

# Joysticks

*Powerful. Robust and individual.*

[www.eao.com](http://www.eao.com)



# Joysticks

*Powerful. Robust and individual.*

EAO, the expert partner for innovative, intuitive and reliable Human Machine Interfaces (HMIs), offers a range of standard and customised joysticks for rough usage in a variety of applications.

EAO joysticks offer a wide range of possibilities for interfacing and control of HMI Systems in vehicles, machinery, medical equipment and remote control systems. Standard and individual configurable joysticks allow intuitive operation, robust construction and reliability. These are important basic characteristics for the joysticks. EAO joystick controllers also offer the potential for applications in construction and agricultural machinery and vehicles as well as police, fire-fighting and cleaning vehicles.

These requirements are also needed for the control of complex additional functions such as hydraulic lifting equipment, powered safety equipment and for other auxiliary functions.

The modern design, low back panel depth and numerous customising options make EAO products particularly attractive and versatile. Joysticks are compatible with established interfaces such as CAN, CANopen, J1939, SPI and USB.

Each joystick can be configured for its individual application. EAO has chosen the following products to represent the whole product range.

#### Typical applications

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

#### EMV qualification

The products are certified according to the relevant EN standards.

#### Materials

The materials used comply with the high EAO standards relating to quality, functional safety, service life and design.

#### Mechanical characteristics

- Mounting
  - Front or rear panel mounted
  - Screw fixing (depending on joystick type)
  - Various fixing rings as design element or as additional sealing available
- Number of axes
  - 1, 2 or 3
- Cross guidance
  - Soft, rigid or none
- Gate shape
  - Standard: square
  - Other gates available on request
- Handle
  - Several standard handle options with configurable functions
- Resetting in centre position
  - Self-resetting
  - With friction break
  - With centre position locking
  - With mechanical interlocking
  - Momentary or maintained action
- Terminals/connections
  - Solder, screw or spring-load terminals
  - Plug, cable (customising possible)

## 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
- Competent and productive project management

### Electrical characteristics

- Technology/sensor
  - Hall effect sensors
  - Conductive plastic (with and without series resistor)
  - Digital steps (up to 4 per semi-axis)
  - Redundancy
  - Exact interlinear
  - Neutral position switch
  - Directional switch
  - Snap-action switching element
- Output signal
  - Proportional
  - With/without centre tab
  - Digital
  - Redundant
  - AC/DC 5V/0.07A up to 500V/10A
  - Customised
- Interfaces
  - CAN, CANopen, J1939, SPI, USB

### Ambient conditions

Temperature

- 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

- Depending on mounting, handle type and function (up to IP65, IP67, IP69K)

### Customised joysticks – EAO is here to advise

Each joystick can be individually configured for your specific application. The EAO team will help you select and specify the optimum products to meet your individual application requirements, also for customised versions.



*Simulated picture of a possible application.*

# 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  
5 VDC
- 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**

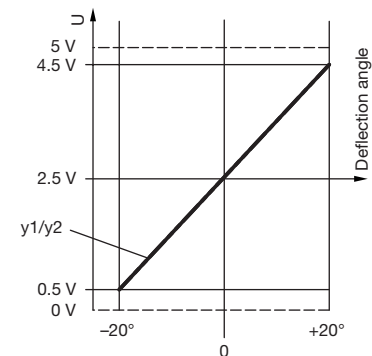
- IP65 front protection
- IP40 rear protection



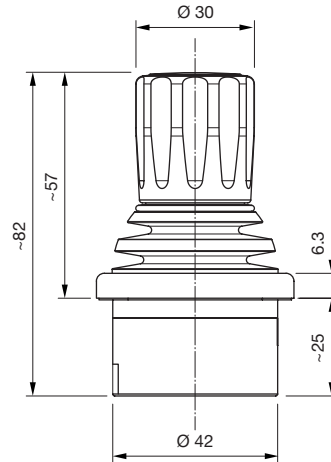
Gate



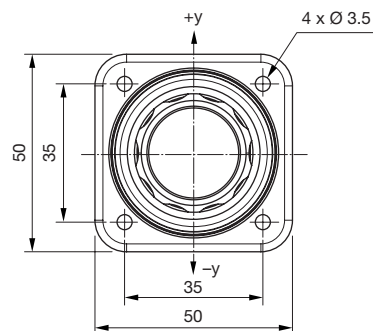
Diagram Y-axis



Dimensions



View from above



# 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 0.18Nm / Z-axis 0.075 Nm
- Operating torque  
X/Y-axis 0.42 Nm / Z-axis 0.18 Nm
- Max. allowable torque  
X/Y-axis 18Nm /  
Z-axis 10Nm

**Electrical characteristics**

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

**Technology**

- Hall effect sensors

**Connections**

- Minitek plug (8-pole)

**Ambient conditions**

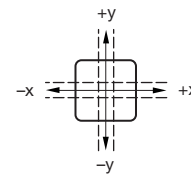
- Operating temperature  
 $-30^\circ\text{C}$  to  $+80^\circ\text{C}$
- Storage temperature  
 $-40^\circ\text{C}$  to  $+85^\circ\text{C}$

**Degree of protection**

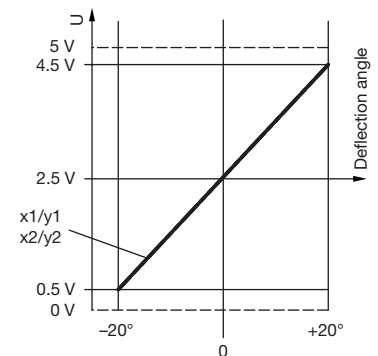
- IP65 front protection
- IP40 rear protection



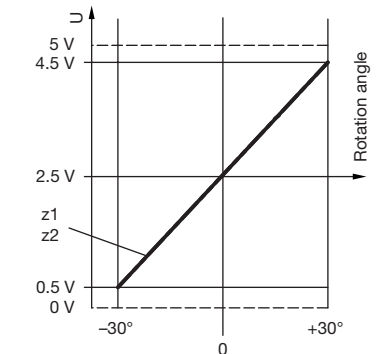
**Gate**



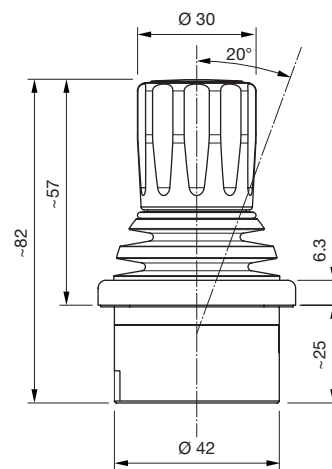
**Diagram X-, Y-axis**



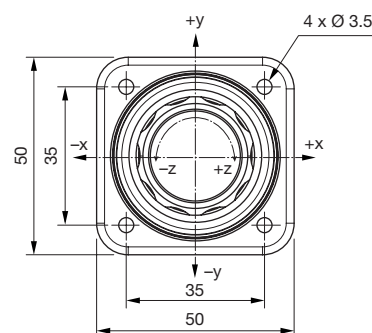
**Diagram Z-axis**



**Dimensions**



**View from above**



# Joystick, small and beautiful.

**Part No.**  
09-01.22224.0128

**Mechanical characteristics**

- Mounting from above, four screws (Ø 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 5 VDC
- Output signal proportional ( $-x1/y1 = 0.5V/\text{average} = 2.5V/+x1/y1 = 4.5V$ ) ( $-x2/y2 = 4.5V/\text{average} = 2.5V/+x2/y2 = 0.5V$ )
- Redundancy all axes

**Technology**

- Hall effect sensors

**Connections**

- Minitek plug (8-pole)

**Ambient conditions**

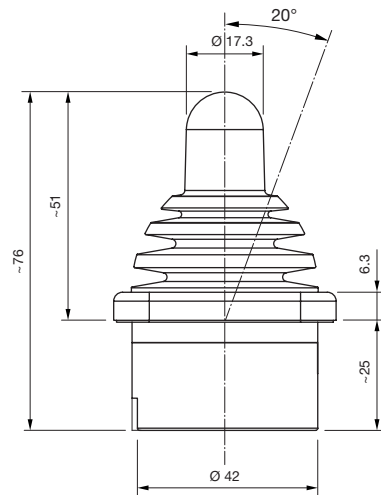
- Operating temperature -30 °C to +80 °C
- Storage temperature -40 °C to +85 °C

**Degree of protection**

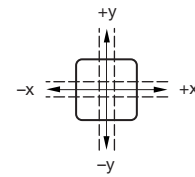
- IP67 front protection
- IP40 rear protection



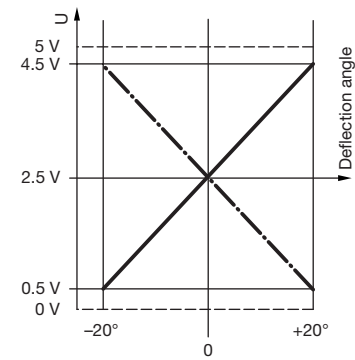
**Dimensions**



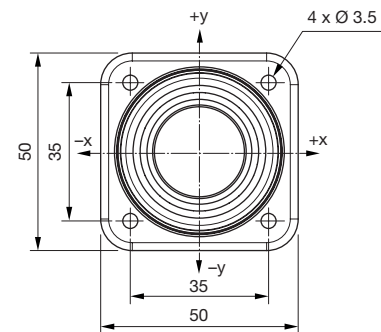
**Gate**



**Diagram X-, Y-axis**



**View from above**



# 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 0.16Nm
- Operating torque  
X/Y-axis 0.5Nm
- Max. allowable torque  
X/Y-axis 18Nm

**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**

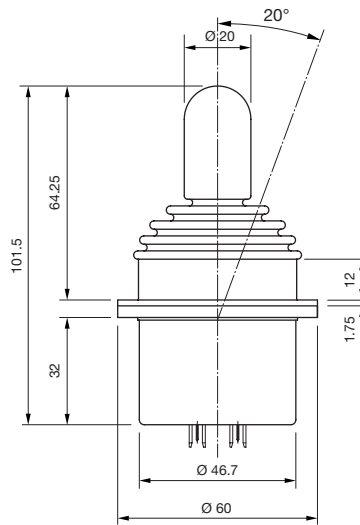
- Operating temperature  
 $-30^\circ\text{C}$  to  $+80^\circ\text{C}$
- Storage temperature  
 $-40^\circ\text{C}$  to  $+85^\circ\text{C}$

**Degree of protection**

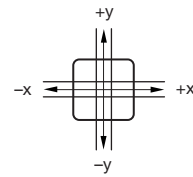
- IP67 front protection
- IP40 rear protection



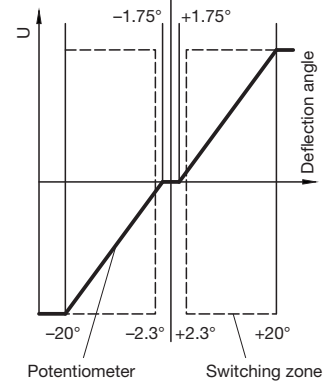
**Dimensions**



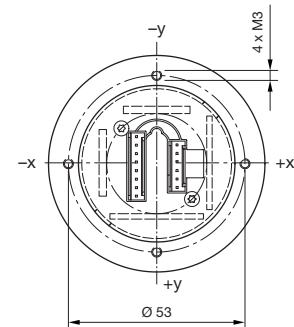
**Gate**



**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 36VDC

## Technology

- Hall effect sensors

## Connections

- Dubox plug (4-pole)

## Interfaces

- CANopen/J1939 interface

## Ambient conditions

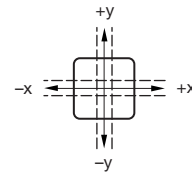
- Operating temperature  
-30 °C to +80 °C
- Storage temperature  
-40 °C to +85 °C

## Degree of protection

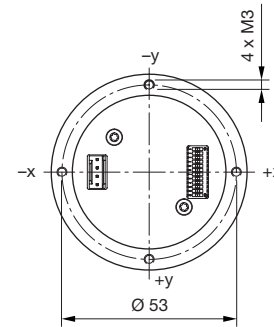
- IP65 front protection
- IP40 rear protection



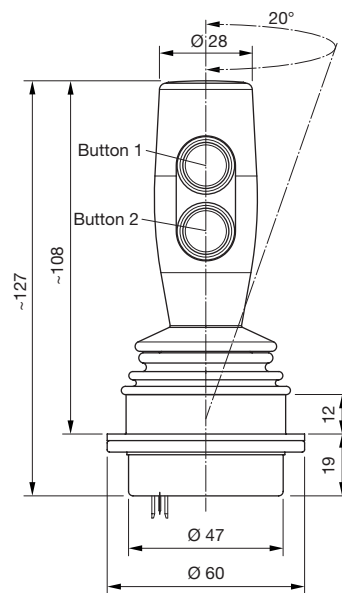
## Gate



## Bottom view



## Dimensions





# 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

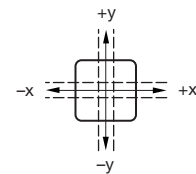
- Operating temperature  
-30 °C to +80 °C
- Storage temperature  
-40 °C to +85 °C

## Degree of protection

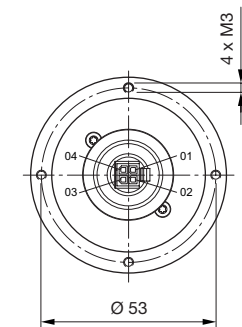
- IP65 front protection
- IP40 rear protection



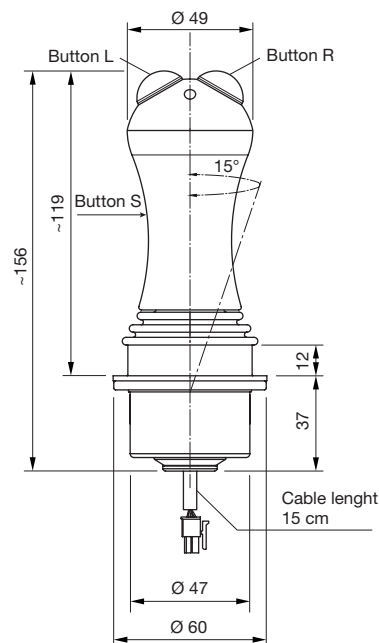
## Gate



## 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 0.19Nm
- Operating torque  
X/Y-axis 0.7Nm
- Max. allowable torque  
X/Y-axis 18Nm

## Electrical characteristics

- Operating voltage  
max. 5VDC/5mA
- 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

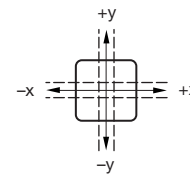
- Operating temperature  
-30°C to +80°C
- Storage temperature  
-40°C to +85°C

## Degree of protection

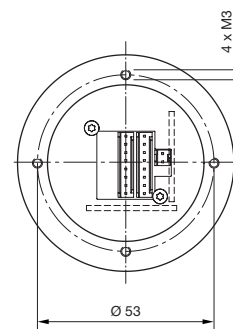
- IP65 front protection
- IP40 rear protection



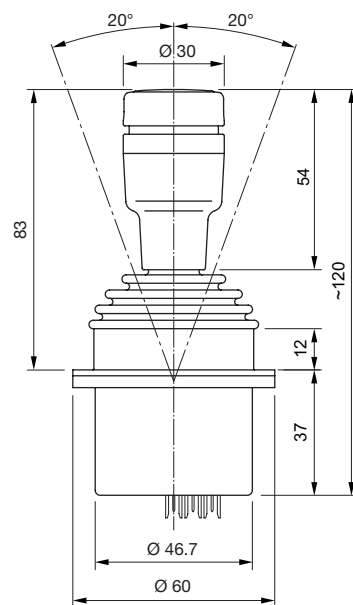
## Gate



## Bottom view



## Dimensions



# 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. 30 VDC
- Output signal  
proportional without centre tab

**Technology**

- Conductive plastic

**Connection**

- Dubox plug (3-pole)

**Ambient conditions**

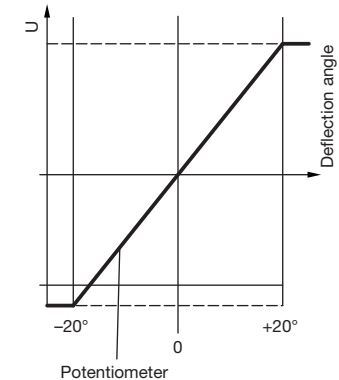
- Operating temperature  
-30 °C to +80 °C
- Storage temperature  
-40 °C to +85 °C

**Degree of protection**

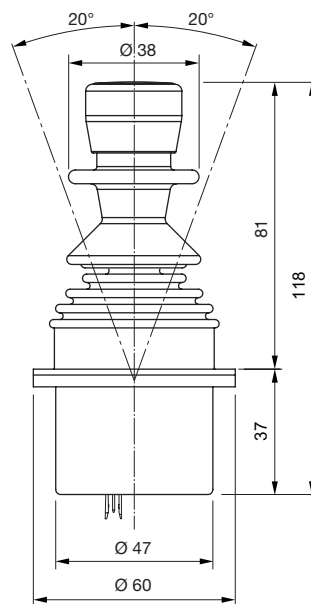
- IP65 front protection
- IP40 rear protection



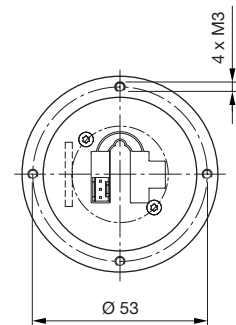
Diagram Y-axis



Dimensions



Bottom view



# Toggle stick, 4 directions with momentary position.

## Applications

The toggle stick from Series 45 (4 directions with momentary position, lockable) is suitable for various applications.

## Part No.

–

## Mechanical characteristics

- Mounting  
Ø 22.5 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/500V
- Contact material  
silver

## Ambient conditions

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

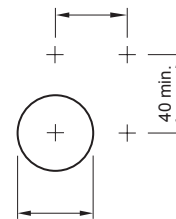
## Degree of protection

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

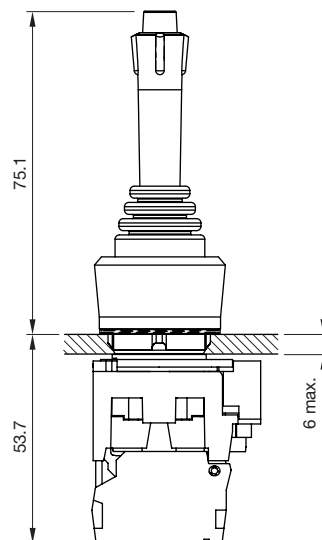
Configure your product in a few steps  
at [eao.com/products](http://eao.com/products).



## Mounting cut-outs



## Dimensions



## Lever switch, 8 positions.

### Applications

The lever switch from Series 44 (8 positions) is suitable for various applications.

### Part No.

44-800.8

### Mechanical characteristics

- Mounting  
Ø 22.5 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

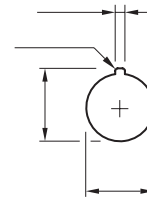
### Degree of protection

- IP65 front protection
- IP20, IP40 rear protection

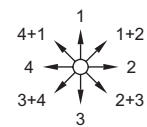
A choice of three lever switches can be found at [eao.com/products](http://eao.com/products).



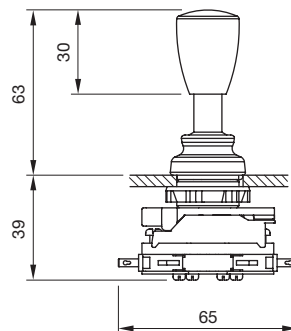
### Mounting cut-outs



### Wiring diagram



### Dimensions



## *Customer-oriented. More than an expert, a partner.*

Being close to customers and able to offer a comprehensive range of services are fundamental to our success and at the core of our corporate policy.

EAO AG, a Swiss, family-owned company founded in 1947, has developed into one of the world's leading manufacturers of high-quality industrial switches, complete custom HMI panels and interface systems, and specialised automotive switch systems.

Efficient and modern development processes, effective global supply chains and skilled project and consultation management represent additional services that we offer our customers and business partners around the world.

### **Your solution-focused expert and partner**

We do much more than just manufacture individual control elements. As a solution-

focused partner, we provide the option of technically and mechanically customising existing HMI Components in line with our customers' individual requirements. From simple control elements through to sophisticated HMI Systems, from serial production through to installation – we offer the entire range of HMI services and inspire the confidence of our customers.

EAO's production sites in Switzerland, Germany, North America and China combine volume production, development, research, and logistics. In addition to these centres of competence, EAO has 10 sales companies around the world at its disposal.

Thanks to this comprehensive network and our 50 distribution companies in the major industrialised countries, EAO is represented wherever interactions between humans and machines play key roles.





# Visit our website.

## EAO.COM

EAO, the expert partner for Human Machine Interfaces (HMIs), offers a variety of innovative, intuitive and reliable HMI Products and Services.

### Online product configurator

Build your tailored product in the online product configuration system and obtain technical specifications and 3D data at the same time. The right HMI for you, step by step: [eao.com/products](http://eao.com/products)

### EAO downloads

Find more extensive documents such as catalogues, data sheets, certificates and brochures to read and use for research: [eao.com/downloads](http://eao.com/downloads)

### Related documents

Find out more about our innovative, intuitive and reliable HMI Products and Solutions.



Image  
Brochure



Automotive  
Brochure



Transportation  
Brochure



Machinery  
Brochure



Series 45  
Brochure

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