



# Product overview



# Sensors and customised operator controls – Made in Germany

## All development and process steps at a single source

As an expanding, globally active foundation company with more than 950 employees, we develop and manufacture sensor solutions and operating systems for industrial machines and mobile machinery. Our high-quality products are characterised by a high range of vertical integration and are manufactured in a carbon-neutral manner in Germany.

With our innovative, contactless sensor products, we support our customers worldwide in constructing machines and vehicles that set standards in terms of performance, operating comfort, safety and quality.

## Facts and figures

- > Company headquarters in Leutkirch in Allgäu
- > Founded in 1972
- > 3 production plants
- > 10 distribution companies
- > Executive management: Michael Hetzer, Dr. Thilo Ittner, Rüdiger Köhler
- > More than 950 employees worldwide
- > Represented in 48 countries
- > 115 million euros in sales (2019)



# What makes elobau special?

## We are innovative, sustainable and responsible

elobau offers innovative products as well as customised, customer-specific solutions of outstanding quality on an internationally competitive level. We achieve this thanks to highly qualified employees and a high vertical integration of over 90%. We construct our own tools and have all key development areas such as mechanical, design, hardware and software development, test and inspection laboratory in-house. This allows us to guarantee high quality as well as speed, flexibility and reliability in product development.

elobau combines economic success with high ethical standards. As a company we continually pursue sustainable development in all areas, our focus is on people – customer, supplier and employee. Our four business areas guarantee a broad presence on the market:

- > **Operator controls**
- > **Sensors**
- > **Level measurement**
- > **Machine safety**

We report in accordance with the German Sustainability Code. All our activities and results are transparent and publicly available, for example in the report to the Economy for the Common Good.



# Sustainability & ecological responsibility

Sustainability is already deeply rooted in our company DNA. For us, this means making a serious effort to take only as much from the economic, ecological and social environment for corporate activities as you put back into it in other ways. It is only with dedication to the economy for the common good that we can create future security for our environment and our posterity. And that is what we strive for - day after day.

At the same time, we are working intensively on critically reflecting on and constantly improving processes in the different areas of the company concerning holistic sustainable activities.

## Resource-saving development

With simulation processes which accompany development, we avoid creating resource-intensive development loops. This way, we can design components optimally in line with material and strength considerations and save resources by reducing weight. This also shortens development times and prevents unnecessary field tests. Using simulation processes also assists us with the optimisation of production.



## Sustainable product design

Our 5,000 products, or more than 10,000 product versions, support elobau customers worldwide in constructing machines and vehicles which set standards regarding performance, operating comfort, safety and quality. Our products are made in Germany. And we manufacture them in a carbon-neutral manner.

## Durable and reliable products

We achieve an improved ecological footprint while creating added value for our customers with repair-friendly products and a long period of availability of spare parts, to name just a couple of examples. Furthermore, we make an above-average investment in research and development with 10% of our turnover. We want to create food for thought in our industries with innovative, sustainable products.

## Trendsetting development

With the development of a modular vehicle operating system, elobau has become a pioneer in the area of bio-based plastics: Our new 225MA midi armrest consists of about 75% bio-based plastics. With the combination of standard products in a variable configuration, we save a significant amount of resources by reducing the need for inefficient single projects for manufacturers requiring low quantities.



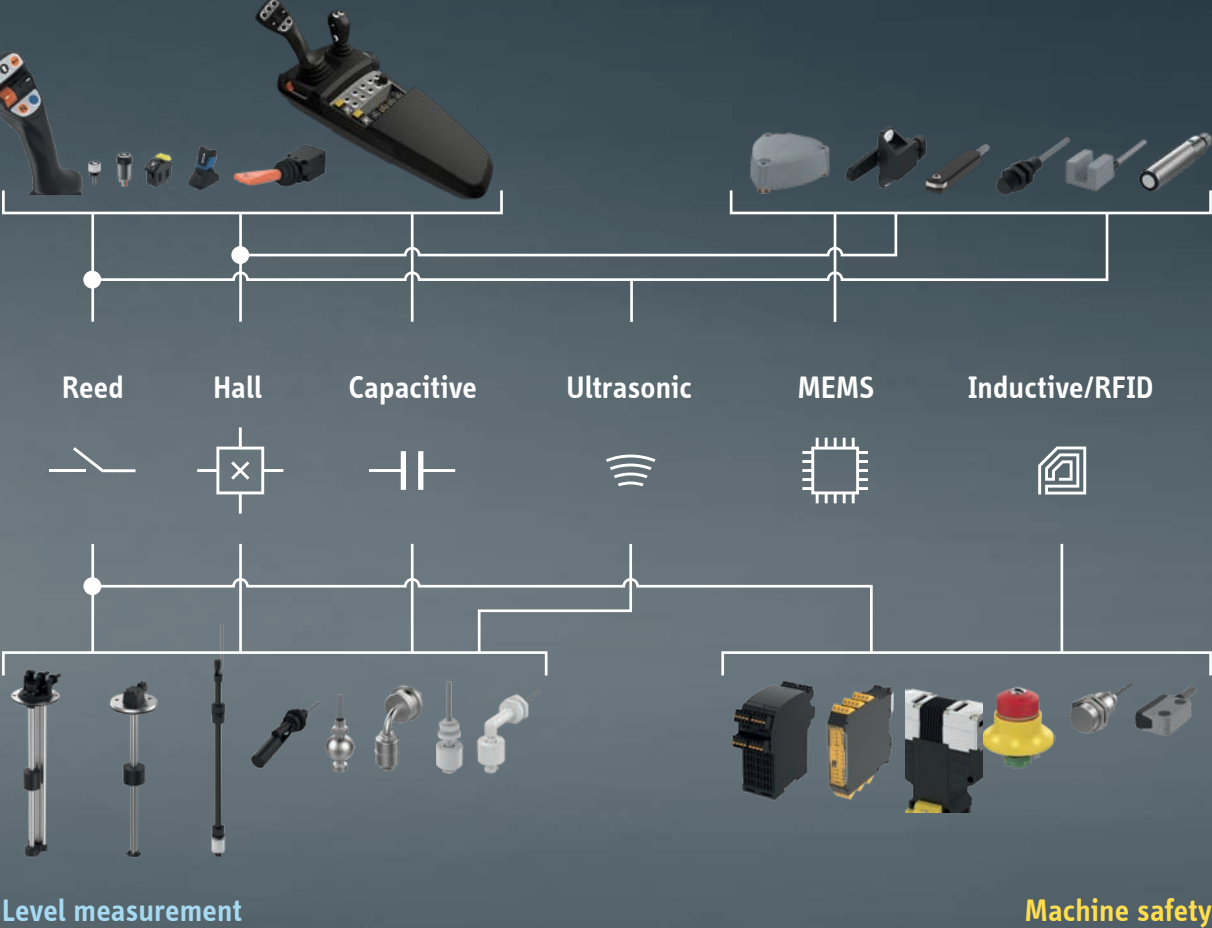
# Design based on durability

## Advantages of non-contact actuation

- > Maintenance-free
- > Hermetically sealed electronics with protection classes up to IP69K
- > Suitable for the harshest environmental conditions
- > Very long service life
- > Safe and reliable switching of extremely low currents
- > Wide variety of materials and special designs to ensure resistance against e.g. aggressive cleaning agents
- > Sensors can be installed under covers, as no mechanical connection between actuator and electronics is necessary
- > Maximum cost-efficiency

### Operator controls

### Sensors





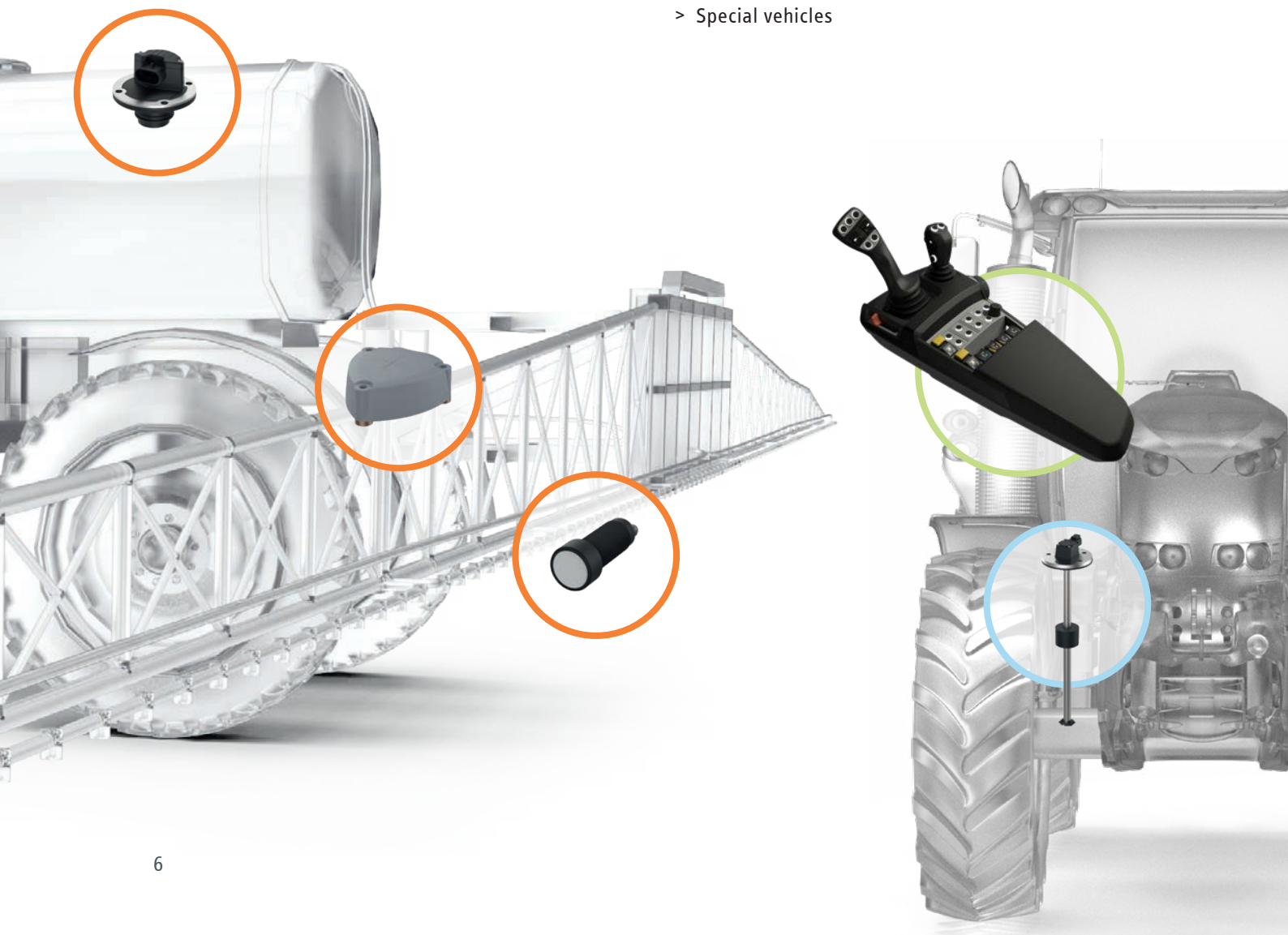
# Applications in mobile machinery

## Benefit from our expertise

Thanks to years of experience in collaboration with leading mobile machinery manufacturers, one of our main areas of expertise today is the off-highway sector. Whether a modularly designed, modified standard product or a customised development - every order completed will fulfill the expectations and individual requirements of every customer. This is our goal.

Our international customers are active in the following areas:

- > Agricultural machinery
- > Forestry machinery
- > Construction machinery
- > Industrial trucks
- > Municipal vehicles
- > Fire-fighting vehicles
- > Lifting platforms and cranes
- > Special vehicles



# Industrial applications

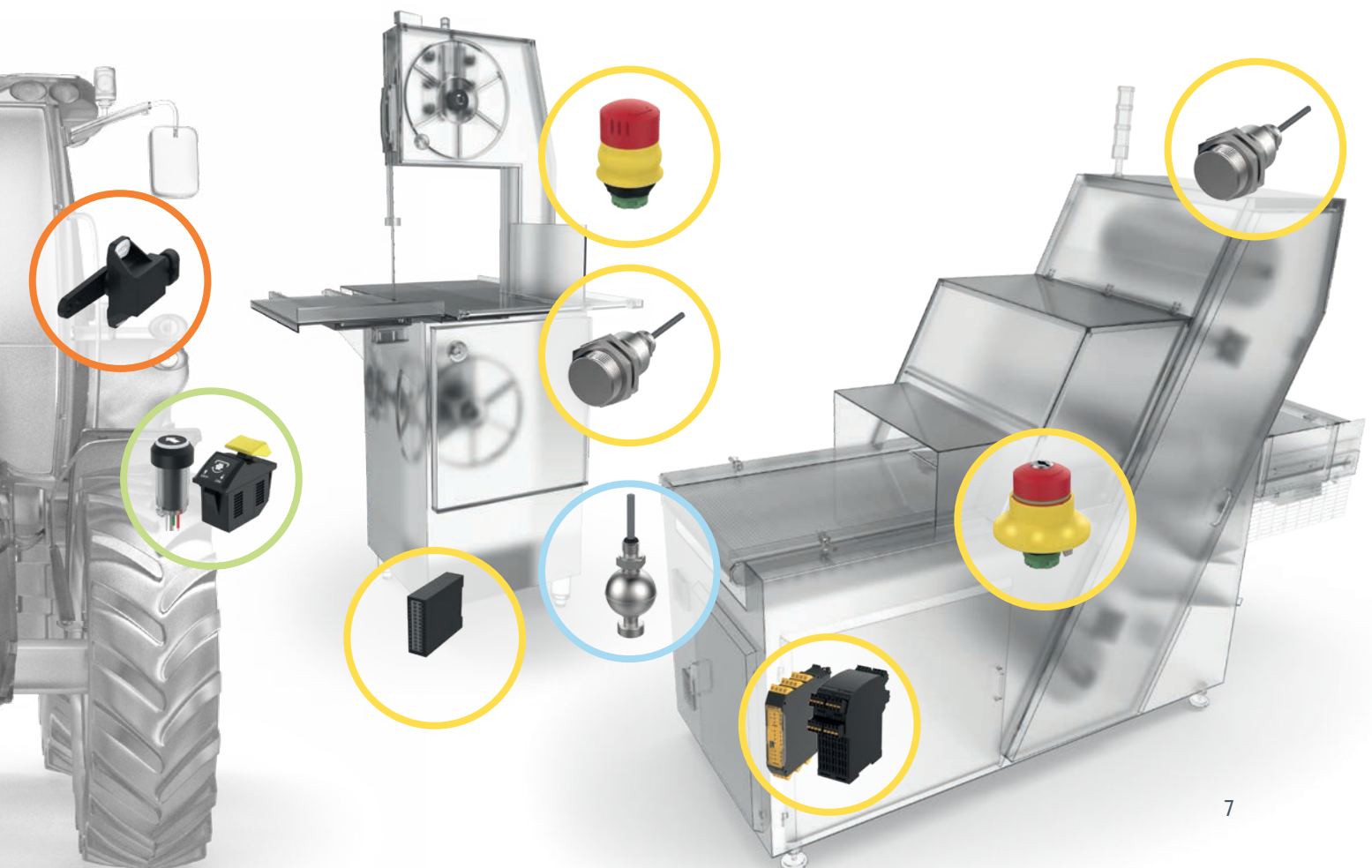
## Reliability from contactless actuation. Always.

As one of the first manufacturers for safety technology in machine construction, elobau started using reed switches in the 1970s. As contactless safety switches and sensors offer more freedom in machine designs, and are more cost-effective than other technologies, they are now well established in this area.

Reed technology is far superior to mechanical switches in terms of environmental influences. With high sensing distances and offset values, no mechanical interlocking is necessary, which means easy alignment.

Based on reed, Hall, RFID, ultrasonic and capacitive technologies, elobau offers a wide range of filling level measuring devices, proximity switches and sensors. Our products are used primarily in the following areas:

- > Packaging machinery
- > Food processing
- > Printing technology
- > Special machinery
- > Injection molding machines
- > Water processing
- > Medical technology
- > Environmental and process engineering



# Operator controls

elobau offers an extremely comprehensive range of standard products for operating and controlling mobile machinery. The versatility of our modular system means your ideal solution can be created quickly and easily.

Our standard portfolio forms the basis for customised products that can be created quickly and cost-effectively. We develop and manufacture exclusive, customer-specific solutions designed for your individual applications.

We design our products to fit effortlessly into your vehicle. The functionality and ergonomic design contributes to operator comfort and allows easy operation of the human-machine interface.

- > Contactless sensor technology ensures long service life
- > Ergonomic design with extremely compact construction
- > Simple installation
- > Analogue, digital, single-channel and redundant output signals as well as with direct bus connection via CANopen or SAE J1939
- > Night and function illumination
- > Adjustable actuation forces
- > Extremely robust
- > Protection class up to IP67
- > Temperature range -40 °C to +85 °C
- > Safety level up to PL d / SIL 2



## Custom operating systems

- > Expert consultation during design and development of the operating concept
- > Ergonomic arrangement according to operating logic
- > Consideration of electronic and mechanical connection even during the development phase
- > Integration of touch panels or displays
- > Highest level of quality assurance





## Modular operating systems

- > State-of-the-art technology and perfected ergonomic design
- > Configurable, multifunctional and modular
- > Custom variants without additional tools and development costs
- > Sustainable: 75% of the used plastics are bio-based; armrest made of innovative apple leather
- > Plug & Play: CAN bus (SAE J1939)



225MA midi

## Operation and control

### Joysticks and steering column switches

- > Modular design
- > All functions of joystick axes, push buttons and thumbwheels are freely configurable
- > Actuation types: no-detent / detent, with friction brake or overpressure points
- > Various deflections
- > Fatigue-free operation through ergonomic handles



JFT



151SL



J7



361G

J4F

### Push buttons

- > Sizes M12 and M30
- > Power take-off (PTO) function
- > Select from a wide range of colours
- > Individual, abrasion-resistant symbols
- > Various connection variants, e.g., NAMUR
- > Various sealed connector variants
- > Tactile performance over the entire service life



145MG



145



145NTG



151PTO



175D

# Sensors

elobau sensors are precise, contactless, and wear and maintenance free. The electronic sensors are based on Hall, MEMS, magnetoresistive or ultrasonic principle. The product range also includes a variety of reed-contact-based sensors for position detection, which can also be used in potentially explosive areas. The different technologies and designs mean that elobau sensors can be used problem free in many mobile and industrial applications.

As well as the extensive standard range, elobau also produces individual solutions quickly, efficiently and reliably, in close collaboration with the customer.

- > Long service life through contactless technologies
- > Simple, time-saving mounting
- > Precise measurement using high-resolution measurement methods
- > Large operating distances depending on the magnet
- > Wide variety of different electrical connections
- > Various output signals: analogue, digital, bus connection via CANopen or SAE J1939
- > Redundant variants
- > Robust and compact housing designs in various materials
- > Explosion-proof versions
- > NO, NC and CO contacts
- > Industry 4.0 ready - IO-Link
- > Temperature range -40°C - +150°C
- > Protection class up to IP69K

## Measurement of angles and tilt

### Tilt sensors

- > Monitoring of up to two axes
- > Zero-point calibration via IR remote control
- > Measurement range with up to four switching points can be freely combined
- > Switch-on and switch-off delay
- > Selectable vibration filter and signal delay
- > High repeating accuracy, low temperature drift
- > High reliability through MEMS technology



### Angle sensors

- > Selectable signal sequences
- > Measuring range up to 360°
- > Redundant versions
- > Convenient CANopen/SAE J1939 interface
- > Analogue and digital outputs



## Position detection

### Proximity switches

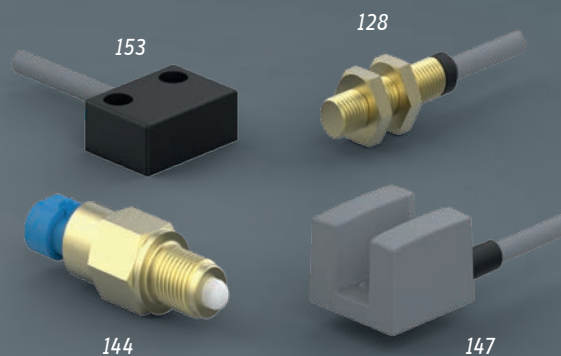
- > Various measuring principles: reed, Hall, magnetoresistive
- > Variants with ATEX approval
- > Optimised versions for pneumatic cylinders
- > Implementation of different operating distances
- > Detection of objects through non-ferrous materials

### Plunger operated switches

- > For end-position monitoring (e.g. of gearbox setting) or for piston monitoring
- > Housing design, plunger and stroke can be modified for individual applications

### Vane switches

- > Contactless actuation through ferrous metal
- > Large offset tolerances are possible
- > Wide variety of application possibilities, e.g. for elevator control, lifting platforms, construction machinery and special machinery



### Ultrasonic sensors

- > Measurement range up to 8m
- > Industry 4.0 ready with IO-Link
- > Four operating modes: retro-reflective, window, hysteresis and switching point operation
- > Large temperature range  $-40^{\circ}\text{C}$  -  $+150^{\circ}\text{C}$
- > Analogue and digital outputs
- > Temperature compensation
- > Synchronization and multiplex mode
- > ATEX approval



# Level measurement

Whether level detection, continuous level measurement, or integrated removal of various liquids – elobau offers the right solution for every application from a wide range of standard products. Various online configurators enable free selection from countless components from our extensive modular system. This allows us to create a modified, customised product solution in the shortest time possible.

We also develop exclusive, customer-specific solutions for your individual requirements for installation conditions, environmental influences or media resistance needs.

- > Various application possibilities with use of simple, tried and tested operating principles
- > Long service life and ideal for adverse operating conditions
- > Wide variety of electrical connections, process connections and materials
- > Float switch can be configured to your specific requirements
- > Measurement range up to 8m
- > Analogue and digital interfaces
- > Industry 4.0 ready – IO-Link
- > Temperature range -40°C - +180°C
- > Protection class up to IP69K

## Level detection

### Float switches based on reed technology

- > Modular system for implementing the optimum, application-specific solution
- > Customer-specific float switches with up to 20 individually definable switching points

### Float switch side mounts based on reed technology

- > Simple and economical level detection
- > Versions for soiled media
- > Solutions for mechanical loading and vibrations
- > Small designs for tight installation situations





## Continuous level measurement

### Fluid level sensors based on reed technology

- > Long service life, proven technology
- > Large range of materials (stainless steel, aluminium, PVC, PA, PP, PVDF)
- > Programming of up to four switching points
- > Simple fill-level calibration
- > Display available for filling level and temperature monitoring
- > Measurement resolution of 5 to 35 mm

### Ultrasonic filling level sensors

- > Contactless, wear-free measurement
- > Extreme inclinations possible through focus tube
- > Measurement resolution 1 mm
- > Wide selection of ultrasonic sensors for almost any application

### Removal and dosing with integrated level measurement

#### Suction pipes

- > Dosing units with empty indicator and advance warning for direct pump control
- > Suitable for a wide range of container heights by means of variable container screw connection
- > Integrated non-return valves for cleanly changing the containers
- > Thanks to standard materials such as PVC, PP and PVDF, can also be used in the most aggressive liquids

#### Float switch with fuel feed & return tube

- > Optimised for fuels and lubricants in the off-highway vehicle sector
- > For SCR catalyst systems (optionally with heating and cooling function)
- > Fuel-level sensor system with fuel removal and return
- > Various flanges available for direct mounting



# Machine safety

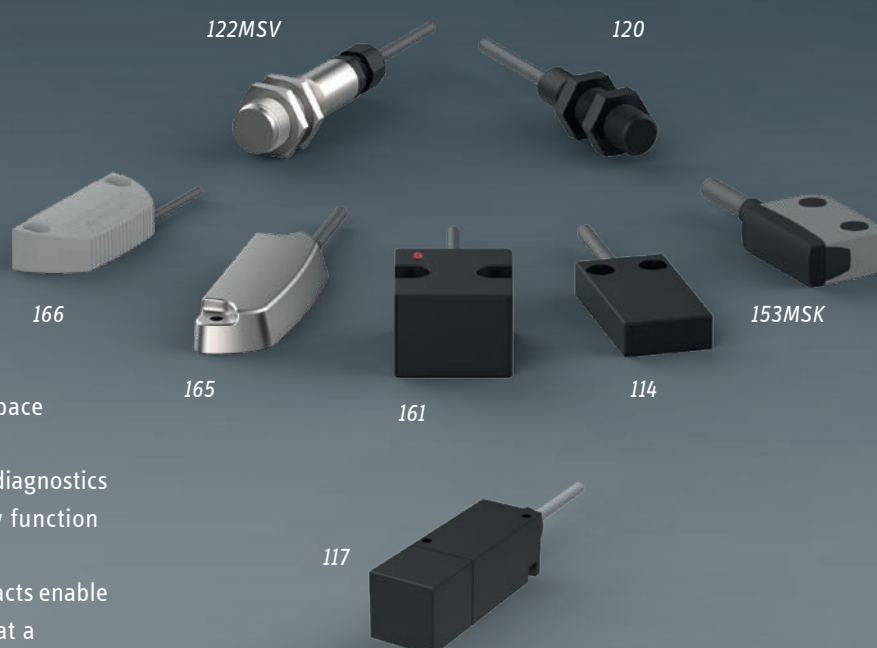
The machine safety products from elobau ensure the efficient use of machines and complex systems and at the same time protect man, machine and the environment. Magnetically actuated or RFID actuated safety sensors offer customisable solutions for monitoring movable guards or positions.

- > Up to PL<sub>e</sub> / SIL 3 and ATEX
- > Protection class up to IP69K
- > Hygienic versions
- > Ambient temperature range -25 °C to +100 °C
- > Space and time-saving installation
- > Different housing designs are available to suit a wide range of applications
- > Robust design ensures long service life

## Safe condition detection

### Safety sensors

- > All common contact types available
- > Cable or plug connection
- > Concealed installation possible
- > LED display for fast diagnostics
- > Series connection up to PL<sub>e</sub>



### Compact systems

- > Safety sensor with built-in relay saves space and money
- > Available with control contact and LED for diagnostics
- > Ideal for machinery with just one safety function and for retrofits
- > If safety functions are added, floating contacts enable integration into existing safety systems at a later stage

### Emergency stop buttons

- > Safely stop machines or systems
- > Maximum safety in every situation, whether illuminated, with key release or for environments with high hygiene requirements
- > Separate mounting of contact block and push button (attachment by means of simple screw connection with detent) enables custom combinations



### Safety interlocks

- > Mechanical locking of flaps, hoods and doors
- > Robust design with metal head



elobau safety control units reliably perform safety-related functions. They are the perfect solution for safety applications of varying levels of complexity. All signals typically used in the market are monitored reliably and, in the event of a fault, result in shutdown of the machinery.

- > Up to 128 safety inputs and up to 16 redundant safety outputs
- > Various compact housing designs
- > Pluggable connection terminals possible
- > Up to PL<sub>e</sub> / SIL 3
- > LED displays for simple on-site diagnostics
- > Suitable for all common contact / sensor types
- > Diagnostic outputs for function display via the machine control

## Safe signal evaluation

### eloProg – configurable safety system

- > Base module can be used as stand-alone device
- > Modules for diagnostic communication via commonly used fieldbus systems
- > Expansion modules to allow the ideal solution to be found for every application:
- > Relay modules for high switching loads
- > Speed monitoring and standstill monitoring
- > Decentralised positioning of I/O modules



eloProg 485EPB

eloFlex 471EFR

480041H

### eloFlex – configurable safety system

- > Realisation of up to four safety functions in one device variant
- > More functions and yet lower space requirements in the switch cabinet
- > Perfect for every application: maximum flexibility through multi-faceted online configuration



4631..B

4701..B1

46212.E1

### Safety control units

- > Monitoring of safety sensors and emergency stop buttons
- > Compact designs save space in the switch cabinet
- > Various connection possibilities due to different terminals types

### Input expansion

- > Economical alternative to individual wiring
- > Up to 40 sensors can be connected to one safety assessment unit – up to PL<sub>d</sub>

### Speed monitor – stand-alone module

- > Standstill monitoring
- > Reliable monitoring of reduced speed
- > Monitoring frequency from 0.1 to 99 Hz




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