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Your Expert Partner for **Human Machine Interfaces**

Series 09

Rugged Keypads and Rotary Cursor Controllers.

www.eao.com/09



Series 09 Rugged Keypads and RCC.
Rugged. Modular. Reliable.

Designed for harsh operating conditions and E1 applications with CAN bus integration – *The robust control units with intelligent illumination are ideally suited for use in heavy duty and special vehicle applications.*

Series 09 Rugged Keypads offer high reliability: The modules are designed for E1 applications and are suitable for safety-relevant applications in accordance with DIN EN ISO 13849. The CAN bus connection ensures an intelligent and free programmability. The robust, modular design with sealing levels of up to IP6K9K and the ability to customise and individually select and arrange the keypad legends make these high-quality devices ideally suited for harsh use in heavy duty and special vehicles.

High reliability is crucial to controlling safety-related applications in vehicles and machines – whether in construction vehicles, agricultural machinery or in special and commercial vehicles of various types. Harsh environments and low back panel depth require a robust and compact product design. The actuators and indicators must also be precisely configured, both mechanically and electronically, to suit the respective application. The high-quality Series 09 Rugged Keypads meet these requirements with cutting-edge system integration.

Robust, innovative design

Robust and innovative construction is a feature of the Rugged Keypads design. The actuators and indicators are as keypad with 6 or 8 pushbuttons or as rotary conntrollers available and are protected up to IP6K9K. They work reliably at operating temperatures from –40 °C to +85 °C. The low back panel depth and robust clip-in or screw-in mounting allow easy, flexible installation, either vertically or horizontally.

The rotary controllers of the rugged modules also have mechanical protection against unintentional contact and operation.

UX DESIGN AWARDS product 2021

These high-quality devices also offer excellent tactile feedback, and are clearly visible in daylight and at night thanks to the powerful RGB LED halo and LED symbol illumination. Attractive and freely configurable 4-segment halo button illumination is integrated (depending on the product variant). The customisable illumination – e.g. steady lighting, flashing, pulses, rotations or colour changes – provides the operator with excellent visual feedback, and is combined with a unique design that has received multiple awards for functionality and usability from renowned institutions.

Functional safety and CAN bus integration

The Rugged Keypads feature a high reliability and are suitable for safety-relevant applications in accordance with the DIN EN ISO 13849 PLd. Integrated safety features, such as permanent function monitoring or the detection of blocked keys, actively support the customer in integrating the keypads into his security concept. Thanks to the CAN bus integration, the devices are intelligently and easily integrated into a bus system using a Deutsch DT series plug.

The PREMIUM version of the Series 09 Rugged Keypads are equipped with the CANopen Safety protocol and achieve Performance Level D (PLd).

CANopen safety easy to use

Manufacturing competence and IATF 16949

The Series 09 modules are produced in our automotive competence centre located in Germany. This allows us to apply years of comprehensive experience as an original equipment manufacturer (OEM) in the automotive industry to the heavy duty and special vehicle markets. At the same time, this offers EAO customers high quality, durable, and intuitive products and services. The development and production process is aligned and executed according to automotive standards (IATF 16949, 100 % product traceability, 100 % EOL testing, etc.).

Advantages.

- Robust, ergonomic and innovative design sealed up to IP6K9K protection
- Suitable for functional safety applications according to DIN EN ISO 13849
- Intelligent, reliable HMIs with CAN bus integration
- Programmable symbol and 4-segment RGB halo ring illumination for function feedback
- Maximum flexibility through modular design and application-specific configuration options

Typical applications
- Special vehicles
  including fire-fighting vehicles, road sweepers, cleaning vehicles, refuse trucks, snow removers and groomers
- Heavy duty vehicles
  including construction and agricultural equipment
- Machines at/around/on the vehicle

HMI functions
- Keypad with 6 or 8 pushbuttons
- Rotary Pushbutton (RPB) with rotation function, 360°, 20 detents, infinitely variable
- Rotary Cursor Controller (RCC) with additional tilt function: X/Y, digital with micro switch

The digital joystick function is implemented with a 3-dimensional tilting movement, which enables safe operation even under difficult operating conditions. This actuation method ensures reliable and accurate operation and guards against switching errors.

Mechanical characteristics
- Actuating force:
  Pushbutton: approx. 6.5 N or 11 N (depending on variant)
  Rotary Controller: approx. 12 N
- Overload: 250 N
- Mechanical lifetime:
  Pushbutton: up to 2 mio. cycles of operation
  Rotary Controller: 500 000 cycles
- Impact resistance:
  IK07 according to IEC 62262

Electrical characteristics
- Operating voltage range: 8–32 VDC
- Quiescent current: < 5 mA
- Load Dump A or B

Illumination
- LED symbol illumination
  – Colour: white LED
  – Luminance: approx. 20 cd/m² (dimmable)
- LED halo ring illumination with
  4 segments, RGB or single colour LED (depending on the product variant)
  – Luminance: approx. 1 500 cd/m²
- Illumination functions: steady lighting, flashing, pulses, rotations, colour changes
- Halo ring and symbol illumination can be configured independently

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

Connections/interfaces
- Hardwired
- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939, CANopen Safety according to EN 50325-5
- Baud rate 125, 250, 500, 1000 kBit/s (with software configurable)

Ambient conditions
- Operating temperature: –40 °C … +85 °C
- Storage temperature: –40 °C … +85 °C

Protection degree
- Up to IP6K9K* protection, front and rear side (basic version with IP20 on rear side)
- Up to IP6K7 protection (panel/screw-in)
- Up to IP5K4 protection (panel/clip-in)

Approvals and conformities
- DIN EN ISO 13849 PLd (PREMIUM variant)
- E1 ECE R10/ECE R118
  (except PREMIUM variant, RCC and RPB)
- CE

Further information is available under
www.eao.com/09

* Under extreme conditions, the symbol inserts may detach. These can be easily reinserted in the keypad. For further information, please refer to the operating instructions.

Features and benefits.



Sealing protection
Rugged and resistant according to IP6K9K. Complete protection against water, dust and salt allows cleaning even with increased water pressure. *1

Symbols
Interchangeable legends with LED backlit, symbols according to ISO 7000 or customer-specific.

Mounting options
Flexible vertical and horizontal installation as well as user-friendly clip-in and screw-in mounting.

Illumination *2
Modern, innovative RGB 4-segment halo ring illumination in nearly unlimited variety of colours and visual effects. The symbol illumination and halo ring illumination can be configured independently.

*1 for cleaning instructions, please refer to the operating instructions
*2 depending on product variant



Diversity of variants
Keypads with 6 or 8 pushbuttons and rotary cursor controller

Safety level *2
Suitable for functional safety applications according to DIN EN ISO 13849 PLd.

Communication protocols *2
Intelligent HMI with J1939, CANopen and CANopen Safety integration.

Design
Smart, optimised ergonomic design with low panel depth mounting.

Feedback
Tactile and visual feedback through optimised haptic design and versatile illumination options.

New application possibilities.

Status indication with halo segments
The 4-segment RGB halo ring illumination of the Rugged Keypads is ideal for dynamic status indications such as the display of fill levels or the gradual control of speed. This provides users with constant feedback on the current operating status. The distinguishing colours and the ability to make the four separate RGB segments light up, flash, pulsate or rotate guarantee intuitive operation and the intelligent integration into a customer-specific operating concept.

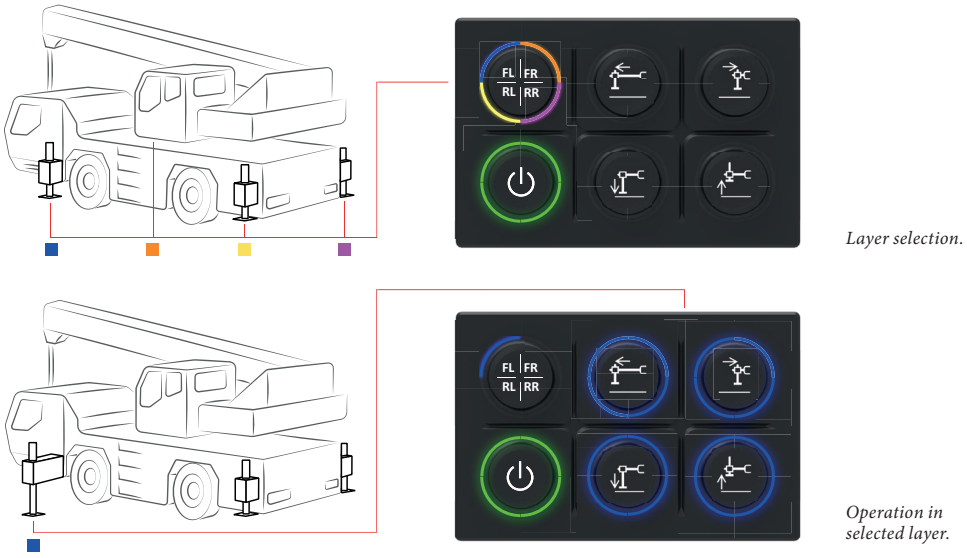
With the individually programmable LEDs it is possible to define different function layers and individual functions per segment – for even more functionality combined in one HMI.

Application examples
- Speed of performance modes
- Lifting and lowering
- Release/hold
- Navigation
- Start/stop
- Menu control/different function levels
- Heating/ventilation

Customer-specific operating concept



Example of a step-by-step operation



Functionally safe. Certified according to DIN EN ISO 13849 PLd.

Put your trust in the PREMIUM Keypad – developed for maximum safety and to reduce your risks and costs. Whether in heavy-duty or specialty vehicles – wherever vehicle bodies or attachments need to be moved and controlled automatically, safety and reliability are of the utmost importance. EAO's PREMIUM version of the Series 09 Rugged Keypad offers you an intelligent solution for demanding and safety-critical control tasks.

The PREMIUM version of the Series 09 Rugged Keypads meet the highest safety requirements and are developed according to DIN EN ISO13849. They achieve Performance Level D (PLd), which is confi rmed and certifi ed by DEKRA Testing and Certification GmbH. The PREMIUM keypads are specially designed for safety-critical applications and offer optimum safety and reliability.

Safe communication through CAN Open Safety

The Series 09 Rugged Keypads PREMIUM variant is equipped with the CANopen Safety protocol, which has been specially developed for safety-critical applications. CANopen Safety complies with international safety standards, in particular DIN EN ISO 13849, and uses various mechanisms for error detection and error correction. Redundancy in communication increases the reliability of the entire system.

In addition to easy integration, the CANopen Safety protocol offers the same advantages as CANopen: flexibility, real-time capability and scalability.

Maximum lifetime, minimum downtime

In addition to maximising safety and reliability, the PREMIUM version of the Series 09 impresses with its robust design and long lifetime. The durable and low-maintenance keypads significantly reduce downtime thanks to an integrated safety architecture that helps to prevent errors. This not only ensures smooth operation and increased efficiency in use, but also minimises the risks for operators and manufacturers.

The increased stability of the system has a direct positive effect on your operating costs. In addition, as a customer, you also benefit from reduced development and certification costs when functionally safe components are integrated – for a faster time to market.

Key product features

- Integrated safety architecture
- Performance Level d (PLd) according to DIN EN ISO 13849
- CANopen Safety Protocol
- DEKRA certifi ed
- Additional safety features in hardware and software (ButtonStuck Detection, Temperature Management, Permanent Heartbeat)

CANopen® safety easy to use



Optimal for your application.

Series 09 variants

The Series 09 Rugged Keypads are available with 6 and 8 pushbuttons and also in a range of different variants. These keypad variants and the rotary controllers (Rotary Cursor Controller/Rotary Pushbutton) have the flexibility of interchangeable legends, but come with a choice of different illumination features and connector types for example. Depending on the variant, the Rugged Keypads are also suitable for safety-relevant applications.

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

Variants	Halo ring illumination	Communication protocol	Switching element	IP protection	Connector	Switching function/s	Functional safety standard
PREMIUM 	4-segment RGB, freely configurable	CANopen Safety	Electromechanical switching element	IP6K7 frontside and rearside	Deutsch DT04-6P	Pushbutton	CANOpen safety protocol and functional safety, certified according to DIN ISO 13849 PLd
SUPER 	4-segment RGB, freely configurable	CANopen, J1939	Electromechanical switching element	IP6K7 frontside and rearside	Deutsch DT04-6P	Pushbutton	Suitable for functional safety applications according to EN ISO 13849
PLUS 	Red LED (other colours on request)	CANopen, J1939	Electromechanical switching element	IP6K7 frontside and rearside	Deutsch DT04-6P	Pushbutton	Suitable for functional safety applications according to EN ISO 13849
BASIC 	Red or yellow LED (other colours on request)	N.A. (hardwired)	Electromechanical switching element	IP6K7 frontside	Würth Elektronik WR-MPC3, 16 pins	Pushbutton	Suitable for functional safety applications due to diagnosable switching function for applications according to ISO 26262 and EN ISO 13849

Variants	Halo ring illumination	Communication protocol	Switching element	IP protection	Connector	Switching function/s	Functional safety standard
PREMIUM 	4-segment RGB, freely configurable	CANopen Safety	Electro-mechanical switching element	IP6K9K frontside and rear-side	Deutsch DT04-6P	Pushbutton	CANOpen safety protocol and functional safety, certified according to DIN ISO 13849 PLd
SUPER 	4-segment RGB, freely configurable	CANopen, J1939	Electro-mechanical switching element	IP6K9K frontside and rear-side	Deutsch DT04-6P	Pushbutton	Suitable for functional safety applications according to EN ISO 13849
PLUS 	Red LED (other colours on request)	CANopen, J1939	Electro-mechanical switching element	IP6K9K frontside and rear-side	Deutsch DT04-6P	Pushbutton	Suitable for functional safety applications according to EN ISO 13849
BASIC 	Red or yellow LED (other colours on request)	N.A. (hardwired)	Electro-mechanical switching element	IP6K9K frontside	Würth Elektronik WR-MPC3, 20 pins	Pushbutton	Suitable for functional safety applications due to diagnosable switching function for applications according to ISO 26262 and EN ISO 13849

Product / Variant	Halo ring illumination	Communication protocol	Switching element	IP protection	Connector	Switching function/s	Functional safety standard
RCC SUPER 	4-segment RGB, freely configurable	CANopen, J1939	Electro-mechanical switching element	IP6K7 frontside and rear-side	Deutsch DT04-6P	Pushbutton: Push RCC: Rotate/ Push/Tilt	Pushbuttons suitable for functional safety applications according to EN ISO 13849
RCC PLUS 	Red LED (other colours on request)	CANopen, J1939	Elektro-mechanisches Schalt-element	IP6K7 Frontseite und Rück-seite	Deutsch DT04-6P	Pushbutton: Push RCC: Rotate/ Push/Tilt	Pushbuttons suitable for functional safety applications according to EN ISO 13849
RPB SUPER 	4-segment RGB, freely configurable	CANopen, J1939	Electro-mechanical switching element	IP6K7 frontside and rear-side	Deutsch DT04-6P	Pushbutton: Push RPB: Rotate/ Push	Pushbuttons suitable for functional safety applications according to EN ISO 13849
RPB PLUS 	Red LED (other colours on request)	CANopen, J1939	Elektro-mechanisches Schalt-element	IP6K7 Frontseite und Rück-seite	Deutsch DT04-6P	Pushbutton: Push RPB: Rotate/ Push	Pushbuttons suitable for functional safety applications according to EN ISO 13849

Keypad PREMIUM.



CANopen safety easy to use

Functional Safety
- Developed and certified according to the safety requirements of DIN EN ISO 13849-1:2023
- Performance Level d (PLd)
- MTTFd (in operating years): 183 (Loaddump B)
- PFH: <21 FIT (Loaddump B)
- DC: >90 %

Mechanical characteristics
- Actuation force: approx. 6.5 N
- Overload: 250 N
- Mechanical lifetime: up to 2 million cycles of operation
- Impact resistance: IK07 according to IEC 62262

Electrical characteristics
- Operating voltage range 8–32 VDC

Illumination
- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  - Colour: white
  - Luminance: approx. 20 cd/m² (dimmable)
- LED halo ring illumination with four freely configurable segments
  - Multi-colour: RGB LED
  - Luminance: approx. 1 500 cd/m² (dimmable)
- Illumination functions: steady lighting, flashing, pulses, rotations, colour changes
  - Halo and symbol illumination can be configured individually

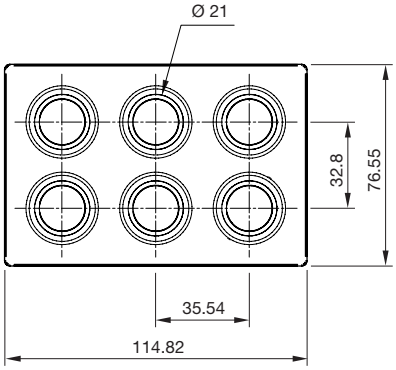
Symbols
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

Interfaces
- CAN interface (ISO 11898)
- CANopen Safety (EN 50325-5)
- Baud rate 125, 250, 500, 1000 kBit/s (software configurable) *1
- Connector Deutsch DT04-6P
- Designed in accordance with the safety requirements of vehicles as per ISO 26262 ASIL B and EN ISO 13849 PL d

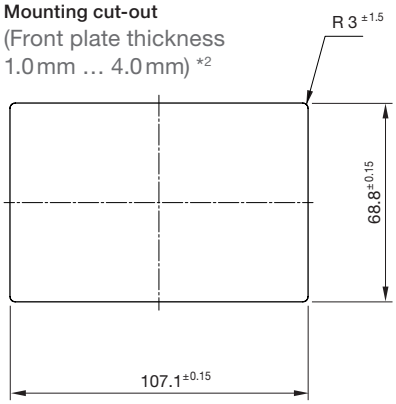
Ambient conditions
- Operating temperature –40 °C … +85 °C
- Storage temperature: –40 °C … +85 °C

Protection degree
- IP6K7 according to ISO 20653
- Up to IP6K7 (panel/screw-in version)
- Up to IP5K4 (panel/clip-in version)

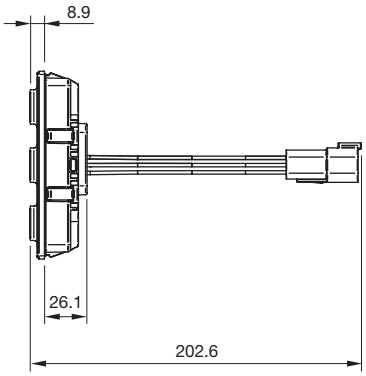
Dimensions
(All dimensions in mm)



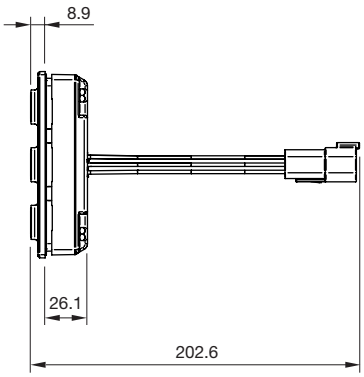
Mounting cut-out
(Front plate thickness 1.0 mm … 4.0 mm) *2



Mounting
Clip-in mounting



Screw-in mounting



*1 In development
*2 For vibration-proof mounting, a front plate of at least 2 mm thickness is recommended.

Keypad SUPER.



Mechanical characteristics
- Actuation force: approx. 6.5 N
- Overload: 250 N
- Mechanical lifetime: up to 2 million cycles of operation
- Impact resistance: IK07 according to IEC 62262

Electrical characteristics
- Operating voltage range: 8 – 32 VDC

Illumination
- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  – Colour: white
  – Luminance: approx. 20 cd/m², dimmable
- LED halo ring illumination with four freely configurable segments
  – Multi-colour: RGB
  – Luminance: approx. 1 500 cd/m² dimmable
- Illumination functions: steady lighting, flashing, pulses, rotations, colour changes
  – Halo and symbol illumination can be configured individually

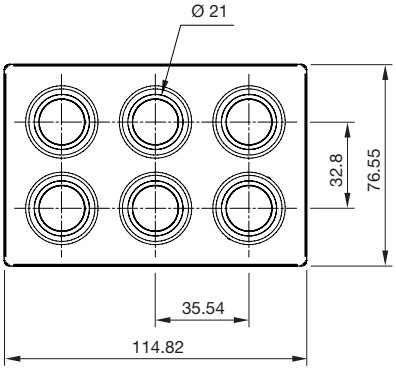
Symbols
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

Interfaces
- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939
- Baud rate 125, 250, 500, 1000 kBit/s (software configurable) *1
- Connector Deutsch DT04-6P

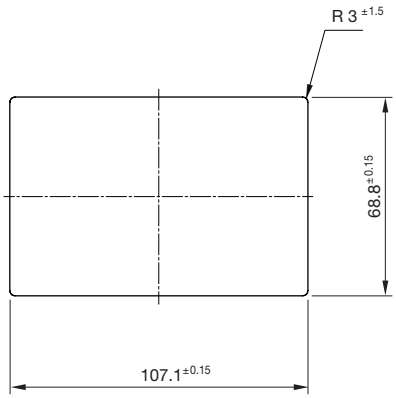
Ambient conditions
- Operating temperature: –40 °C … +85 °C
- Storage temperature: –40 °C … +85 °C

Protection degree
- IP6K7 according to ISO 20653
- Up to IP6K7 (panel/screw-in version)
- Up to IP5K4 (panel/clip-in version)

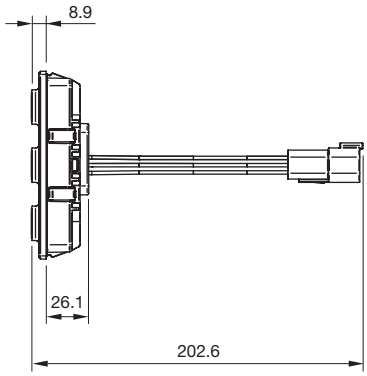
Dimensions
(All dimensions in mm)



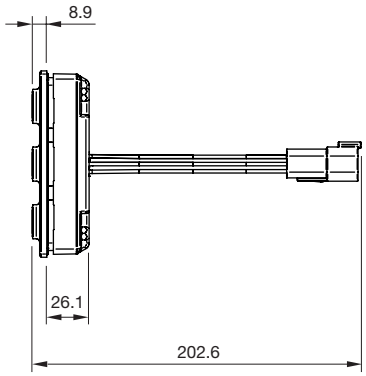
Mounting cut-out
(Front plate thickness 1.0 mm … 4.0 mm) *2



Mounting
Clip-in mounting



Screw-in mounting



*1 In development
*2 For vibration-proof mounting, a front plate of at least 2 mm thickness is recommended.

Keypad PLUS.



Mechanical characteristics
- Actuation force: approx. 6.5 N
- Overload: 250 N
- Mechanical lifetime: up to 2 million cycles of operation
- Impact resistance: IK07 according to IEC 62262

Electrical characteristics
- Operating voltage range: 8 – 32 VDC

Illumination
- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  - Colour: white
  - Luminance: approx. 20 cd/m², (dimmable)
- LED halo ring illumination
  - Colour: red (other colours on request)
  - Luminance: approx. 750 cd/m² (dimmable)
- Illumination functions: lighting, flashing, pulses
  - Halo and symbol illumination can be configured individually

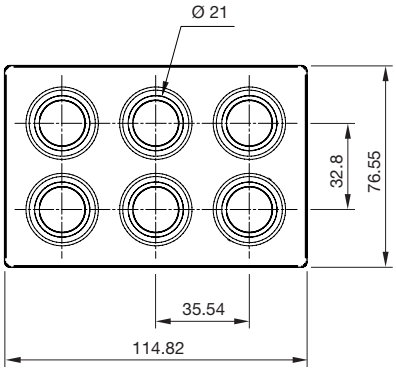
Symbols
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

Interfaces
- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939
- Baud rate 125, 250, 500, 1000 kBit/s (software configurable) *1
- Connector Deutsch DT04-6P

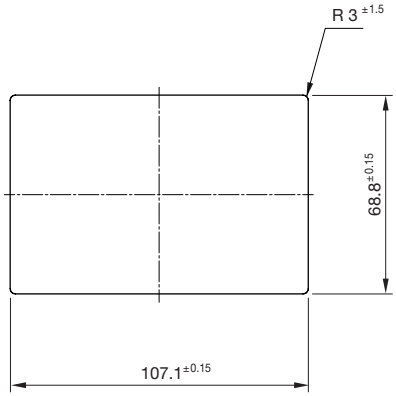
Ambient conditions
- Operating temperature: –40 °C … +85 °C
- Storage temperature: –40 °C … +85 °C

Protection degree
- IP6K7 according to ISO 20653
- Up to IP6K7 (panel/screw-in version)
- Up to IP5K4 (panel/clip-in version)

Dimensions
(All dimensions in mm)

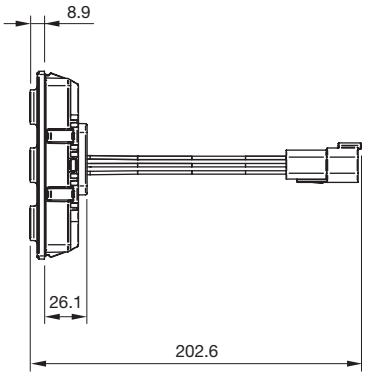


Mounting cut-out
(Front plate thickness 1.0 mm … 4.0 mm) *2

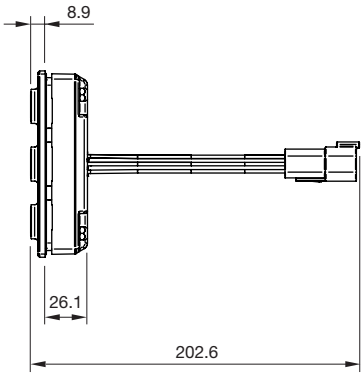


Mounting

Clip-in mounting



Screw-in mounting



*1 In development
*2 For vibration-proof mounting, a front plate of at least 2 mm thickness is recommended.

Keypad BASIC.



Mechanical characteristics
- Actuation force: approx. 6.5 N
- Overload: 250 N
- Mechanical lifetime: up to 2 million cycles of operation
- Impact resistance: IK07 according to IEC 62262

Electrical characteristics
- 8 – 18 VDC or 18 – 32 VDC for operating voltage of the illumination for use in 12 V or 24 V 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: approx. 20 cd/m², (dimmable)
- LED halo ring illumination
  – Colour: red or yellow (other colours on request)
  – Luminance: approx. 750 cd/m²
- Illumination functions
  – Halo and symbol illumination can be configured individually

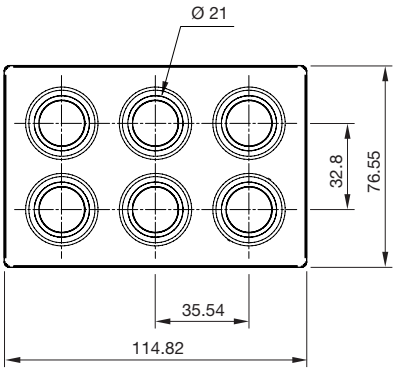
Symbols
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

Interfaces
- Connector: Würth Elektronik WR-MPC3, 16 Pins

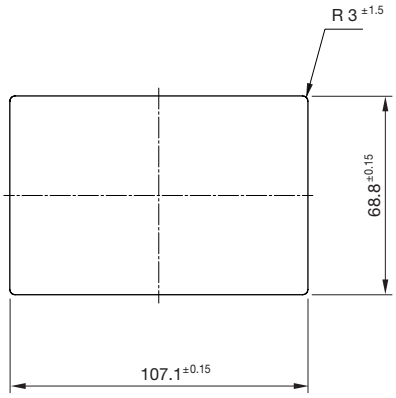
Ambient conditions
- Operating temperature: –40 °C … +85 °C
- Storage temperature: –40 °C … +85 °C

Protection degree
- IP6K7 (front side)
- IP20 (rear side) according to ISO 20653
- Up to IP6K7 (panel/screw-in version)
- Up to IP5K4 (panel/clip-in version)

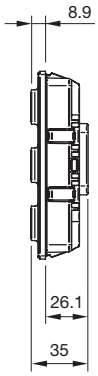
Dimensions
(All dimensions in mm)



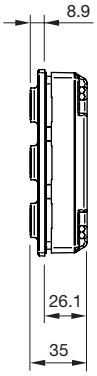
Mounting cut-out
(Front plate thickness 1.0 mm … 4.0 mm) *



Mounting
Clip-in mounting



Screw-in mounting



* For vibration-proof mounting, a front plate of at least 2 mm thickness is recommended.

Keypad PREMIUM.



CANopen safety easy to use

Functional Safety
- Developed and certified according to the safety requirements of DIN EN ISO 13849-1:2023
- Performance Level d (PLd)
- MTTFd (in operating years): 91
- PFH: <32 FIT
- DC: >90 %

Mechanical characteristics
- Actuation force: approx. 11 N
- Overload: 250 N
- Mechanical lifetime: up to 2 million cycles of operation
- Impact resistance: IK07 according to IEC 62262

Electrical characteristics
- Operating voltage range 8–32 VDC

Illumination
- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  - Colour: white
  - Luminance: approx. 20 cd/m² (dimmable)
- LED halo ring illumination with four freely configurable segments
  - Multi-colour: RGB LED
  - Luminance: approx. 1 500 cd/m² (dimmable)
- Illumination functions: steady lighting, flashing, pulses, rotations, colour changes
  - Halo and symbol illumination can be configured individually

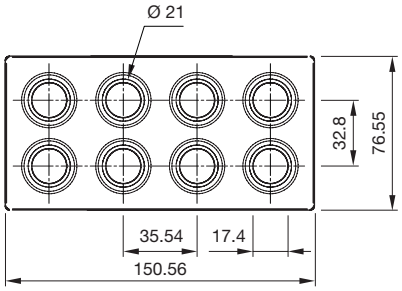
Symbols
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

Interfaces
- CAN interface (ISO 11898)
- CANopen Safety (EN 50325-5)
- Baud rate 125, 250, 500, 1000 kBit/s (software configurable) *1
- Connector Deutsch DT04-6P
- Designed in accordance with safety requirements of vehicles as per ISO 26262 ASIL B and EN ISO 13849 PL d

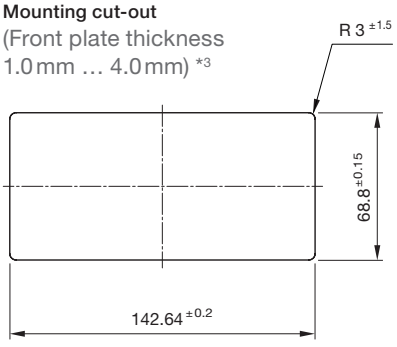
Ambient conditions
- Operating temperature –40 °C … +85 °C
- Storage temperature: –40 °C … +85 °C

Protection degree
- IP6K9K according to ISO 20653 *2
- Up to IP6K9 (panel/screw-in version)
- Up to IP5K4 (panel/clip-in version)

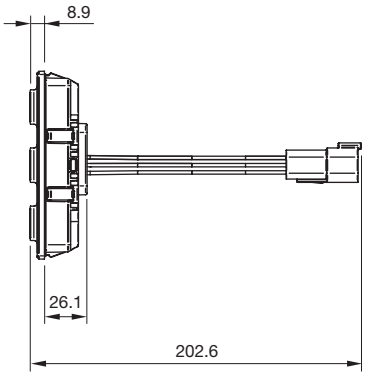
Dimensions
(All dimensions in mm)



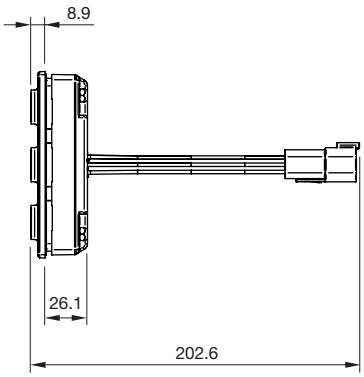
Mounting cut-out
(Front plate thickness 1.0 mm … 4.0 mm) *3



Mounting
Clip-in mounting



Screw-in mounting



*1 in development

*2 Under extreme conditions, the symbol inserts may detach. These can be easily reinserted in the keypad. For further information, please refer to the operating instructions.

*2 For vibration-proof mounting, a front plate of at least 2 mm thickness is recommended.

Keypad SUPER.



Mechanical characteristics
- Actuation force: approx. 11 N
- Overload: 250 N
- Mechanical lifetime: up to 2 million cycles of operation
- Impact resistance: IK07 according to IEC 62262

Electrical characteristics
- Operating voltage range: 8 – 32 VDC

Illumination
- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  - Colour: white
  - Luminance: approx. 20 cd/m² (dimmable)
- LED halo ring illumination with four freely configurable segments
  - Multi-colour: RGB
  - Luminance: approx. 1 500 cd/m² (dimmable)
- Illumination functions: steady lighting, flashing, pulses, rotations, colour changes
  - Halo and symbol illumination can be configured individually

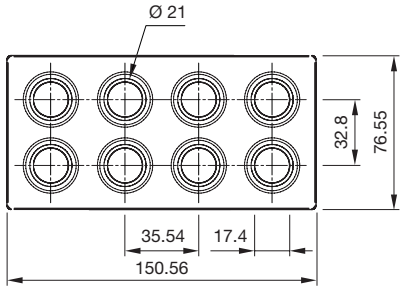
Symbols
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

Interfaces
- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939
- Baud rate 125, 250, 500, 1000 kBit/s (software configurable) *1
- Connector Deutsch DT04-6P

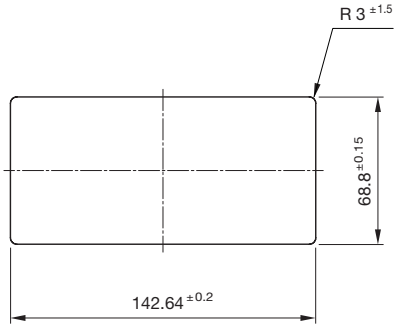
Ambient conditions
- Operating temperature: –40 °C … +85 °C
- Storage temperature: –40 °C … +85 °C

Protection degree
- IP6K9K according to ISO 20653 *2
- Up to IP6K9 (panel/screw-in version)
- Up to IP5K4 (panel/clip-in version)

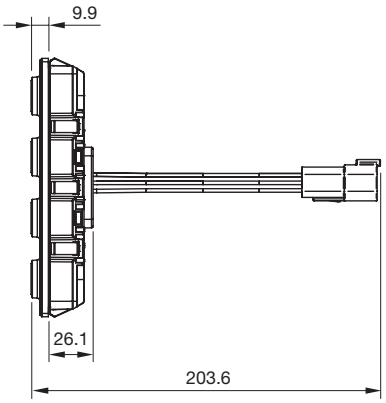
Dimensions
(All dimensions in mm)



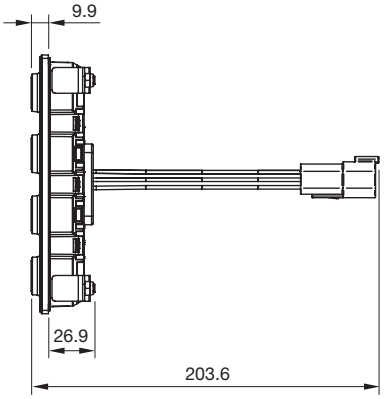
Mounting cut-out
(Front plate thickness 1.0 mm … 4.0 mm) *3



Mounting
Clip-in mounting



Screw-in mounting



*1 in development

*2 Under extreme conditions, the symbol inserts may detach. These can be easily reinserted in the keypad. For further information, please refer to the operating instructions.

*2 For vibration-proof mounting, a front plate of at least 2 mm thickness is recommended.

Keypad PLUS.



Mechanical characteristics
- Actuation force: approx. 11 N
- Overload: 250 N
- Mechanical lifetime: up to 2 million cycles of operation
- Impact resistance: IK07 according to IEC 62262

Electrical characteristics
- Operating voltage range: 8 – 32 VDC

Illumination
- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  – Colour: white
  – Luminance: approx. 20 cd/m², (dimmable)
- LED halo ring illumination
  – Colour: red (other colours on request)
  – Luminance: approx. 750 cd/m² (dimmable)
- Illumination functions: lighting, flashing, pulses
  – Halo and symbol illumination can be configured individually

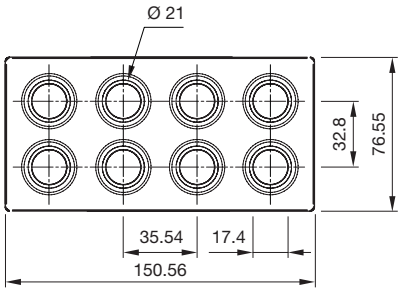
Symbols
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

Interfaces
- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939
- Baud rate 125, 250, 500, 1000 kBit/s (software configurable) *1
- Connector Deutsch DT04-6P

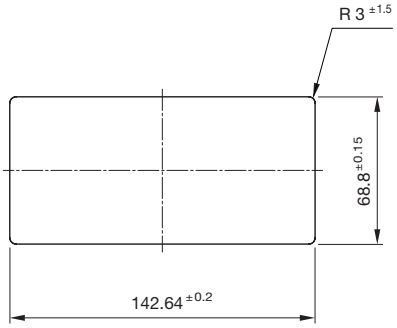
Ambient conditions
- Operating temperature: –40 °C … +85 °C
- Storage temperature: –40 °C … +85 °C

Protection degree
- IP6K9K according to ISO 20653 *2
- Up to IP6K7 (panel/screw-in version) *2
- Up to IP5K4 (panel/clip-in version)

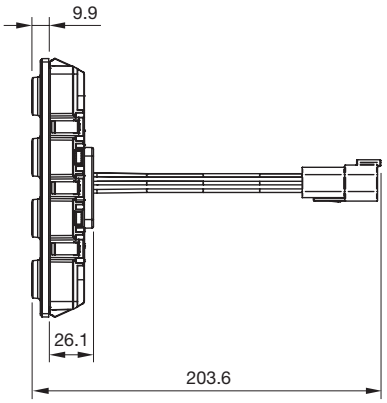
Dimensions
(All dimensions in mm)



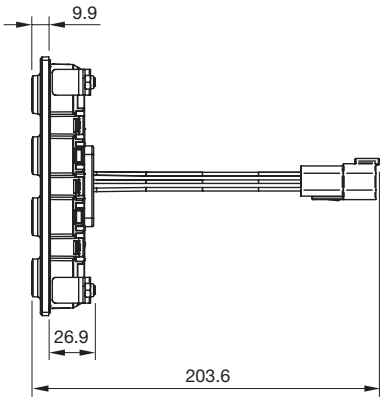
Mounting cut-out
(Front plate thickness 1.0 mm … 4.0 mm) *3



Mounting
Clip-in mounting



Screw-in mounting



*1 In development

*2 Under extreme conditions, the symbol inserts may detach. These can be easily reinserted in the keypad. For further information, please refer to the operating instructions.

*3 For vibration-proof mounting, a front plate of at least 2 mm thickness is recommended.

Keypad BASIC.



Mechanical characteristics
- Actuation force: approx. 11 N
- Overload: 250 N
- Mechanical lifetime: up to 2 million cycles of operation
- Impact resistance: IK07 according to IEC 62262

Electrical characteristics
- 8–18 VDC or 18–32 VDC for operating voltage of the illumination for use in 12 V or 24 V 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: approx. 20 cd/m², (dimmable)
- LED halo ring illumination
  - Colour: red or yellow (other colours on request)
  - Luminance: approx. 750 cd/m²
- Illumination functions
  - Halo and symbol illumination can be configured individually

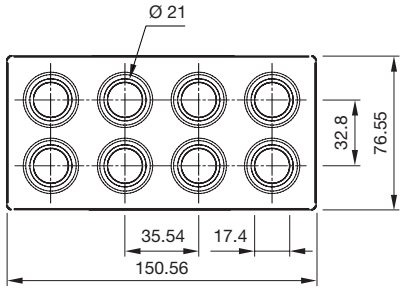
Symbols
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

Interfaces
- Connector: Würth Elektronik WR-MPC3, 20 Pins

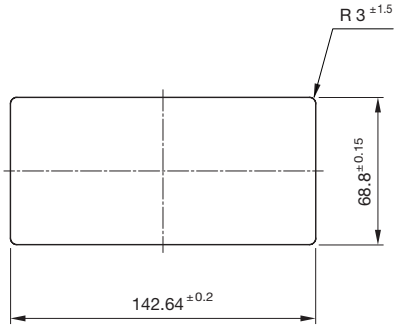
Ambient conditions
- Operating temperature: –40 °C … +85 °C
- Storage temperature: –40 °C … +85 °C

Protection degree
- IP6K9K (front side)
- IP20 (rear side) according to ISO 20653 *1
- Up to IP6K9K (panel/screw-in version)
- Up to IP5K4 (panel/clip-in version)

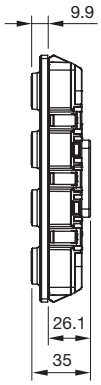
Dimensions
(All dimensions in mm)



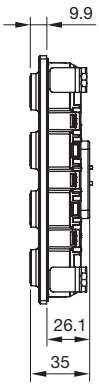
Mounting cut-out
(Front plate thickness 1.0 mm … 4.0 mm) *2



Mounting
Clip-in mounting



Screw-in mounting



*1 Under extreme conditions, the symbol inserts may detach. These can be easily reinserted in the keypad. For further information, please refer to the operating instructions.

*2 For vibration-proof mounting, a front plate of at least 2 mm thickness is recommended.

Rotary Cursor Controller SUPER.



Mechanical characteristics
- Actuation force: approx. 11 N
- Overload: 250 N
- Mechanical lifetime:
  Pushbuttons: up to 2 million cycles of operation
  Rotary Switch: up to 500 000 cycles
- Impact resistance:
  IK07 according to IEC 62262

Rotary pushbutton
- Rotation function: 360°, 20 detents, incremental
- Tilt angle: X/Y, digital with micro-switch

Electrical characteristics
- Operating voltage range: 8–32 VDC
- LoadDump A or B

Illumination
- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  – Colour: white
  – Luminance:
  approx. 20 cd/m² (dimmable)
- LED halo ring illumination with four freely configurable segments
  – Multi-colour: RGB
  – Luminance: approx. 1 500 cd/m² (dimmable, depending on colour)
- Illumination functions: steady lighting, flashing, pulses, rotations, colour changes

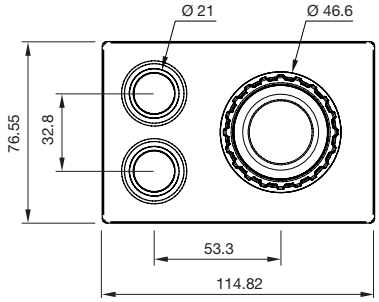
Symbols
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

Interfaces
- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939
- Baud rate 125, 250, 500, 1000 kBit/s (software configurable) *1
- Connector Deutsch DT04-6P

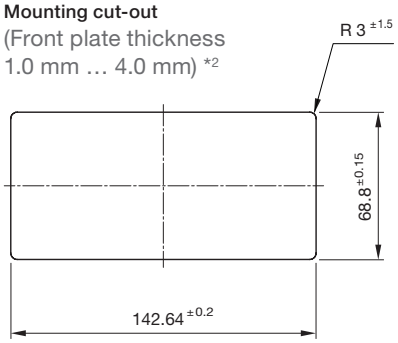
Ambient conditions
- Operating temperature:
  –40 °C … +85 °C
- Storage temperature:
  –40 °C … +85 °C

Protection degree
- IP6K9K according to ISO 20653
- Up to IP6K9K (panel/screw-in version)
- Up to IP5K4 (panel/clip-in version)

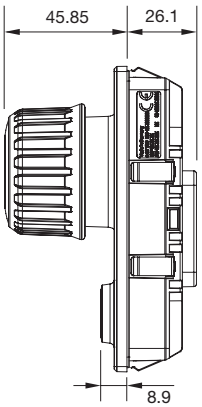
Dimensions
(All dimensions in mm)



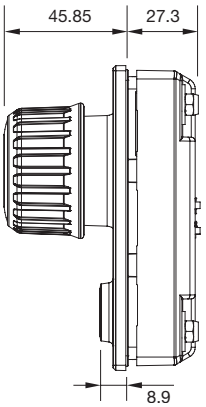
Mounting cut-out
(Front plate thickness 1.0 mm … 4.0 mm) *2



Mounting
Clip-in mounting



Screw-in mounting



*1 in development

*2 For vibration-proof mounting, a front plate of at least 2 mm material thickness and the use of the screw mounting variant is recommended.

Rotary Cursor Controller PLUS.



Mechanical characteristics
- Actuation force: approx. 11 N
- Overload: 250 N
- Mechanical lifetime:
  Pushbuttons: up to 2 million cycles of operation
  Rotary Switch: up to 500 000 cycles
- Impact resistance:
  IK07 according to IEC 62262

Rotary pushbutton
- Rotation function: 360°, 20 detents, incremental
- Tilt angle: X/Y, digital with micro-switch

Electrical characteristics
- Operating voltage range: 8–32 VDC
- LoadDump A or B

Illumination
- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  – Colour: white
  – Luminance: approx. 20 cd/m², (dimmable)
- LED halo ring illumination
  – Colour: red
  (other colours on request)
  – Luminance: approx. 1 500 cd/m²
  (dimmable, depending on colour)
- Illumination functions steady lighting, flashing, pulses, rotations, colour changes

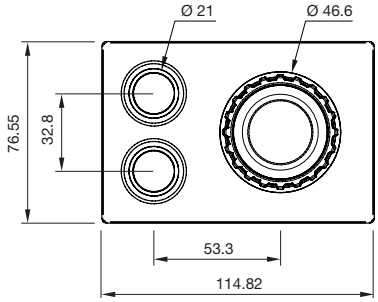
Symbols
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

Interfaces
- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939
- Baud rate 125, 250, 500, 1000 kBit/s (software configurable) *1
- Connector Deutsch DT04-6P

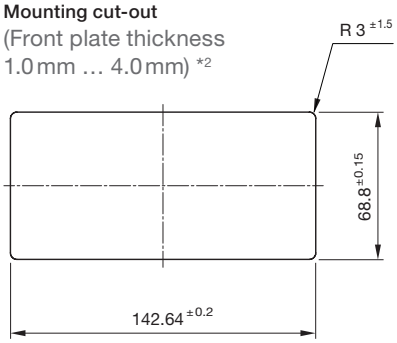
Ambient conditions
- Operating temperature:
  –40 °C … +85 °C
- Storage temperature:
  –40 °C … +85 °C

Protection degree
- IP6K9K according to ISO 20653
- Up to IP6K9K (panel/screw-in version)
- Up to IP5K4 (panel/clip-in version)

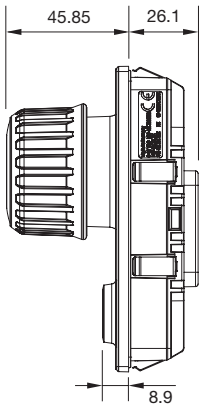
Dimensions
(All dimensions in mm)



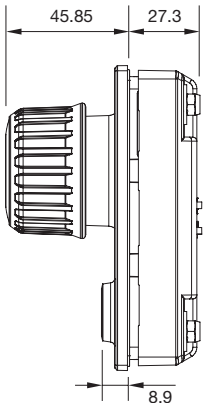
Mounting cut-out
(Front plate thickness 1.0 mm … 4.0 mm) *2



Mounting
Clip-in mounting



Screw-in mounting



*1 in development

*2 For vibration-proof mounting, a front plate of at least 2 mm material thickness and the use of the screw mounting variant is recommended.

Rotary Pushbutton SUPER.



Mechanical characteristics
- Actuation force: approx. 11 N
- Overload: 250 N
- Mechanical lifetime:
  Pushbuttons: up to 2 million cycles of operation
  Rotary Switch: up to 500 000 cycles
- Impact resistance:
  IK07 according to IEC 62262

Rotary pushbutton
- Rotation function: 360°, 20 detents, incremental

Electrical characteristics
- Operating voltage range: 8–32 VDC
- LoadDump A or B

Illumination
- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  – Colour: white
  – Luminance:
  approx. 20 cd/m² (dimmable)
- LED halo ring illumination with four freely configurable segments
  – Multi-colour: RGB
  – Luminance: approx. 1 500 cd/m² (dimmable, depending on colour)
- Illumination functions: steady lighting, flashing, pulses, rotations, colour changes

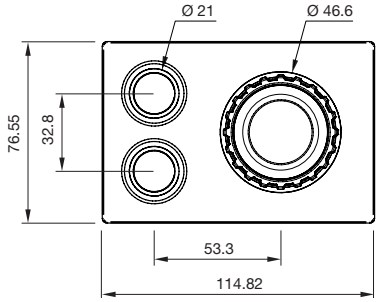
Symbols
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

Interfaces
- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939
- Baud rate 125, 250, 500, 1000 kBit/s (software configurable) *1
- Connector Deutsch DT04-6P

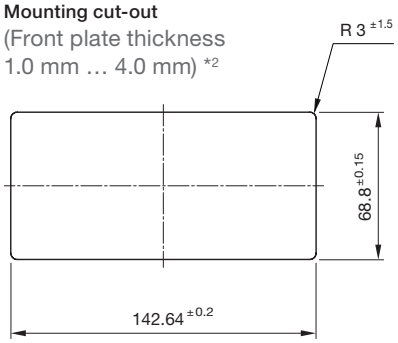
Ambient conditions
- Operating temperature:
  –40 °C … +85 °C
- Storage temperature:
  –40 °C … +85 °C

Protection degree
- IP6K9K according to ISO 20653
- Up to IP6K9K (panel/screw-in version)
- Up to IP5K4 (panel/clip-in version)

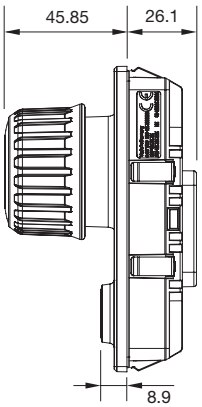
Dimensions
(All dimensions in mm)



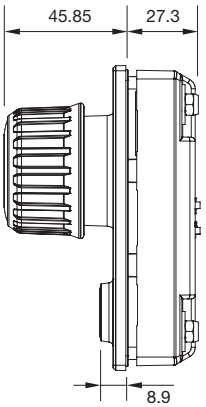
Mounting cut-out
(Front plate thickness 1.0 mm … 4.0 mm) *2



Mounting
Clip-in mounting



Screw-in mounting



*1 in development

*2 For vibration-proof mounting, a front plate of at least 2 mm material thickness and the use of the screw mounting variant is recommended.

Rotary Pushbutton PLUS.



Mechanical characteristics
- Actuation force: approx. 11 N
- Overload: 250 N
- Mechanical lifetime:
  Pushbuttons: up to 2 million cycles of operation
  Rotary Switch: up to 500 000 cycles
- Impact resistance:
  IK07 according to IEC 62262

Rotary pushbutton
- Rotation function: 360°, 20 detents, incremental

Electrical characteristics
- Operating voltage range: 8–32 VDC
- LoadDump A or B

Illumination
- Halo ring and symbol illumination can be configured independently
- LED symbol illumination
  – Colour: white
  – Luminance: approx. 20 cd/m², (dimmable)
- LED halo ring illumination
  – Colour: red
  (other colours on request)
  – Luminance: approx. 1 500 cd/m²
  (dimmable, depending on colour)
- Illumination functions steady lighting, flashing, pulses, rotations, colour changes

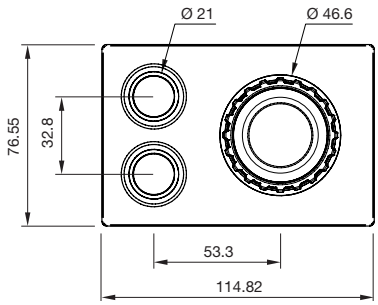
Symbols
- Symbols in accordance with ISO 7000
- Customer-specific symbols on request

Interfaces
- CAN interface (ISO 11898)
- CAN protocols: CANopen (CiA 401), CAN J1939
- Baud rate 125, 250, 500, 1000 kBit/s (software configurable) *1
- Connector Deutsch DT04-6P

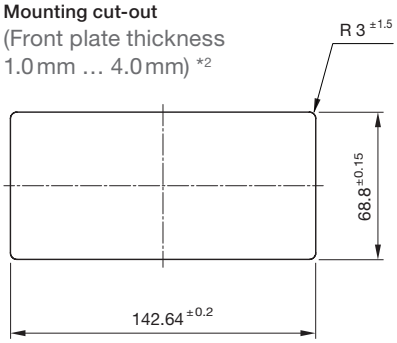
Ambient conditions
- Operating temperature:
  –40 °C … +85 °C
- Storage temperature:
  –40 °C … +85 °C

Protection degree
- IP6K9K according to ISO 20653
- Up to IP6K9K (panel/screw-in version)
- Up to IP5K4 (panel/clip-in version)

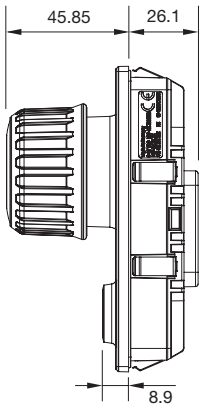
Dimensions
(All dimensions in mm)



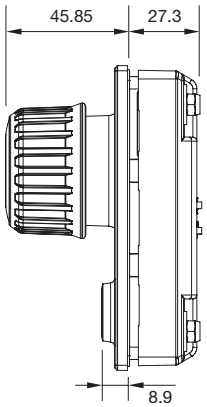
Mounting cut-out
(Front plate thickness 1.0 mm … 4.0 mm) *2



Mounting
Clip-in mounting



Screw-in mounting



*1 In development

*2 For vibration-proof mounting, a front plate of at least 2 mm material thickness and the use of the screw mounting variant is recommended.

Rotary Cursor Controller and Rotary Pushbutton.

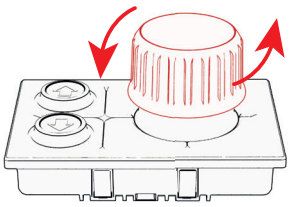
The Series 09 Rotary Cursor Controller and Rotary Pushbutton Modules are designed for use in special vehicles, trucks and buses. They cover the functions of a rotary control, a pushbutton and, in the case of the Rotary Cursor Controller, also a digital joystick. The modules are ideal for control and selection within a vehicle display or navigation in a user menu.

The two additional pushbuttons supplement the functionalities of the RCC and RPB and can be configured with individual HALO ring and symbol illumination and symbols depending on the product variant.

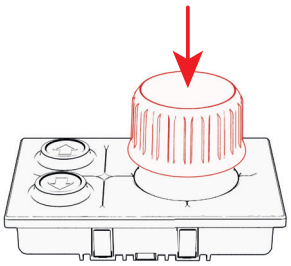
The joystick function of the Rotary Cursor Controller is implemented with a three-dimensional tilt function. The tilt function in the X/Y direction has been designed with integrated protection against unintentional contact and actuation, so that safe operation is possible even under difficult conditions, for example under strong movement.

With this high level of safety, our Series 09 rugged modules stand not only for intuitive, but also for reliable operation in the vehicle interior.

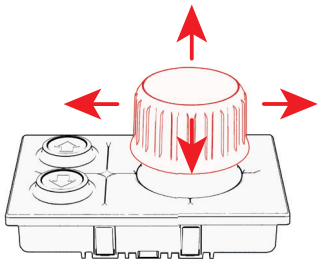
Functions



"Rotate" function.

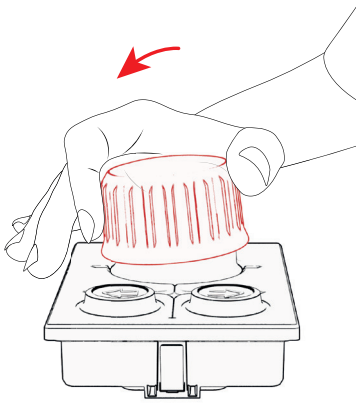


"Push" function.



"Joystick" function.

Operation



Intuitive operation with two or three fingers.



Protection against unintentional actuation through lateral contact.

Accessories.



Protective shroud

Series 09

For protection against unintentional actuation and operating errors.
In some applications, users face additional challenges when operating HMIs. For example, in vehicles that are continuously in motion on uneven terrain or when using work equipment such as work gloves – which can cause additional difficulties in the operation of HMIs. To prevent unintentional actuation or operating errors, EAO offers a protective shroud for its robust Rugged Keypads with 6 or 8 pushbuttons. The Protective Shroud can simply be screwed onto the Rugged Keypad, thus separating the individual pushbuttons. The additional guidance of the fingers makes it easy to operate the desired function

The robust and shock-resistant protective shroud also serves to comply with specific standards in various areas of application. For example, the EN1501-1:2021 standard requires all control and monitoring units on the outside of garbage trucks to be secured against accidental actuation or contact. In this way, erroneous operation and uncontrolled movement of equipment parts such as the lifting devices can be avoided. Likewise, HMIs on garbage trucks must also be able to be operated with work gloves.

Advantages
- Prevention of unintentional actuation
- Finger guidance and separation of individual pushbuttons
- Reduced risk of operating errors

Interchangeable symbol inserts

Series 09

Flexibility – customisable for your specific application.
The interchangeable symbol inserts are available with ISO 7000 or customer-specific symbols. This enables the Series 09 products to be perfectly adapted to your application.

In addition to the standard colour black, symbol inserts are also available in a variety of other colours.

The symbol insert tool with trendy design enables userfriendly fitting and removal of symbol inserts of the pushbuttons.



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EAO reserves the right to change specifications without further notice.

700.067.BR09-Keypads.03/05.2026