:  
2 mA
- Max. voltage:  
32 V
- Contact resistance (unactuated):  
> 2 MΩ (without NAMUR)  
1 kΩ ± 4 % (with NAMUR)
- Contact resistance (actuated):  
< 10 Ω (without NAMUR)  
110 Ω ± 10 Ω (with NAMUR)

### Illumination

- Halo-ring and symbol illumination can be configured independently of one another
- LED symbol illumination
  - Colour: white
  - Luminance: approx. 20 cd/m<sup>2</sup> (dimnable)
- LED halo-ring illumination
  - Colour: red (other colours on request)
  - Luminance: approx. 500 cd/m<sup>2</sup> (dimnable)

### Symbols

- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Connections/interfaces

- Integrated plug recess, compatible with TE 8P-1745000-3/8P-1745000-4, 8-pin

### Protection degree

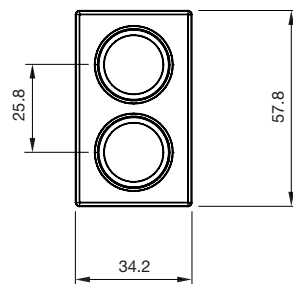
- IP5K4 in accordance with ISO 20653 (front side in installed state)
- IP20 in accordance with ISO 20653 (rear side)

### Ambient conditions

- Operating temperature  
–40 °C ... +85 °C
- Storage temperature  
–40 °C ... +85 °C

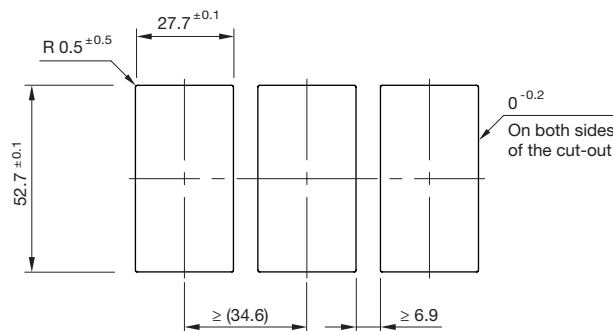
### Dimensions

(All dimensions in mm)



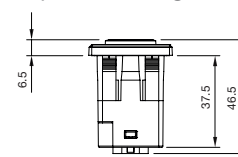
### Mounting cut-out

(Panel thickness 1.0 mm ... 4.0 mm)

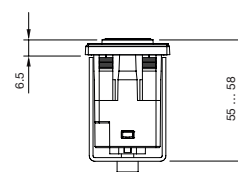


### Mounting

Clip-in mounting



Screw-in mounting

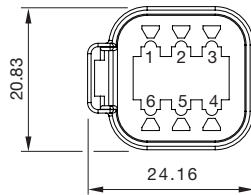
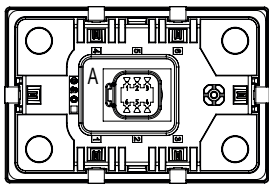
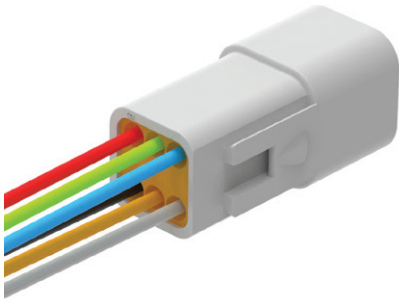


The keypad can be mounted into front plate thicknesses between 1 and 4 mm. A front plate of at least 2 mm thickness is recommended. Non-compliance with these specifications may lead to damage to the locking tongue.



## Accessories

Deutsch DT Series connector (DT04-6P)



Connector 6 – DT (DT04-6P)

Mating plug                    Deutsch DT06-6S  
 Matching contacts            e.g. 1062-16-0122  
 Matching wedge              W6-S

Pin Nr.	Signal	Wire colour	Comment
Pin 1	GND	Black	
Pin 2	CAN High	Yellow	
Pin 3	WakeUp_Out	Grey	
Pin 4	WakeUp_In	Blue	
Pin 5	CAN Low	Green	
Pin 6	Vcc		8 – 32VDC

All dimensions in mm.

### Symbol inserts



### Tool for legends



The new symbol insert tool with trendy design enables user-friendly fitting and removal of symbol inserts from the keypad. The round tip layout without edges prevents from damage of the keypad and symbol inserts. The ergonomically adjusted surface with balance point in the middle offers optimal handling.

# 09 Universal Switch

## Universal Switch\*



### Typical applications

- Universal switch with white symbol illumination without status indicator
  - Menu button
  - Reset button
  - Tyre failure/malfunction
- Universal switch with white symbol illumination and red single LED status indicator
  - Lock/unlock
  - Headlights On/Off
  - Air conditioning On/Off
- Universal switch with white symbol illumination and three red LED status indicators
  - Seat heating
  - Air conditioning
  - Ventilation fan
  - Blower position
- Universal switch with red symbol illumination for use as a hazard warning light
  - Hazard warning switch
- Indicator without mechanical function with and without functional illumination
  - Driver airbag on, off or not existing
  - Passenger airbag on, off or not existing
  - ESP off
  - Parking brake

### Mechanical characteristics

- Actuation force  
5–13 N
- Overload  
250 N
- Mechanical lifetime  
250 000 cycles of operation

### Electrical characteristics

- Operating voltage range: designed for 12VDC and 24VDC vehicle electrical system
- Maximum power\*: 1 VA
- Maximum current\*: 50 mA
- Minimum current\*: 1 mA
- Contact resistance\*: <math> < 10 \Omega </math>
- Additional resistor coding customer specific version on request\*

\* Refer to S1 (see wiring diagram, page 10)

### Illumination

#### LED symbol illumination

- Colour: white with luminance:  
~20 cd/m<sup>2</sup> at 28VDC and 23 °C ± 2 °K
- Colour: red (for hazard warning light) with luminance: ~90 cd/m<sup>2</sup> at 28VDC and 23 °C ± 2 °K

#### LED status indicator

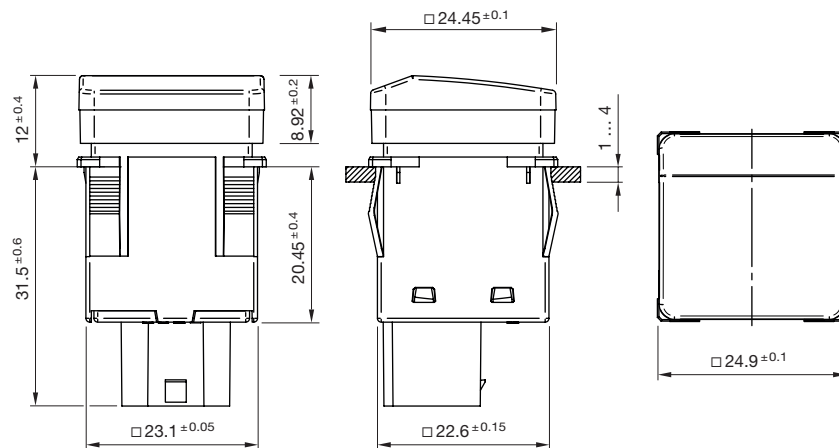
- Colour: Red
- Luminance: ~200 cd/m<sup>2</sup> at 28VDC and 23 °C ± 2 °K

### Symbols

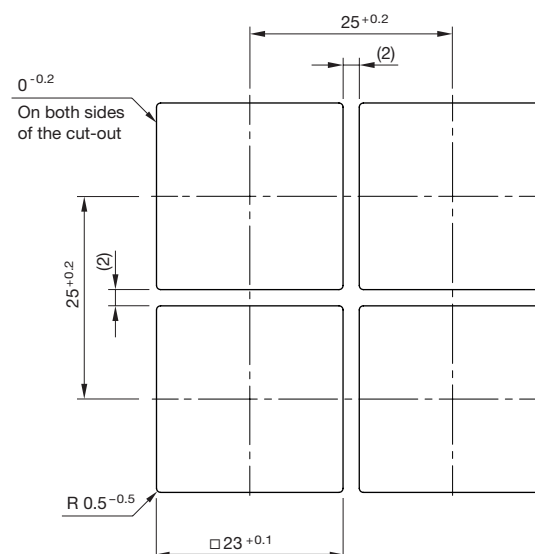
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Dimensions

(All dimensions in mm)



### Mounting cut-outs

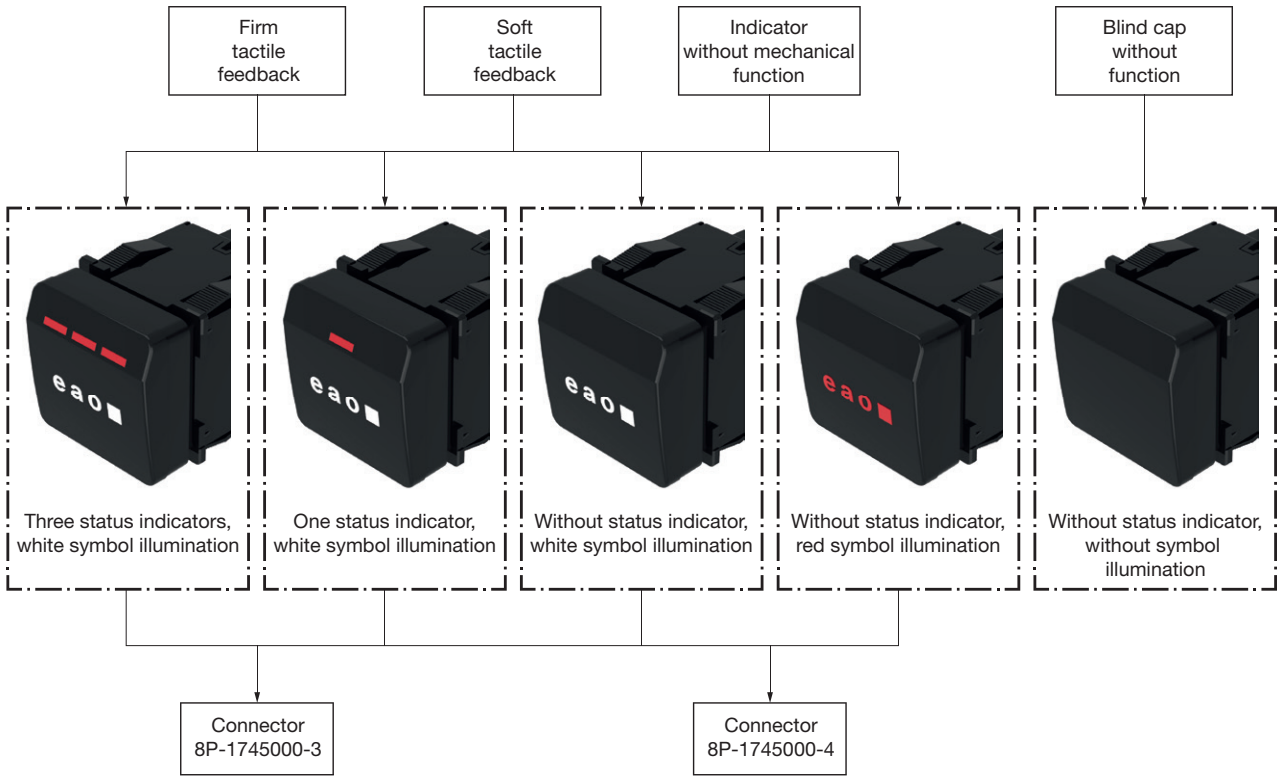


### Please note

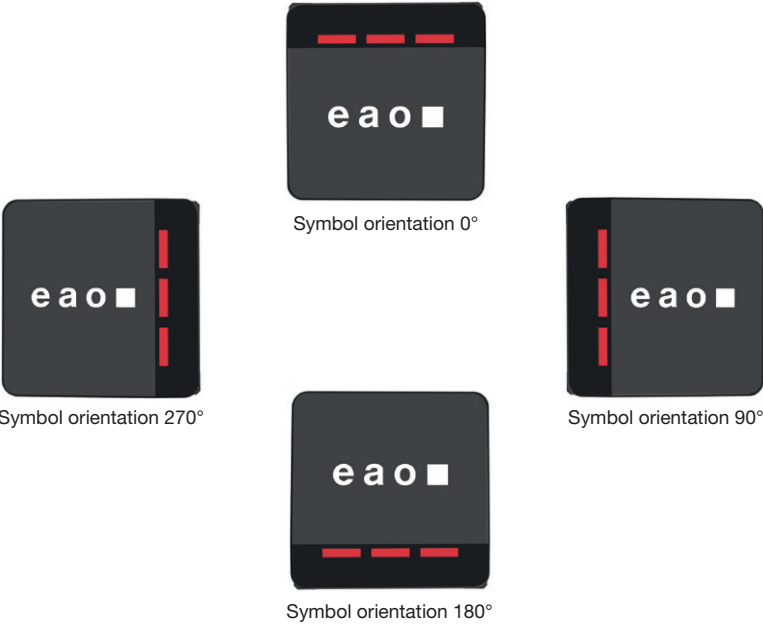
- The view shows the minimum possible distance between the cut-outs for two universal switches
- Another mounting option is using the mounting frame that fits into radio slot according to DIN ISO 7736

## Options

### Product options



### Options of the symbol orientation

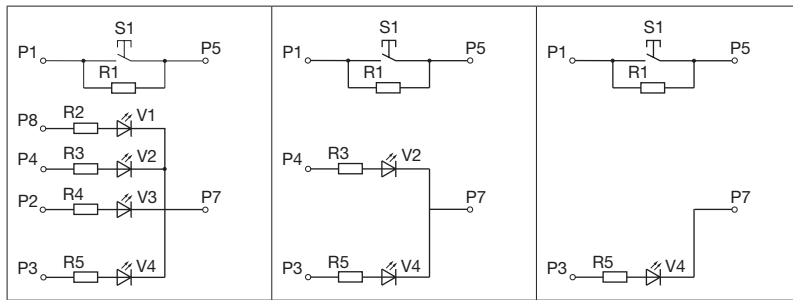


- 01
- 02
- 03
- 04
- 09**
- 14
- 17
- 18
- 19
- 22
- 31
- 41
- 45
- 51
- 56
- 57
- 61
- 70
- 71
- 82
- 84
- 92
- 96

# 09 Universal Switch

## Wiring diagrams

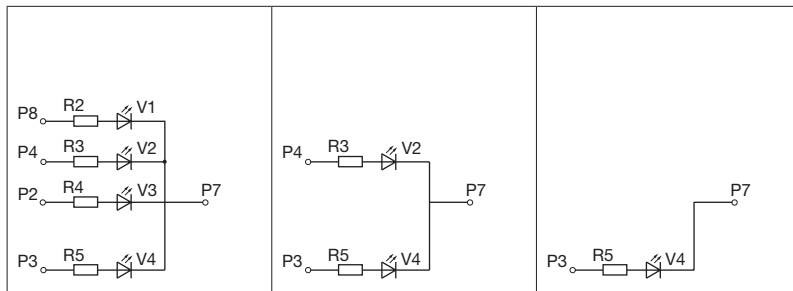
### Wiring diagrams



Three status indicators, backlight and switching element

One status indicator, backlight and switching element

Backlight and switching element



Three status indicators and backlight

One status indicator and backlight

Backlight

### Please note

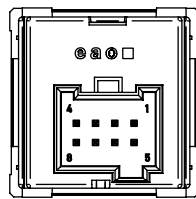
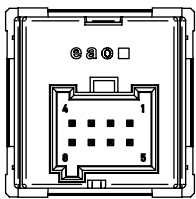
R1 not placed as standard.

### TYCO Pin connector

Tyco part-no. locking cover: 1745000-3, 1745000-4

Tyco part-no. housing: 965601-2

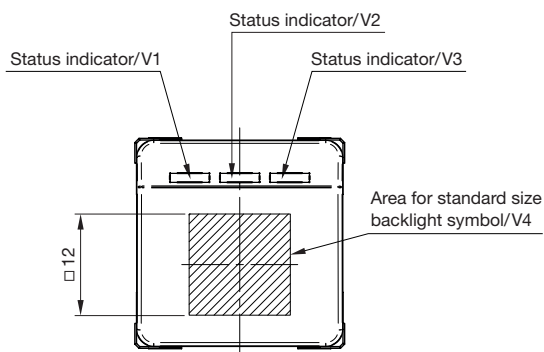
Tyco part-no. receptacle: 963715-1 (0.5 – 0.75 mm<sup>2</sup>), 928999-1 (0.25 – 0.35 mm<sup>2</sup>)



Connector  
8P-1745000-3

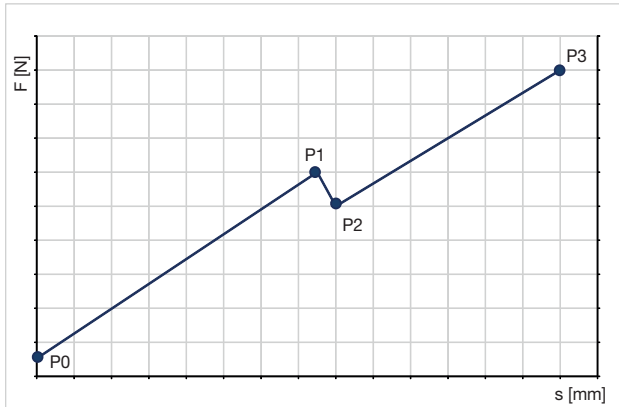
Connector  
8P-1745000-4

### Illumination specification



## Haptic specifications

### Universal switch with firm tactile feedback

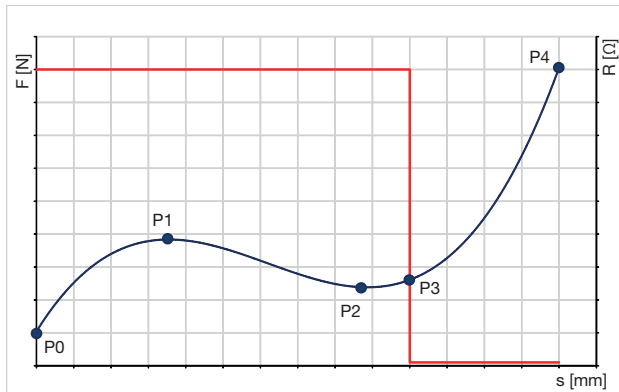


#### Parameters

P0: $F_0 \sim 2\text{ N}$
P1: $s_1 \sim 0.65\text{ mm}/F_1 \sim 6\text{ N}$
P2: $s_2 \sim 0.775\text{ mm}/F_2 \sim 4\text{ N}$
P3: $s_3 \sim 1.4\text{ mm}/F_3 \sim 10\text{ N}$

$S_n$ : travel at point  $P_n$   
 $F_n$ : force at point  $P_n$

### Universal switch with soft tactile feedback



#### Parameters

P0: $F_0 \sim 2\text{ N}$
P1: $s_1 \sim 0.3\text{ mm}/F_1 \sim 5\text{ N}$
P2: $s_2 \sim 0.65\text{ mm}/F_2 \sim 2,5\text{ N}$
P3: $s_3 \sim 0.825\text{ mm}/F_3 \sim 3\text{ N}$
P4: $s_4 \sim 1.4\text{ mm}/F_4 \sim 10\text{ N}$

$S_n$ : travel at point  $P_n$   
 $F_n$ : force at point  $P_n$

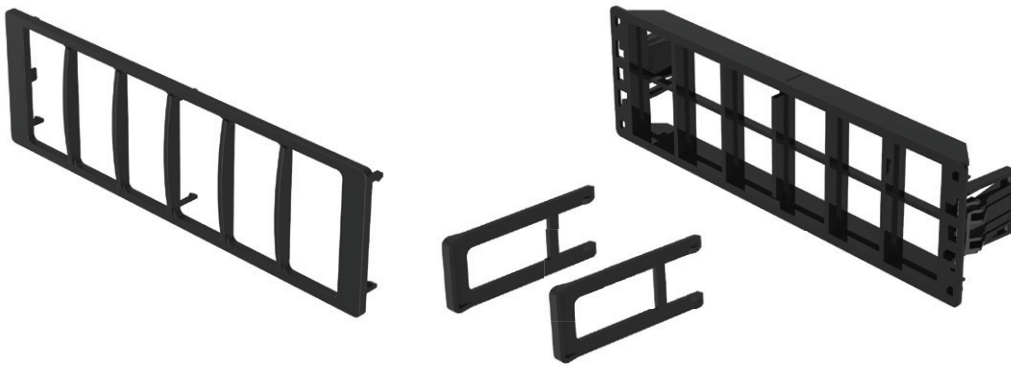
### Please note

The customer must ensure the functional and product safety compliance of the integration. The customer must perform all safety activities on the integration level and confirm that no functional safety requirements have been derived from the integration with the HMI.

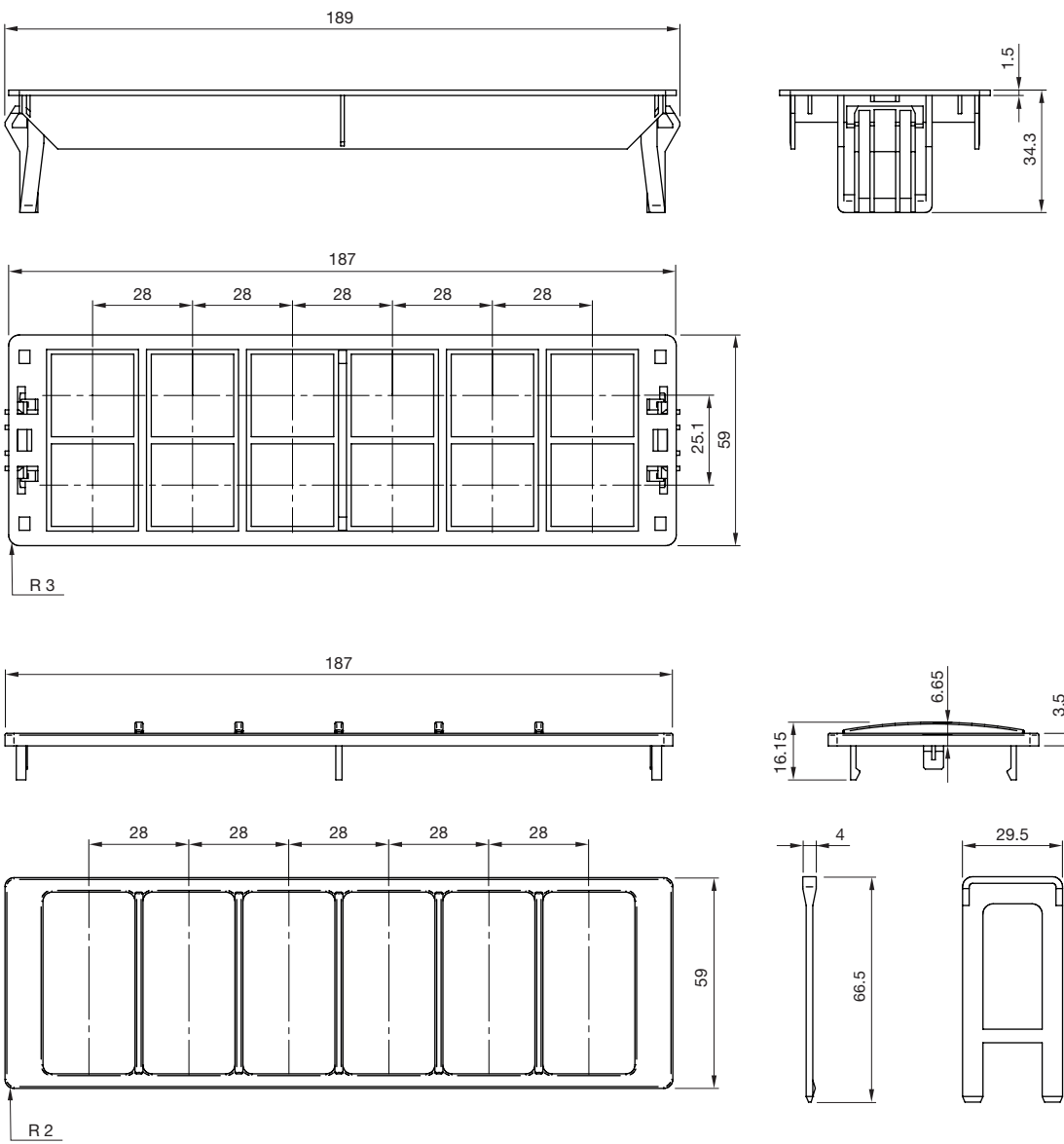
As a consequence, no functional safety requirements have been assigned to the HMI. The customer should be aware that the HMI has been developed according IATF 16949 and fulfils the ISO 26262 classification of a QM level.

# 09 Universal Switch

## Radio slot frame



### Dimensions



All dimensions in mm.

The radio slot frame is always customer specific and the above dimensions are an example only.

## LIN Switch Panel



### Mechanical characteristics

- Actuation force  
5–13N
- Overload  
250N
- Service life  
Up to 50 000 cycles of operation

### Electrical characteristics

- Designed for 12VDC operating voltage

### Illumination

- LED symbol illumination
- Colour white with luminance  
~20cd/m<sup>2</sup>
  - Colour red with luminance  
~90cd/m<sup>2</sup>

### LED status indicator

- Colour  
Red
- Luminance  
~600cd/m<sup>2</sup>

### Symbols

- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

### Connections/interfaces

- LIN interface

### Ambient conditions

- Operating temperature  
–40°C ... +85°C
- Storage temperature  
–40°C ... +85°C

### Protection degree

- IP5K3 protection front side (mounted into panel)
- IP20 protection rear side (mounted into panel)

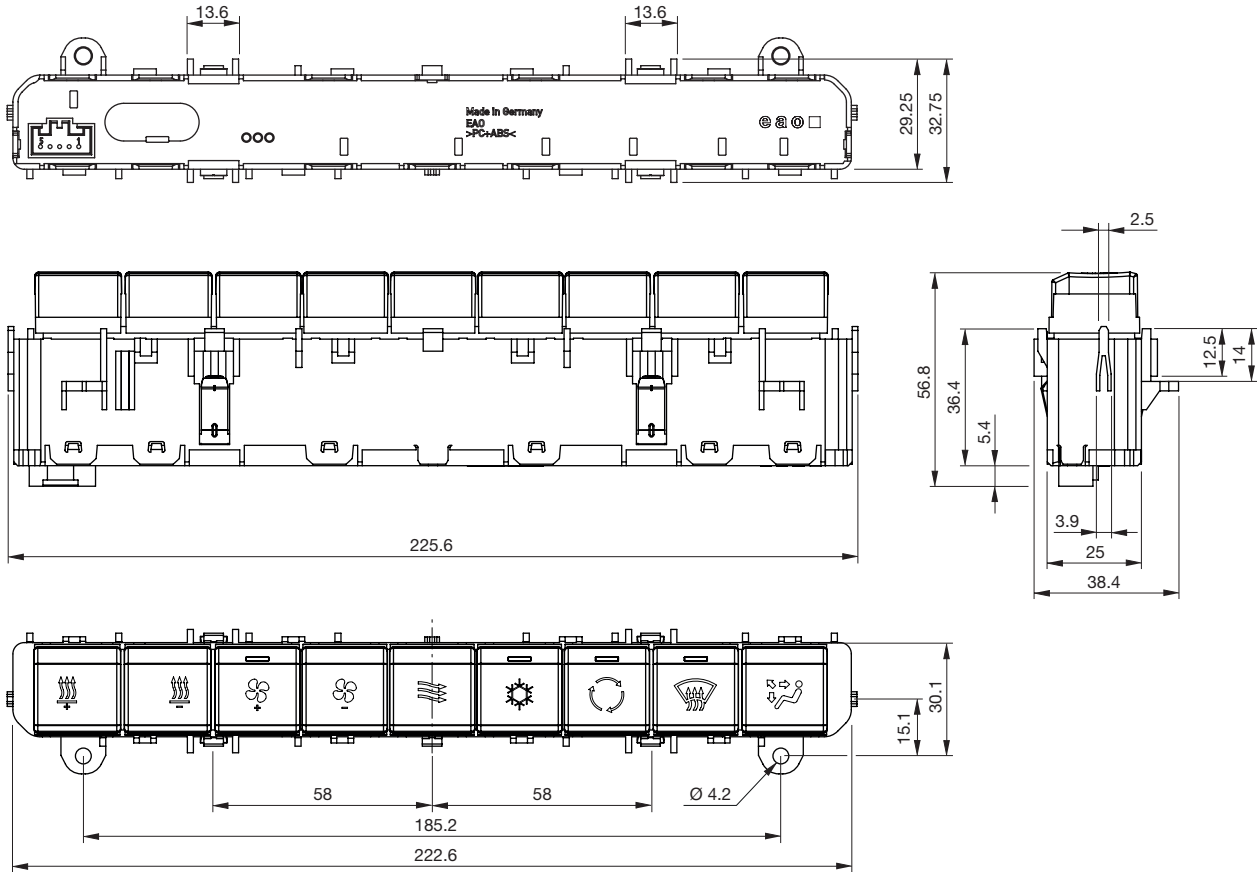
### Approvals and conformities

- E1 R10
- E1 R118
- CE

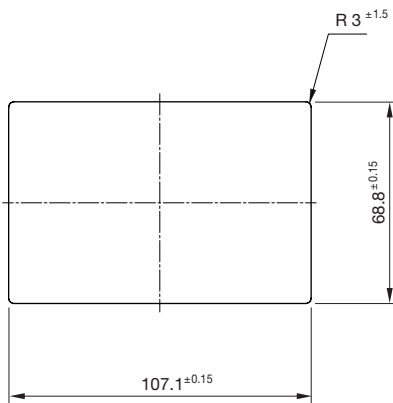
01  
02  
03  
04  
09  
14  
17  
18  
19  
22  
31  
41  
45  
51  
56  
57  
61  
70  
71  
82  
84  
92  
96

# 09 LIN Switch Panel

## Dimensions



## Mounting cut-out (clip-in version)

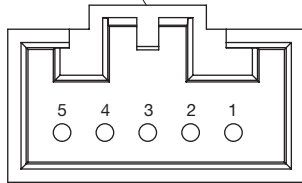
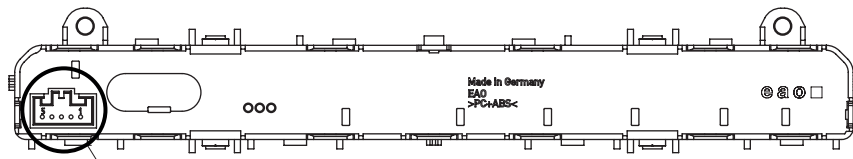


All dimensions in mm.

Dimensional tolerance according to DIN 16472 – TGS/2768-mk.

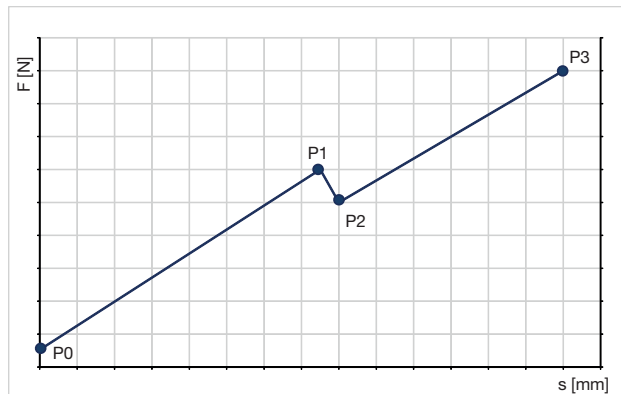


## Electrical connections and interfaces



LIN interface pin allocation	
1	nc
2	KL 30
3	LIN
4	KL 31
5	nc

## Haptic specifications



### Parameters

P0:  $F_0 \sim 1 \text{ N}$

P1:  $s_1 \sim 0.65 \text{ mm} / F_1 \sim 5 \text{ N}$

P2:  $s_2 \sim 0.75 \text{ mm} / F_2 \sim 4 \text{ N}$

P3:  $s_3 \sim 1.35 \text{ mm} / F_3 \sim 10 \text{ N}$

$S_n$ : travel at point  $P_n$

$F_n$ : force at point  $P_n$

### Please note

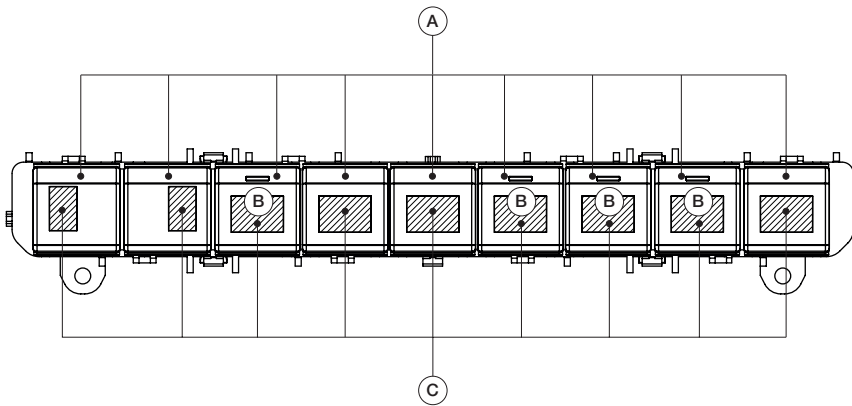
The customer must ensure the functional and product safety compliance of the integration. The customer must perform all safety activities on the integration level and confirm that no functional safety requirements have been derived from the integration with the HMI.

As a consequence, no functional safety requirements have been assigned to the HMI. The customer should be aware that the HMI has been developed according IATF 16949 and fulfils the ISO 26262 classification of a QM level.

# 09 LIN Switch Panel

## Illumination specifications

Variant with maximum number of indicators



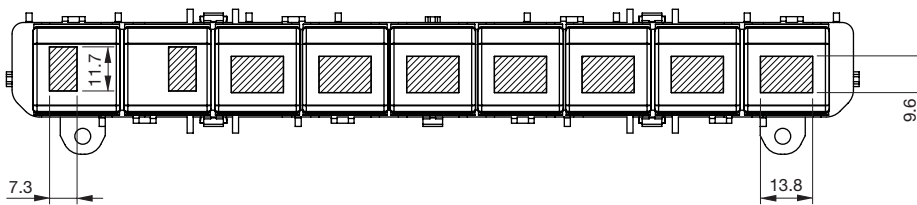
### Legend

A = Position

B = Indicator

C = Area for backlight symbol

Variant without indicators



	Pos. 1	Pos. 2	Pos. 3	Pos. 4	Pos. 5	Pos. 6	Pos. 7	Pos. 8	Pos. 9
Backlight colour	white	white	white	white	red	white	white	white	white
Backlight brightness	~ 20 cd/m <sup>2</sup>	~ 20 cd/m <sup>2</sup>	~ 20 cd/m <sup>2</sup>	~ 20 cd/m <sup>2</sup>	~ 90 cd/m <sup>2</sup>	~ 20 cd/m <sup>2</sup>	~ 20 cd/m <sup>2</sup>	~ 20 cd/m <sup>2</sup>	~ 20 cd/m <sup>2</sup>
Indicator colour (optional)	–	–	red	–	–	red	red	red	–
Indicator brightness (optional)	–	–	~ 600 cd/m <sup>2</sup>	–	–	~ 600 cd/m <sup>2</sup>	~ 600 cd/m <sup>2</sup>	~ 600 cd/m <sup>2</sup>	–

Symbols according to ISO 7000 or customer-specific symbols on request.

## Joystick, 1 axis with square flange

**Part No.**  
09-01.18214.0107

**Mechanical characteristics**

- Mounting  
from front of panel, 4 screws  
( $\varnothing 3.5\text{mm}$ )
- 1 axis
- No cross guidance
- No gate shape
- $20^\circ$  deflection angle
- Handle "Winter"
- Resetting  
self-resetting (medium resetting force)
- Breakout torque  
Y-axis 0.18 Nm
- Operating torque  
Y-axis 0.42 Nm
- Max. allowable torque  
Y-axis 18 Nm

**Electrical characteristics**

- Operating voltage  
5VDC
- Output signal  
proportional ( $-y = 0.5\text{V}$  /  
Mid =  $2.5\text{V}$  /  $+y = 4.5\text{V}$ )
- Redundancy  
yes

**Technology**

- Hall effect sensors

**Connections**

- Minitek plug (8-pole)

**Ambient conditions**

- Operating temperature  
 $-30^\circ\text{C}$  to  $+80^\circ\text{C}$
- Storage temperature  
 $-40^\circ\text{C}$  to  $+85^\circ\text{C}$

**Degree of protection**

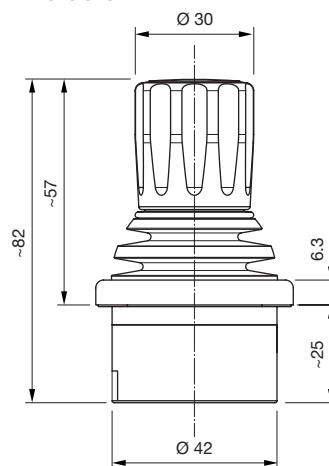
- IP65 front protection
- IP40 rear protection



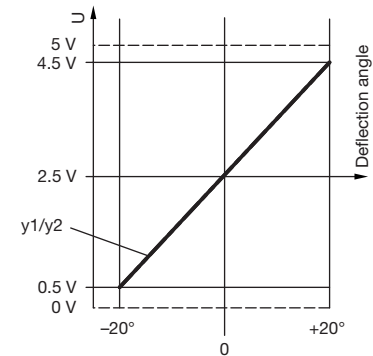
**Gate**



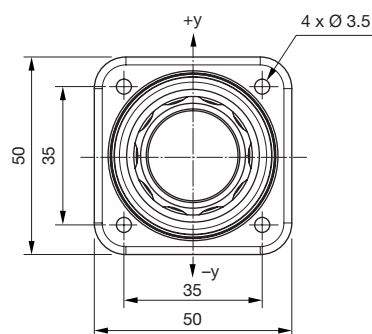
**Dimensions**



**Diagram Y-axis**



**View from above**



# 09 Joysticks

## Joystick, 3 axes with square flange.

### Part No.

09-01.32294.0109

### Mechanical characteristics

- Mounting from front of panel, four screws ( $\varnothing 3.5$  mm)
- 3 axes
- Soft cross guidance
- Gate shape square
- Deflection angle XY:  $\pm 20^\circ$  / Z:  $\pm 30^\circ$
- Handle "Winter twist"
- Resetting self-resetting (medium resetting force)
- Breakout torque X/Y-axis 0.18 Nm / Z-axis 0.075 Nm
- Operating torque X/Y-axis 0.42 Nm / Z-axis 0.18 Nm
- Max. allowable torque X/Y-axis 18 Nm / Z-axis 10 Nm

### Electrical characteristics

- Operating voltage 5 VDC
- Output signal proportional ( $-x/y/z = 0.5$  V / Mid = 2.5 V /  $+x/y/z = 4.5$  V)
- Redundancy all axes

### Technology

- Hall effect sensors

### Connections

- Minitek plug (8-pole)

### Ambient conditions

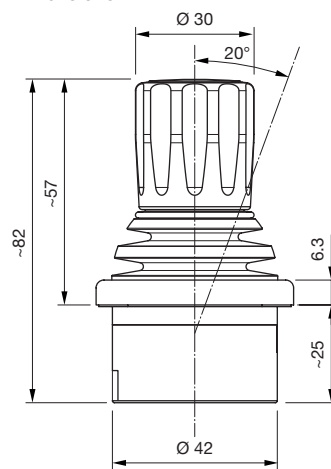
- Operating temperature  $-30^\circ\text{C}$  to  $+80^\circ\text{C}$
- Storage temperature  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$

### Degree of protection

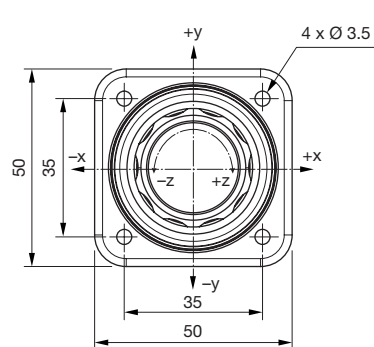
- IP65 front protection
- IP40 rear protection



Dimensions



View from above



Gate

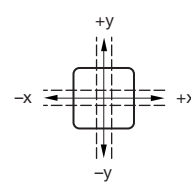


Diagram X-, Y-axis

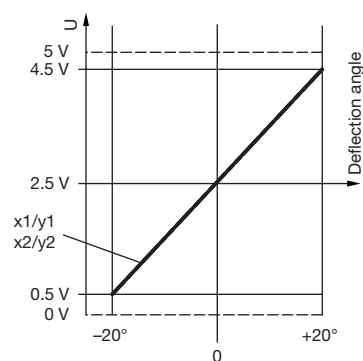
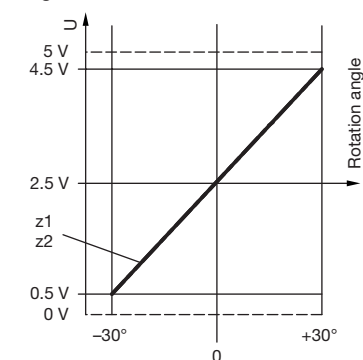


Diagram Z-axis



## Joystick, small and beautiful

### Part No.

09-01.22224.0128

### Mechanical characteristics

- Mounting  
from above, four screws ( $\varnothing$  3.5 mm)
- 2 axes
- Light cross guidance
- Gate shape square
- 20° deflection angle
- Handle "Nupsi"
- Resetting  
self-resetting (medium resetting force)
- Breakout torque  
X/Y-axis 0.18 Nm
- Operating torque  
X/Y-axis 0.42 Nm
- Max. allowable torque  
X/Y-axis 10 Nm

### Electrical characteristics

- Operating voltage  
5VDC
- Output signal  
proportional ( $-x1/y1 = 0.5V$ /average =  $2.5V$ / $+x1/y1 = 4.5V$ ) ( $-x2/y2 = 4.5V$ /average =  $2.5V$ / $+x2/y2 = 0.5V$ )
- Redundancy  
all axes

### Technology

- Hall effect sensors

### Connections

- Minitek plug (8-pole)

### Ambient conditions

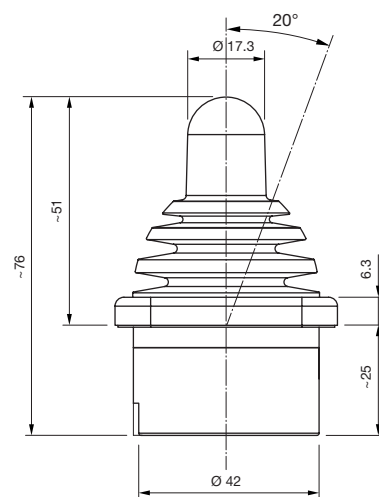
- Operating temperature  
 $-30^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$
- Storage temperature  
 $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

### Degree of protection

- IP67 front protection
- IP40 rear protection



Dimensions



Gate

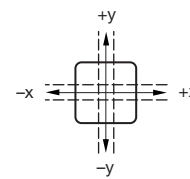
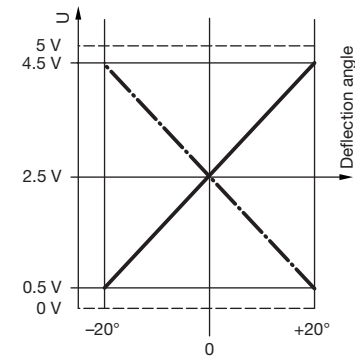
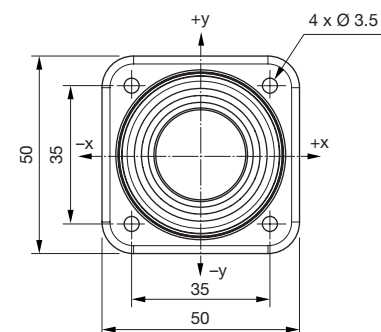


Diagram X-, Y-axis



View from above



# 09 Joysticks

## Joystick, standard with round flange

### Part No.

09-02.22244.1052

### Mechanical characteristics

- Mounting  
from rear of panel, 4 x M3 screws
- 2 axes
- Rigid cross guidance
- Gate shape square
- 20° deflection angle
- Handle "Standard"
- Resetting  
self-resetting (medium resetting force)
- Breakout torque  
X/Y-axis 0.16 Nm
- Operating torque  
X/Y-axis 0.5 Nm
- Max. allowable torque  
X/Y-axis 18 Nm

### Electrical characteristics

- Operating voltage  
max. 30VDC
- Output signal  
proportional with centre tab at  $\pm 1.75^\circ$ ,  
switch point at  $\pm 2.3^\circ$  (see diagram  
X-, Y-axis)

### Technology

- Conductive plastic with digital steps/  
control segment 1-0-1

### Connections

- Dubox plug (6- and 8-pole)

### Ambient conditions

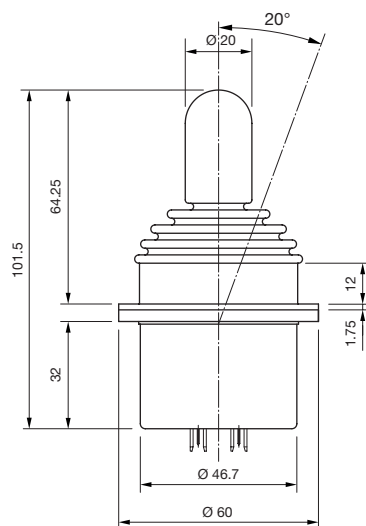
- Operating temperature  
 $-30^\circ\text{C}$  to  $+80^\circ\text{C}$
- Storage temperature  
 $-40^\circ\text{C}$  to  $+85^\circ\text{C}$

### Degree of protection

- IP67 front protection
- IP40 rear protection



Dimensions



Gate

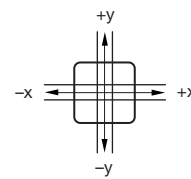
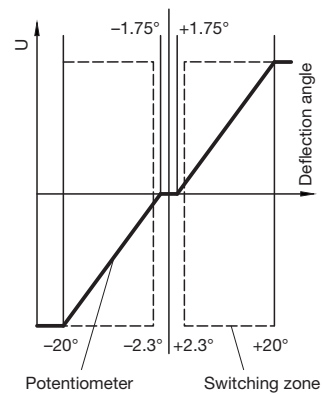
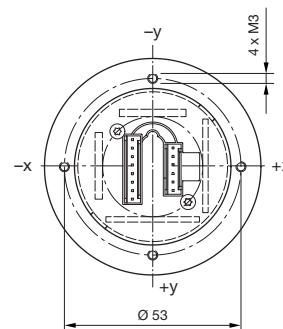


Diagram X-, Y-axis



Bottom view



## Joystick, CAN with round flange

### Part No.

09-03.23362.1051 (CANopen)

09-03.23363.1051 (J1939)

### Mechanical characteristics

- Mounting  
from rear of panel, 4 x M3 screws
- 2 axes
- Soft cross guidance
- Gate shape square
- 20° deflection angle
- Handle "Sleek"  
with two integrated buttons (red)
- Resetting  
self-resetting (strong resetting force)
- Breakout torque  
X/Y-axis 0.19 Nm
- Operating torque  
X/Y-axis 0.7 Nm
- Max. allowable torque  
X/Y-axis 18 Nm

### Electrical characteristics

- Operating voltage  
8 to 36 VDC

### Technology

- Hall effect sensors

### Connections

- Dubox plug (4-pole)

### Interfaces

- CANopen/J1939 interface

### Ambient conditions

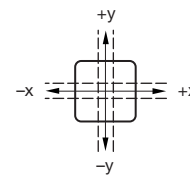
- Operating temperature  
-30 °C to +80 °C
- Storage temperature  
-40 °C to +85 °C

### Degree of protection

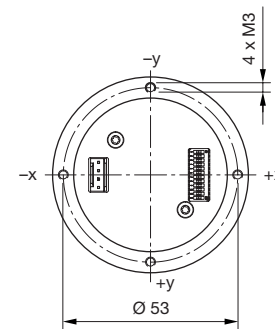
- IP65 front protection
- IP40 rear protection



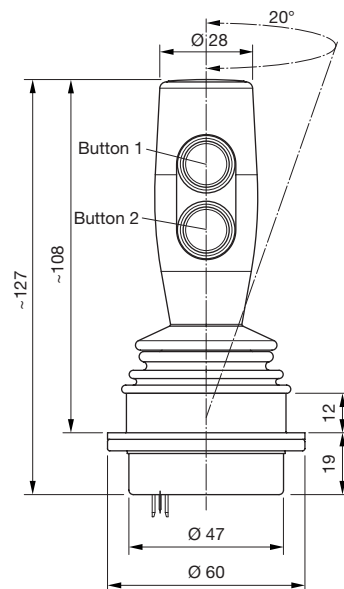
### Gate



### Bottom view



### Dimensions



# 09 Joysticks

## Joystick, CAN with 3 buttons and 1 cable

### Applications

Especially well-suited to heavy duty and special vehicles.

### Part No.

09-03.223A2.1114 (CANopen)  
09-03.223A3.1114 (J1939)

### Mechanical characteristics

- Mounting from below, 4 x M3 screws
- 2 axes
- Light cross guidance
- Gate shape square
- 15° deflection angle
- Handle "Kermit" with 3 integrated buttons (black)
- Resetting self-resetting (strong resetting force)
- Breakout torque X/Y-axis 0.63 Nm
- Operating torque X/Y-axis 1.16 Nm
- Max. allowable torque X/Y-axis 18 Nm

### Electrical characteristics

- Operating voltage 8 to 36 VDC

### Technology

- Hall effect sensors

### Connections

- PVC cable, 4 x 0.34 mm<sup>2</sup> Molex Micro-Fit (4-pole)

### Interfaces

- CANopen/ J1939 interface

### Ambient conditions

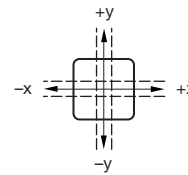
- Operating temperature -30 °C to +80 °C
- Storage temperature -40 °C to +85 °C

### Degree of protection

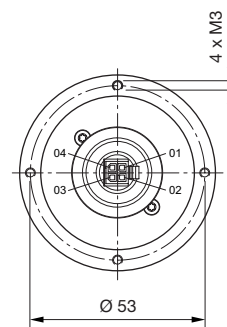
- IP65 front protection
- IP40 rear protection



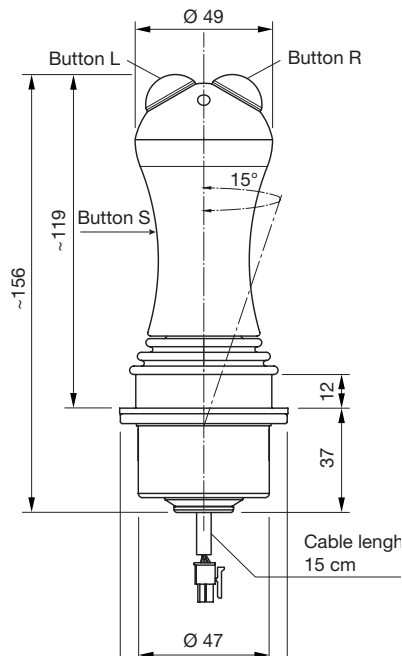
### Gate



### Bottom view



### Dimensions





## Joystick, 2 axes with 6 momentary positions each

### Applications

Especially well-suited to wireless remote control systems.

### Part No.

09-04.223E4.1112

### Mechanical characteristics

- Mounting  
from below, 4 x M3 screws
- 2 axes
- Soft cross guidance
- Gate shape square
- 20° deflection angle
- 6 momentary positions per axis
- Handle "Goblet Top" with button
- Resetting  
self-resetting (strong resetting force)
- Breakout torque  
X/Y-axis 0.19 Nm
- Operating torque  
X/Y-axis 0.7 Nm
- Max. allowable torque  
X/Y-axis 18 Nm

### Electrical characteristics

- Operating voltage  
max. 5 VDC/5 mA
- Output signal  
switching point at  $\pm 3.33^\circ$

### Technology

- Digital grid/switching segment 3-1-3

### Connections

- Dubox plug (2 and 8-pole)

### Ambient conditions

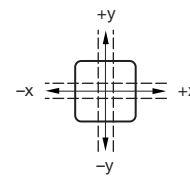
- Operating temperature  
-30 °C to +80 °C
- Storage temperature  
-40 °C to +85 °C

### Degree of protection

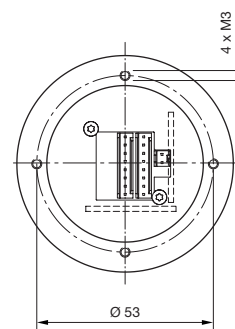
- IP65 front protection
- IP40 rear protection



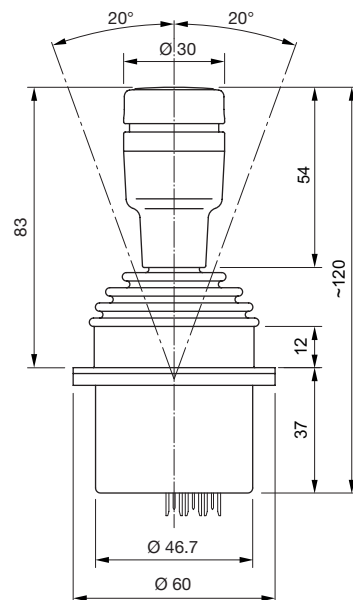
### Gate



### Bottom view



### Dimensions



# 09 Joysticks

## Joystick, drive lever with mechanical interlocking

### Part No.

09-02.174C4.1113

### Mechanical characteristics

- Mounting  
from below, 4 x M3 screws
- 1 axis
- No cross guidance
- No gate shape
- 20° deflection angle
- Handle "Central Lock"
- Resetting  
friction brake
- Unlocking force  
22 N
- Breakout torque  
0.456 Nm
- Operating torque  
0.456 Nm
- Max. allowable torque  
18 Nm

### Electrical characteristics

- Operating voltage  
max. 30VDC
- Output signal  
proportional without centre tab

### Technology

- Conductive plastic

### Connection

- Dubox plug (3-pole)

### Ambient conditions

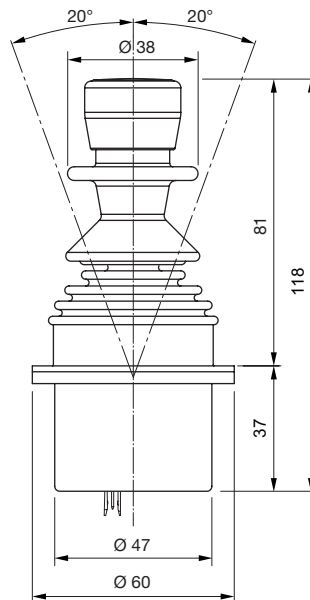
- Operating temperature  
-30 °C to +80 °C
- Storage temperature  
-40 °C to +85 °C

### Degree of protection

- IP65 front protection
- IP40 rear protection



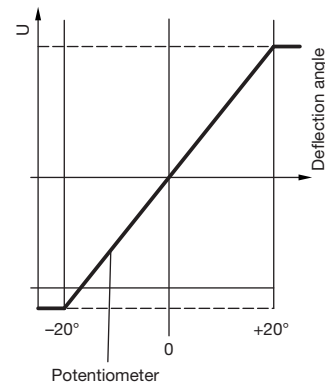
Dimensions



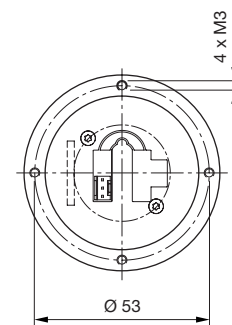
Gate



Diagram Y-axis



Bottom view



## Joystick with handle and additional buttons.

### Part No.

09-01.222Y2.0009

09-01.222Y3.0009

### Mechanical characteristics

- Mounting  
from below, 4 x  $\varnothing$  5.5 screws
- 1 or 2 axes
- Soft cross guidance
- Gate shape round
- 24° deflection angle
- Multifunction handle with 3 buttons
- Resetting  
self-resetting (strong resetting force)
- Breakout torque  
0.5 Nm
- Max. allowable torque  
60 Nm

### Electrical characteristics

- Operating voltage  
8 – 36 V
- Output signal  
CANopen/J1939

### Technology

- Hall effect sensors

### Connections

- Deutsch DTM04-4P (4-pole)

### Ambient conditions

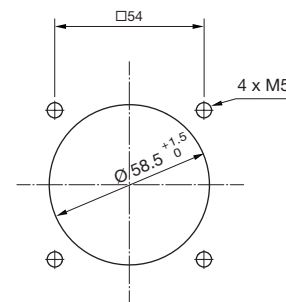
- Operating temperature  
-30 °C to +80 °C
- Storage temperature  
-40 °C to +85 °C

### Protection degree

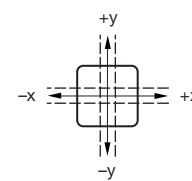
- IP65 front side



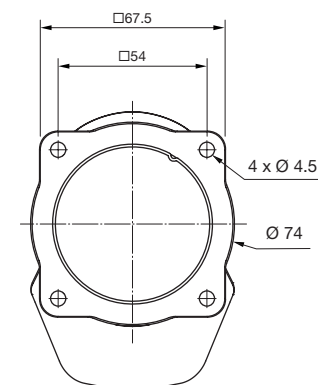
### Mounting cut-out



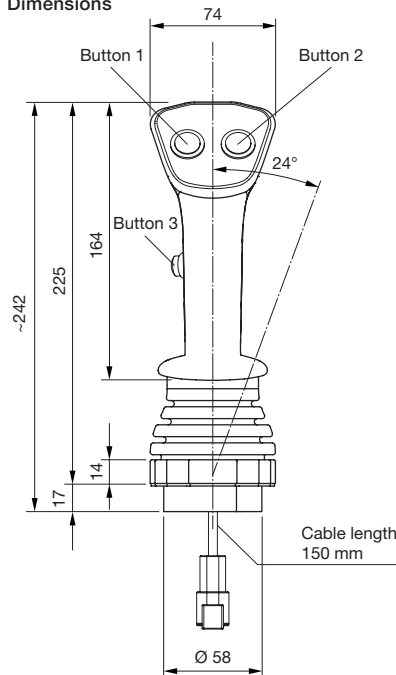
### Gate



### View from bottom



### Dimensions



All dimensions in mm.

## Fingertip joystick

### Part No.

09-03.22204.0010

### Mechanical characteristics

- Mounting  
from below, 4 x Ø 2.7 screws
- 1 or 2 axes
- Soft or rigid guidance
- Gate shape round
- 25° deflection angle
- Handle "thumb tower"
- Resetting  
self-resetting (medium resetting force)
- Operating torque  
0.026 Nm
- Max. allowable torque  
4 Nm

### Electrical characteristics

- Operating voltage  
5 VDC
- Output signal  
0.5–4.5 V linear, redundant

### Technology

- Hall effect sensors

### Connections

- Connector JST EHR (6-Pol)  
length 80 mm

### Ambient conditions

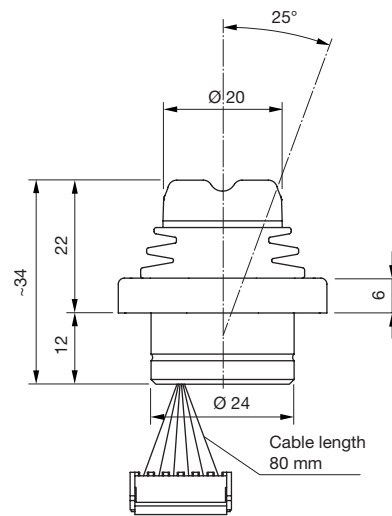
- Operating temperature  
–30 °C to +80 °C
- Storage temperature  
–40 °C to +85 °C

### Protection degree

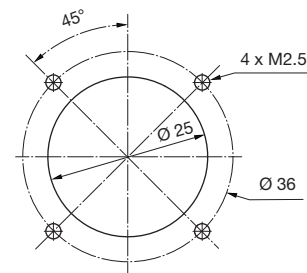
- IP65 front side



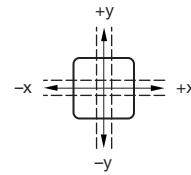
### Dimensions



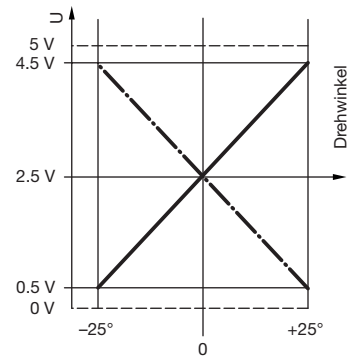
### Mounting cut-out



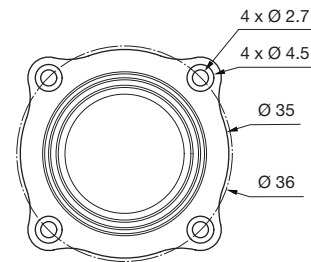
### Gate



### Diagram X-, Y-axis



### View from bottom



All dimensions in mm.

## Toggle stick, 4 directions with momentary position

### Applications

The toggle stick (4 directions with momentary position, lock-able) is suitable for various applications.

### Part No.

Please see Series 45

### Mechanical characteristics

- Mounting  
Ø 22.3 mm, raised
- 2 axes
- Rigid cross guidance
- 35° deflection angle
- Mechanical service life  
up to 250 000 switching cycles
- Connection  
screw terminal

### Electrical characteristics

- Operating voltage  
5 to 500 V
- Output signal  
AC15: 6A/24 V to 1.4A/500 V
- Contact material  
silver

### Ambient conditions

- Operating temperature  
-25 °C to +70 °C
- Storage temperature  
-40 °C to +85 °C

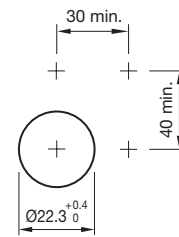
### Degree of protection

- IP65, IP67 front protection
- IP20 or IP40 rear protection

Configure your product in a few steps at [eao.com/products](http://eao.com/products).

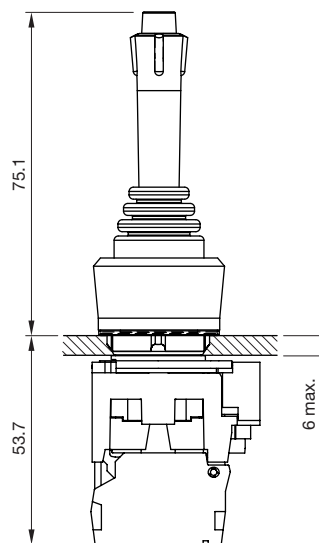


### Mounting cut-outs



All dimensions in mm.

### Dimensions



# 09 Joysticks

## Lever switch, 8 positions

### Applications

The lever switch (2, 4 or 8 positions) is suitable for various applications.

### Part No.

44-800.2  
44-800.4  
44-800.8

### Mechanical characteristics

- Mounting  
Ø 22.3 mm, raised
- 2 axes
- Soft cross guidance, pulse
- 12° deflection angle
- Mechanical service life  
up to 1.2 million switching cycles
- Connection  
soldering terminal

### Electrical characteristics

- Operating voltage  
250 VAC
- Output signal  
5A/4 NC + 4 NO
- Contact material  
gold-plated silver alloy

### Ambient conditions

- Operating temperature  
-30 °C to +80 °C
- Storage temperature  
-40 °C to +85 °C

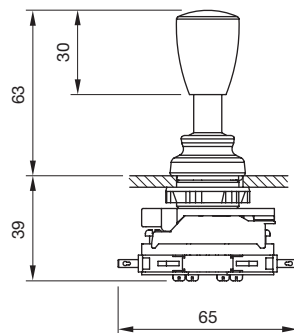
### Degree of protection

- IP65 front protection
- IP20, IP40 rear protection

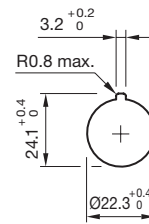
A choice of three lever switches can be found at [eao.com/products](http://eao.com/products).



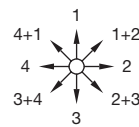
Dimensions



### Mounting cut-outs



### Wiring diagram



All dimensions in mm.



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