elobau
sustainable solutions

ENG

Translation of the original operating instructions Safety sensor 671 series

DIRECTIVE 2014/34/EU

CE 0123

Date: 10/10/2022

Made in Germany

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1 About these operating instructions

Warning

- Failure to observe can result in faults or malfunctions.
- Failure to observe can result in personal injury resulting in death and/or damage to the machine.

Warning of danger due to a potentially explosive atmosphere!

- Failure to observe can result in personal injury resulting in death and/or damage to the machine.
- Failure to observe can result in damage of a greater extent (magnitude).

These operating instructions contain the requirements for safety sensor 671 *** *** **-** and applicable information from type-examination certificate BVS 03 ATEX E 126 X.

They are intended exclusively for the use of safety sensors 671 *** *** **-** as safety sensors in the approved Ex-area according to the EU Machinery Directive.

These operating instructions are to be used in conjunction with the respective technical data sheet included in the delivery for the respective version.

The person installing the safety sensors must be provided with the operating instructions.

The operating instructions and technical data sheet must be kept in a legible condition and in an accessible location.

Only install and put the device into operation once you have read and understood the operating instructions and are familiar with the applicable regulations.

Failure to observe the requirements of these operating instructions can result in personal injury with fatal consequences and/or damage to the machine.

1.1 Symbols used

The warnings draw attention to residual hazards that cannot be avoided by design. Make sure to observe the specified measures in order to avoid this danger!

	**Information** Indicates available accessories and useful additional information.
	**Warning of a potentially explosive atmosphere** The warning sign indicates an increased risk of explosion in the indicated work area. The warning sign prohibits the use of non-explosion-proof electrical equipment and any type of ignition source. The warning sign is used in all areas where flammable substances can create a potentially explosive atmosphere. These areas include, for example, storage rooms for explosive chemicals, flour and grain stores, battery rooms and certain production areas in the textile industry.
	**Warning against dangers** This warning indicates danger points. Carry out all work in a safety-conscious manner.
	**Explosion protection label** Explosion protection label for equipment and protective systems for use in potentially explosive atmospheres, according to Directive 2014/34/EU.

2 Regulations, certificates and standards

2.1 Requirements in regard to potentially explosive atmospheres

Directive	DIRECTIVE 2014/34/EU
EU Type-Examination Certificate	BVS 03 ATEX E 126 X* 4. Addendum
	*X = Reference in the type-examination certificate (operating instructions) to special conditions for the safe use of the device
Identification number of the notified body for QM EU surveillance	CE 0123
Standards	
EN IEC 60079-0:2018	General requirements
EN 60079-11:2012	Intrinsic safety “i”
EN 60079-18:2015 / A1:2017	Encapsulation “m”
EN 60079-26:2015	Equipment with equipment protection level (EPL) Ga

2.2 Requirements in regard to functional safety

Directive	DIRECTIVE 2006/42/EC
Standards	EN ISO 13849-1:2015 EN ISO 13849-2:2012 EN 60947-5-3:2013

2.3 Other certificates

Intertek ETL approved to ANSI/UL 508/CSA C22.2#14	
Control number	3079760
UL 508:2018 Ed.18	Industrial Control Equipment
CSA C22.2#14:2018 Ed.13	Industrial Control Equipment
C ETL LISTED US Intertek 3079760 CONFORMS TO STD ANSI/UL 508 CERTIFIED TO STD CAN/CSA C22.2#14	Types concerned -671***MU0**-** -671***NU0**-** -671***ML0**-** -671***NL0**-** -671***IU012-** -671***KU012-** -671***IL012-** -671***KL012-** -671271ML003-** -671271NL003-**

3 Intended use

3.1 General information

The product may only be used as described in these operating instructions.

When using the 671* safety sensors, the Ex-relevant and functionally safe requirements must be met.

In combination with the elobau safety evaluation units or similar safety controllers, the safety sensors and actuators are exclusively used to monitor moving, isolating safety devices.

The overall control concept into which the safety sensor is incorporated must be validated according to DIN EN ISO 13849-2 standards.

The device is used in industrial areas as a safety sensor and position detection sensor in hazardous areas and safety-critical environments.

For functional safety applications of intrinsically safe safety sensors (Ex i) in intrinsically safe circuits, the requirements of the required safety level for the application must be checked and observed.

Applicable requirements for the intrinsically safe circuit must also be observed.

3.2 Intended use according to potentially explosive atmospheres

Safety sensors 671 *** *** **-** are designed for general applications. They are manufactured in various explosion protection types and designs for use in potentially explosive atmospheres of equipment group II, category *G and category *D.

When using the safety sensors in areas that must meet category 3 (zone 2 (22)) requirements, these operating instructions must be applied without exceptions.

There are two types of ignition protection and various Ex labels:

Non-intrinsically safe version (mb) 671 *** M/N** **-**

The safety sensors with identification letters "M" or "N" in column "f" of the type code are intended for connection to non-intrinsically safe circuits.

They can be used in the following zones:

Gas atmosphere

⟨Ex⟩ II 2G Ex mb IIC T6/T5 Gb

Use in zone 1, zone 2

These safety sensors in non-intrinsically safe design have been manufactured under the requirements of category 2G;.

Dust atmosphere

⟨Ex⟩ II 2D Ex mb IIIC IP68 T105°C Db

Use in zone 21, zone 22

These safety sensors in non-intrinsically safe design have been manufactured under the requirements of category 2D;.

Intrinsically safe version (Ex i) 671 *** I/K** **-**

The safety sensors with identification letters "I" or "K" in column "f" of the type code are intended for connection to intrinsically safe circuits.

They can be used in the following zones:

Gas atmosphere

⟨Ex⟩ II 2G Ex ia IIC T6/T5 Gb

Use in zone 1, zone 2

⟨Ex⟩ II 1/2G Ex ia IIC T6/T5 Ga/Gb

Use in partition wall zone 0/1; zone 1; zone 2

⟨Ex⟩ II 1G Ex ia IIC T6/T5 Ga

Use in zone 0, zone 1, zone 2

These safety sensors with an intrinsically safe design have been manufactured according to the requirements of category 1G, 1/2G or 2G.

The intrinsically safe safety sensors 671 *** *** 12-** with code number “12” in column “ij” are suitable for installation into the partition wall between areas requiring EPL 1G and areas requiring EPL 2G (partition wall zone 0/1).

An external thread on the housing of the safety sensors is used for installation into the partition wall.

In this case, the connecting cable of the safety sensors is in the 2G area.

Dust atmosphere

 II 1D Ex ia IIIC IP68 T_{200}105°C Da

Use in zone 20, zone 21, zone 22

 II 2D Ex ib IIIC IP68 T105°C Db

Use in zone 21, zone 22

These safety sensors with an intrinsically safe design have been manufactured according to the requirements of category 1D and 2D.

3.3 Intended use with functionally safe application

In combination with the elobau safety evaluation units or similar safety controllers, the safety sensors and actuators are exclusively used to monitor moving, isolating safety devices.

The overall control concept into which the safety sensor is incorporated must be validated according to DIN EN ISO 13849-2 standards.

Connecting sensors in series can, under certain circumstances, reduce their performance level according to EN ISO 13849-1 due to a lower rate of fault detection.

4 Safety sensors type 671 *** *** **-**

4.1 Description of the safety sensors

The safety sensor type 671 *** **0 **-** consists of a cylindrical metallic housing (material no. 1.4571, 1.4305 or 1.4401), which – depending on the version – contains two or three resistors and two (three) reed contacts (3 NO contacts, 2 NO contacts, NO/NC contacts). The components are embedded in potting compound.

A connecting cable with free cable ends is conducted into the housing through a suitable cable gland and firmly connected to the connections of the contacts.
The designation of the connections can be found in the respective technical data sheets and in these operating instructions (21 Technical illustration, circuit diagram).

The safety sensors are installed by means of an external thread (M30 thread metal) with fastening nuts or in a threaded sleeve.

4.1.1 Connections

The safety sensors are manufactured with a permanently connected flexible connecting cable. The connection to the supplies and peripheral devices must be established under consideration of the permissible limit values and in accordance with the respective installation regulations.
The designation of the connections can be found in the respective technical data sheets and in chapter 21 Technical illustration, circuit diagram of these operating instructions.

4.2 Allocation of the technical data sheet to the version

Article number, non-intrinsically safe (mb)	*Technical data sheet (Document number) In German DEU (K11) and English ENG (KE11) (other languages on request)*
671261M*0**-** 671261N*0**-**	671261..0_K11 671261..0_KE11
671V62M*0**-** 671V62N*0**-**	671V62..0_K11 671V62..0_KE11
671V62M40**-** 671V62N40**-**	671V62.40_K11 671V62.40_KE11
671271M*0**-** 671271N*0**-**	671271..0_K11 671271..0_KE11
671271M*001-** 671271N*001-**	671271..001_K11 671271..001_KE11
671271M40**-** 671271N40**-**	671271.40_K11 671271.40_KE11
671271ML0**-** 671271NL0**-**	671271.L0_K11 671271.L0_KE11
671271ML003-** 671271NL003-**	671271.L003_K11 671271.L003_KE11

Article number (intrinsically safe)	*Technical data sheet (Document number) In German DEU (K12) and English ENG (KE12) (other languages on request)*
671V62I40**-** 671V62K40**-**	671V62..0_K12 671V62..0_KE12
671V62 I*012-** 671V62K*012-**	671V62..012_K12 671V62..012_KE12
671271 I40**-** 671271K40**-**	671271..0_K12 671271..0_KE12
671271I*012-** 671271K*012-**	671271..012_K12 671271..012_KE12
671271IL012-** 671271KL012-**	671271.L012_K12 671271.L012_KE12

5 Type code 671*

(information applicable for safety sensor version)

The safety sensors are coded according to the following type code (space characters are not used; they are only used for a better readability here):

Pos. ij (specific) and pos. kl (extra cable length) are indicated in the item number and on the safety sensor labelling only if required.

Pos. kl is always preceded by a "-" character.

6** *** *** **-**

6ab cde fgh ij-kl

	Characteristic		***Meaning***
6	Version	6	Safety sensors in Ex version
As of	Housing type	71	Safety sensor VA 1.4571 or 1.4305 or 1.4401, M30
c	Variants	2	Safety sensor
		V	Safety sensor linkable
de	Contact type	61	Three-NO-contact system
		62	Two-NO-contact system
		71	Normally open/normally closed contact system
f	Ex version	M	Encapsulated without an external potential terminal, flange-mounted
		N	Encapsulated with an external potential terminal, flange-mounted
		I	Intrinsically safe without an external potential terminal, flange-mounted
		K	Intrinsically safe with an external potential terminal, flange-mounted

	Characteristic		*Meaning*
g	Cable (line type)[1)]	4	LIYCYW (PVC shielded) 2 x 0.75 mm² / 3 x 0.75 mm² / 4 x 0.5 mm²
		L	HK-SO-Li9Y11Y-OZ-HF (PU grey UL) 4 x 0.75 mm²
		U	Y-UL 2517 (PVC grey UL) 2 x 0.75 mm² / 3 x 0.75 mm² / 4 x 0.75 mm²
h	Protective hose	0	No protective hose
ij	Specific	**	Non-Ex-relevant information (such as imprint, marking, etc.)
		12	Intrinsically safe version 1/2G ia Ga/Gb (version 671*)
kl	Additional cable length	**	Standard = 1m

[1)] Optional for intrinsically safe version:

Blue cable sheath or marking with blue heat shrink tubing.

Variants

Type	*Contact type*
671261*****-**	Three-NO-contact system
671V62*****-**	Two-NO-contact system
671271*****-**	Normally open/ normally closed contact system

6 Technical specifications for connecting cables

The maximum cable length is limited to 30 m.

- ➲ Lay the cables in accordance with the valid installation instructions.
- ➲ Lay cables firmly at an ambient temperature below -5°C.

For category 1G and 1D, 2D:

- ➲ Use electrostatically tested cables.
- ➲ When using a shielded cable, the shielding must be included in the equipotential bonding.

Additionally for category 1G:

- ➲ Use electrostatically tested cables.
  - → Cable type 4 = PVC shielded (standard version)
    Cable type L = PU/PP
- ➲ Avoid intensive charging processes of the lines

Cables are listed which are used in version 671 *** *** **-**

Type plate assign-ment g=	*Type*	*Operating temperature*	*Rated volt-age*	*Test voltage*	*Capacity*	*Induct-ance*	*Electrostati-cally tested for use*
4	PVC grey LIYCYW Shielded	-25°C ...105°C	300 V	1,200 V Core/shield	4x0.5 188 pF/m 3x0.75 210 pF/m	1.0 µH/m	1G 2D, 1D
				2,000 V Wire/core	4x0.5 115 pF/m 3x0.75 129 pF/m		
L	HK-SO-Li9Y11Y-OZ-HF PU / PP, UL	-40°C ...85°C UL -40°C ...80°C	300 V	2,000 V	70 pF/m	0,5 µH/m	1G 2D, 1D
U	PVC-UL Y-UL 2517	-30°C ...105°C	300 V	2,000 V	100 pF/m	0,7 µH/m	2D, 1D

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7 Electrical data

7.1 Non-intrinsically safe sensors (mb)

Sensor 671 *** M** **-**, 671 *** N** **-**

Rated voltage U_n	***24 V AC/DC***		
Rated current I_n and maximum ambient temperature Ta according to the following table			
Rated current strength I_n ($I_{n\ max}$) $I_n = I_{n1}+I_{n2}+I_{n3}$	Classification T6	Classification T5	Classification T105°C
Max. 60 mA	-25 ≤ Ta ≤ 70°C	-25 ≤ Ta ≤ 75°C	-25 ≤ Ta ≤ 75°C
Max. 150 mA I_{n1}, I_{n2}, I_{n3} each ≤ 75 mA	-25 ≤ Ta ≤ 50°C	-25 ≤ Ta ≤ 70°C	-25 ≤ Ta ≤ 70°C
Protection class	IP 68 10 bar (DIN EN 60529)		

➲ Make sure that the sum of all individual currents is not greater than the specified rated current strength $I_n = I_{n1}+I_{n2}+I_{n3}$ of the sensor.

➲ In the process, ensure that the maximum rated current strength I_n per circuit (switching contact) I_{n1}, I_{n2}, I_{n3} is not greater than 75 mA.

For the connection designation of the circuits, see the technical data sheet and in these operating instructions
(chapter 21 Technical illustration, circuit diagram)

Allocation of circuits (switching contacts) to the rated current strength I_n

Version	*I_n*	*Anschluss_1*	*Anschluss_2*	*Circuit (SK)*
671V62*	I_{n1}	Strand black (BK)_No.1	Strand black (BK)_No.2	SK 1 = normally open contact (NO)
	I_{n2}	Strand black (BK)_No.4	Strand black (BK)_No.3	SK 2 = normally open contact (NO)
	I_{n3}	N / A		
671261*	I_{n1}	Strand black (BK)_No.1	Strand black (BK)_No.2	SK 1 = normally open contact (NO)
	I_{n2}		Strand black (BK)_No.3	SK 2 = normally open contact (NO)
	I_{n3}		Strand black (BK)_No.4	SK 3 = normally open contact (NO)
671271*	I_{n1}	Strand black (BK)_No.1	Strand black (BK)_No.2	SK 1 = normally open contact (NO)
	I_{n2}	Strand black (BK)_No.3	Strand black (BK)_No.4	SK 2 = normally closed contact (NO)
	I_{n3}	N / A		

7.2 Intrinsically safe sensors (Ex i)

Sensor 671 *** I** **-**, 671 *** K** **-**

Input voltage U_i	Max. 24V AC/DC		
Input power P_i	Max. 500 mW		
Input current I_i and maximum ambient temperature T_a according to the following table			
Input current strength (peak value) I_i ($I_{i\,max}$) $I_i = I_{i1}+I_{i2}+I_{i3}$	Classification T6	Classification T5	Classification T105°C
Max. 60 mA	-25 ≤ Ta ≤ 70°C	-25 ≤ Ta ≤ 75°C	-25 ≤ Ta ≤ 75°C
Max. 150 mA I_{i1}, I_{i2}, I_{i3} each ≤ 75mA	-25 ≤ Ta ≤ 50°C	-25 ≤ Ta ≤ 70°C	-25 ≤ Ta ≤ 70°C
Protection class	IP 68 10 bar (DIN EN 60529)		

➲ Make sure that the sum of all individual currents is not greater than the specified input current strength (peak value) $I_i = I_{i1}+I_{i2}+I_{i3}$ of the sensor.

➲ In the process, ensure that the maximum input current strength (peak value) I_i per circuit (switching contact) I_{i1}, I_{i2}, I_{i3} is not greater than 75 mA.

For the connection designation of the circuits, see the technical data sheet and in these operating instructions
(chapter 21 Technical illustration, circuit diagram)

Allocation of circuits (switching contacts) to the input current strength I_i

Version	*I_i*	*Anschluss_1*	*Anschluss_2*	*Circuit (SK)*
671V62*	I_{i1}	Strand black (BK)_No.1	Strand black (BK)_No.2	SK 1 = normally open contact (NO)
	I_{i2}	Strand black (BK)_No.4	Strand black (BK)_No.3	SK 2 = normally open contact (NO)
	I_{i3}	N / A		
671261*	I_{i1}	Strand black (BK)_No.1	Strand black (BK)_No.2	SK 1 = normally open contact (NO)
	I_{i2}		Strand black (BK)_No.3	SK 2 = normally open contact (NO)
	I_{i3}		Strand black (BK)_No.4	SK 3 = normally open contact (NO)
671271*	I_{i1}	Strand black (BK)_No.1	Strand black (BK)_No.2	SK 1 = normally open contact (NO)
	I_{i2}	Strand black (BK)_No.3	Strand black (BK)_No.4	SK 2 = normally closed contact (NO)
	I_{i3}	N / A		

Effective internal capacitances C_i and inductances L_i

C_i and L_i depend on the cable used and the cable length. Selection according to the table below:

Line length	≤ *10 m*	≤ *50 m*	≤ *100 m*	≤ *200 m*
Effective internal capacity C_i (Line type g≠4)	2 nF	7 nF	12 nF	24 nF
Effective internal capacity C_i (Line type g=4)	2 nF	10 nF	20 nF	40 nF
Effective internal inductance L_i	10 µH	50 µH	100 µH	200 µH

Line type g = 4: LIYCYW PVC shielded 4x0.5mm²

8 Additional technical, mechanical data

Housing material	VA 1.4571 (alternative VA 1.4305, 1.4401)
Screw connection	Ms nickel-plated NBR (M12x1.5)
Fastening	Housing with external thread M30x1.5, with locknuts or in a threaded hole
Switching frequency	Max. 5 Hz
Storage and transport temperature	-25°C ... +75°C
Shock-resistance	30 g / 11 ms
Vibration resistance according to EN 60947-5-2 ***Amplitude***	10 Hz ... 55 Hz 1 mm

9 Labelling of versions 671 *** *** **-**

The safety sensors are labelled with a sticker according to Directive 2014/34/EU (ATEX).

elobau GmbH & Co. KG with address
Type: 6** *** *** **-** CE A***A
BVS 03 ATEX E 126 X F-No. .....

Ex II 1G Ex ia IIC T6/T5 Ga

Labelling	***Meaning***
Manufacturer's address	elobau GmbH & Co. KG (with address)
Type:	Indication of the type number of the respective version 671 *** *** **-**
CE A***A	A***A CE marking and identification number of the notified body for QM EU monitoring
BVS 03 ATEX E 126 X	No. of the EU type-examination
BVS ***X label	X = Reference to special requirements which result from the type examination for the safe use of the safety sensor and are listed in the operating instructions. For example: - Special ambient temperature requirements depending on temperature class and rated current strength. - Assembly requirements

Labelling	*Meaning*
F-No.	Serial number (batch) and year of manufacture are encoded in the production number.
Ⓔx II 1G Ex ia IIC T6/T5 Ga	Ex label The alternative label for the protection classes is **a.) Non-intrinsically safe version** Ⓔx II 2G Ex mb IIC T6/T5 Gb Ⓔx II 2D Ex mb IIIC IP68 T105°C Db **b.) Intrinsically safe version** Ⓔx II 1G Ex ia IIC T6/T5 Ga Ⓔx II 1/2G Ex ia IIC T6/T5 Ga/Gb Ⓔx II 2G Ex ia IIC T6/T5 Gb Ⓔx II 1D Ex ia IIIC IP68 T_{200}105°C Da Ⓔx II 2D Ex ib IIIC IP68 T105°C Db

The intrinsically safe safety sensors are marked with a blue connecting cable or every 50 cm with a blue shrink hose

Labelling of the safety sensors 671 *** *** **-*			
Non-intrinsically safe versions Type:		For variants with g = cable version 671 *** *g* **-**	Labelling
671 V62 M*0 **-** 671 261 M*0 **-** 671 271 M*0 **-**	671 V62 N*0 **-** 671 261 N*0 **-** 671 271 N*0 **-**	g = 4 g = L g = U	Ⓔx II 2G Ex mb IIC T6/T5 Gb Ⓔx II 2D Ex mb IIIC IP68 T105°C Db

Labelling of the safety sensors 671 *** *** **-*			
Intrinsically safe versions Type:		For variants with g = cable version 671 *** *g* **-**	Labelling
671 V62 I*0 12-** 671 261 I*0 12-** 671 271 I*0 12-**	671 V62 K*0 12-** 671 261 K*0 12-** 671 271 K*0 12-**	g = 4 g = L g = U	⟨Ex⟩ II 1/2G Ex ia IIC T6/T5 Ga/Gb ⟨Ex⟩ II 2G Ex ia IIC T6/T5 Gb ⟨Ex⟩ II 1D Ex ia IIIC IP68 T_{200}105°C Da ⟨Ex⟩ II 2D Ex ib IIIC IP68 T105°C Db
671 V62 I*0 **-** 671 261 I*0 **-** 671 271 I*0 **-**	671 V62 K*0 **-** 671 261 K*0 **-** 671 271 K*0 **-**	g = 4 g = L	⟨Ex⟩ II 1G Ex ia IIC T6/T5 Ga ⟨Ex⟩ II 1D Ex ia IIIC IP68 T_{200}105°C Da ⟨Ex⟩ II 2D Ex ib IIIC IP68 T105°C Db

10 Safety/hazards

10.1 Requirements according to potentially explosive areas

Danger due to electrostatic charge!

- Only clean plastic parts with a damp cloth.
- Include all equipment in the equipotential bonding.
- Include the shielding of the permanently connected cable (version "g"=4) in the equipotential bonding.
- Intensive charging processes are to be avoided.

Danger due to heating!

- Maximum ambient temperature Ta as a function of temperature class and rated current I_n – determine the input current I_i.
- In the case of non-intrinsically safe design (Ex mb), switch the fuse into the circuit (switching contact) as required.
- For intrinsically safe design (Ex i), use a suitable intrinsically safe circuit.
- Clean the housing regularly to prevent dust deposits.

Danger due to damaged safety sensors!

- Install protected from mechanical hazards.
- Do not install damaged safety sensors.
- Do not continue to operate damaged safety sensors.
- Check safety sensors and connecting cables regularly for damage.

Danger due to improper use!

- Installation and commissioning only by specially trained, authorised personnel.
- Use only in the approved Ex-areas.
- Observe the requirements of these operating instructions.
- Compliance with the electrical data.

Warning against misuse in potentially explosive atmospheres

- In the event of improper or unintended use or manipulation, the use of the safety sensors cannot exclude risks of personal injury resulting in death or damage to machine or system parts.
- Ensure that all applicable Ex-relevant requirements are met.
- Ensure that the safety sensors are only used in the approved Ex area.
- Ensure that chapter 11 Conditions for safe use in potentially explosive atmospheres is observed.
- Ensure that the safety sensors are only operated within the permissible ranges of the electrical data.
- Ensure that **non-intrinsically safe** versions are operated with the required circuit fuse protection.
- Ensure that **intrinsically safe** versions are operated in an approved intrinsically safe circuit.

10.2 Requirements in regard to functional safety

- Ensure that the safety sensors are installed and put into operation only by specially trained, authorized personnel.
- Only install and put the device into operation once you have read and understood the operating instructions and are familiar with the applicable regulations on occupational safety and accident prevention.
- Ensure that the safety sensors are only used to protect against dangers.
- Ensure that all applicable safety requirements for the machine in question are observed.
- Ensure that all applicable European directives and national laws/directives are observed.
- The safety sensor may only be activated by a correctly mounted actuator on the safety device. Actuation by a spare actuator that is not mounted to the safety device is prohibited.
- Connecting safety sensors in series can, under certain circumstances, reduce their performance level according to EN ISO 13849-1 due to a lower detection of errors.
- There are no known residual risks, if all of the information contained in these operating instructions is complied with.

Warning of safety-specific misuse

In case of incorrect and unintended use or manipulation, the use of the safety sensors does not exclude risks to persons or damage to machine or system components.
Please also observe the relevant information stipulated in the currently valid version of ISO 14119.

➲ Make sure that no current or voltage peaks that are higher than the electrical specifications of the safety sensors are caused by any external components.
Current or voltage peaks are produced, for example, by capacitive or inductive loads.

→ The safety sensor is not short-circuit proof.

→ Exceeding the electrical specifications of the safety sensors (e.g. in the event of defective wiring or short circuits) can damage the system irreparably.

→ The actuation of the safety sensor is only permitted in the released control options (See section 21.4 Installation tolerance).
Non-compliance with this information may result in reduced service life of the safety sensor.

11 Conditions for safe use in potentially explosive atmospheres

11.1 General requirements

Non-intrinsically safe design ***671 *** M** **-** /*** ***671 *** N** **-****	***Intrinsically safe design*** ***671 *** I** **-** /*** ***671 *** K** **-****
These safety sensors may be used in the approved Ex zones. See section 3 Intended use	
Connection to non-intrinsically safe circuit	Connection to intrinsically safe circuit
For types 6** *** *40 **-** The shield of the permanently connected cable must be included in the local equipotential bonding.	
At ambient temperatures below -5°C, the cables must be laid firmly.	
-	Only one intrinsically safe circuit (potential) is allowed in the safety sensor.
-	The safety sensors are powered by approved intrinsically safe circuits, which must meet the requirements in the area of application.

Non-intrinsically safe design ***671 *** M** **-** /*** ***671 *** N** **-****	***Intrinsically safe design*** ***671 *** I** **-** /*** ***671 *** K** **-****
-	Fastening and cable bushings in the walls of areas requiring category 1G (EPL Ga) (zone 0) equipment shall be at least IP67 according to EN 60529.
-	**For version 1D , EPL Da:** An intrinsically safe circuit with protection level of Ex ia IIB or Ex ia IIC may be connected to the safety sensors (safety sensor).
-	**For version 2D, EPL Db:** An intrinsically safe circuit with a protection level of Ex ia IIB or Ex ia IIC or Ex ib IIB or Ex ib IIC may be connected.

Non-intrinsically safe design *671 *** M** **-** /* *671 *** N** **-******	*Intrinsically safe design* *671 *** I** **-** /* *671 *** K** **-******
-	**For applications 1/2G (671 *** *** 12-**)** The installation of the safety sensors into the partition walls of areas requiring EPL 1G and EPL 2G (between zone 0 and zone 1) is carried out using an external thread. > Type 671*: M30 thread (metal) The safety sensor must be secured against self-loosening and twisting. The connecting cable of the safety sensors must be located in 2G areas (zone 1).

11.2 Special conditions for use according to the X label

Special conditions from the EU type-examination certificate BVS 03 ATEX E 126 X / 4N for the safe use of the safety sensors 671 *** *** **-**

Non-intrinsically safe design 671 *** M** **-** / 671 *** N** **-*	***Intrinsically safe design 671 *** I** **-** / 671 *** K** **-****
Determine the permissible ambient temperature range (Ta) depending on he temperature class and rated values. See section 7 Electrical data	
Ta classification See section 7.1 Non-intrinsically safe sensors (mb)	Ta classification See section 7.2 Intrinsically safe sensors (Ex i)
For types 671...: The metallic housing of the safety sensors must be included in the local equipotential bonding. The connection of the equipotential bonding must be carried out in accordance with applicable standards and regulations. The connection of the metallic housing to the external equipotential bonding is carried out via the mounting type of the housing or the alternative external potential terminal. When connecting the equipotential bonding via the mounting type, it must be ensured that permanent and safe contacting of the housing to the equipotential bonding is guaranteed. The connection to the equipotential bonding must be carried out in such a way that the conductor is secured against loosening and twisting. The connections must be effectively protected against corrosion.	
When using the safety sensors in connection with aggressive/ corrosive media, the media resistance must be checked.	

Non-intrinsically safe design ***671 *** M** **-** /*** ***671 *** N** **-***	***Intrinsically safe design*** ***671 *** I** **-** /*** ***671 *** K** **-***
Mechanical dangers are to be excluded by: > Installing sensors protected from destruction and mechanical hazards > Only installing undamaged sensors > Preventing impacts and friction caused by moving parts	
For types 6 *** *40 **-**:** The shield of the permanently connected cable must be included in the local equipotential bonding for 2D applications.	**For types 6** *** *40 **-**:** The shield of the permanently connected cable must be included in the local equipotential bonding for 1G, 1D and 2D applications.
In the circuit of safety sensor type 671 *** *** **-**, a fuse adapted to the rated data of the switching contact/switching electronics must be provided with a breaking capacity at least equal to the prospective short-circuit current of the supplying mains at the place of use. The nominal current I_{Si} of the fuse must be selected so that **I_{Si}*1,7 ≤ I_n** is the result.	**For applications 1G:** 1. For safety sensor Type 671 *** *40 **-** (Line type "4"): > The shield of the permanently connected cable must be included in the equipotential bonding. > Intensive charging processes of the permanently connected lines must be avoided. 2. For safety sensor Type 671 *** *L0 **-** (Line type "L"): > Intensive charging processes of the permanently connected lines must be avoided.

Non-intrinsically safe design ***671 *** M** **-** /*** ***671 *** N** **-****	***Intrinsically safe design*** ***671 *** I** **-** /*** ***671 *** K** **-****
The unconnected free line ends must be connected in accordance with the applicable installation regulations.	**For applications 1/2G:** > The installation of the safety sensors into zone 0/zone 1 partition walls must be carried out in such a way that protection class IP67 according to EN 60529 is guaranteed. > In areas that meet the requirements 1G (zone 0) IIC, plastic fastening nuts must not be used. Metallic nuts must be used in the 1G area (zone 0). > Metal fastening nuts must be included in the local equipotential bonding.

12 Requirements in regard to functional safety

12.1 Function

A coded magnetic safety sensor with a non-contact activation through a coded actuator.

Type 4; low coding level according to EN ISO 14119.

An elobau safety evaluation unit or similar safety evaluation unit/safety controller analyses the switching state of the safety sensor. The safety sensors are suitable for the following elobau safety evaluation units:

Corresponds to Cat. 4/PLe/SIL3:

462...	4621273E
470... [1)]	470EFR3E12K_
471...	471EFR3E11K_ 471EFR3E12K_ 471EFR3E13K_ 471EFR3E14K_
eloProg 485...	485EP_
[1)] Only valid for sensors series 671V62...	

Table valid for Type 671V62 and 671271...

Type 671261 on request

Corresponds to Cat.3/PLd/SIL2:

470...	470EFR2D12K_
471...	471EFR2D14K_

12.2 Safety-relevant data

Safety sensors type 671271* **-**, 671V62*** **-****

Safety characteristics	***671271..0..-..***	***671V62..0..-..***
B_{10d} (according to EN ISO 13849-1, < 20% contact load) B_{10d} (> 20% contact load)	20.000.000 4.000.000	
 $MTTF_d = \frac{B_{10d}}{0{,}1 \times n_{op}}$ $n_{op} = \frac{d_{op} \times h_{op} \times 3600s/h}{t_{cycle}}$		
Service life in years	20	
An individual sensor can be used up to [1)]	PL e (EN ISO 13849-1:2015) SIL 3 (IEC / EN 61508)	
[1)] For this purpose, at least the following measures are required: - Short circuit detection through differing voltages or pulsed signals - Two-channel structure (see EN ISO 13849-1:2015) - Additional information (see EN ISO 13849-2:2012)		

Safety sensors type 671261*** **-**

Safety characteristics	***671261..0..-..***
B_{10d} (according to EN ISO 13849-1, < 20% contact load) B_{10d} (> 20% contact load)	20.000.000 4.000.000
$MTTF_d = \frac{B_{10d}}{0{,}1 \times n_{op}}$ $n_{op} = \frac{d_{op} \times h_{op} \times 3600s/h}{t_{cycle}}$	
Service life in years	20
An individual sensor can be used up to	PL c (EN ISO 13849-1:2015) SIL 1 (IEC / EN 61508)

12.3 Actuator

Type key actuator	30420000V actuator, magnet (standard) 30420000VH actuator, magnet (standard) 30420000VS actuator, magnet (reinforced) 30420000SH actuator, magnet (reinforced)

Switching distances (mm) for safe switching function:

	S_{ao} (mm)		S_{ar} (mm)		S_{omin} (mm) (Min. air gap)	
Actuator →	30420000*					
Safety sensor ↓	*V/VH	*VS/SH	*V/VH	*VS/SH	*V/VH	*VS/SH
671271*	4	7	16	23	0.5	3
671261*	4	7	14	20	0.5	3
671V62*	4	7	16	20	0.5	3

When selecting and installing the actuators:
Observe the maximum permissible opening gap of the cover.

Dimensions, actuation and offset See section 21 Technical illustration, circuit diagram

13 Installation

Danger to life due to improper installation!

➲ Ensure that the safety sensor is installed and put into operation only by specially trained, authorised personnel.

13.1 Requirements according to potentially explosive areas

➲ The information in chapter 11 Conditions for safe use in potentially explosive atmospheres must be taken into consideration.

➲ Observe the standards for the installation of electrical systems in potentially explosive atmospheres.

➲ Mounting of the safety sensors only in the approved Ex area
See section 3.2 Intended use according to potentially explosive atmospheres

➲ The installation of the safety sensors 671* can be carried out via a thread with fastening nuts or in a threaded sleeve.
Type 671*: M30 thread (metal)

➲ The installation of the safety sensors is only permitted with intact housings and cables.

➲ Safety sensors must be secured against self-loosening and twisting during installation.

➲ Installation of the safety sensors ⟨Ex⟩ II 1/2G into partition walls.

→ The installation of the safety sensors into zone 0/zone 1 partition walls must be carried out in such a way that protection class IP 67 according to EN 60529 is guaranteed.

→ The connecting cable of the safety sensors must be located in 2G areas (zone 1).

- The manufacturer's technical information on avoiding mechanical hazards must be observed. See section 11.2 Special conditions for use according to the X label.
- The manufacturer's technical information on the use of the safety sensor in connection with aggressive/corrosive media must be observed. See section 11.2 Special conditions for use according to the X label.
- Only accessories that meet all the requirements of European directives and national legislation may be used in potentially explosive atmospheres.

13.2 Requirements in regard to functional safety

- Safety sensor and actuator
  - → Do not use as a limit stop.
  - → Do not install in strong magnetic fields.
  - → Do not expose to any strong shocks or vibrations.
  - → Keep away from iron filings.
- The safety sensor and the accompanying actuators may only be mounted in a voltage-free state.
- Ensure that all safety sensor and actuator labels are congruently opposed to one another.
- The installation position is arbitrary. The safety sensor and actuator must however be mounted in parallel, facing each other.
- Please note the specified installation tolerances and the approved control options. See section 21 Technical illustration, circuit diagram.

- Since the safety sensor is a non-embeddable proximity switch (in accordance with EN 60947-5-2), the safety sensor and the actuator should be mounted on non-ferromagnetic material. A free zone of 25 mm is required in the event that this cannot be avoided.
- Do not attach the safety sensor and switching magnet to ferromagnetic material. If necessary, use 20 mm of non-ferromagnetic material to attach the safety sensor and switching magnet. The above-mentioned free zone still applies to the sensor and actuator.
- Where possible, the safety sensor and actuator should not be mounted on ferromagnetic material. Changes to the switching distances are to be expected.
- The mounting distance between two safety sensor and actuator systems must be at least 50 mm.
- Tightly fasten the safety sensor and actuator to the safety device.

14 Connection

Danger to life due to electric shock and ignition of gases!

➲ Ensure that the safety sensor is only connected and commissioned by specially trained, authorised personnel.

14.1 Requirements according to potentially explosive areas

➲ The information in chapter 11 Conditions for safe use in potentially explosive atmospheres must be taken into consideration.

➲ The connections are established via a permanently connected flexible connecting cable.
→ Observe the permissible limit values.

➲ Connect non-terminated free cable ends of the safety sensor in accordance with the applicable setup regulations.

➲ Observe the connection assignment of the strands in:
Section 7 Electrical data
Section 21 Technical illustration, circuit diagram
The technical specifications sheet

➲ Damaged cables and strands must not be connected.

➲ Safety sensors with a damaged housing must not be connected.

➲ When used as non-intrinsically safe equipment (mb), an adapted fuse must be present in the circuit. See section 11.2 Special conditions for use according to the X label

➲ The intrinsically safe version must be supplied by an approved intrinsically safe circuit.

➲ For intrinsically safe application, only one circuit (potential) is allowed in the safety sensor.

	➲ The maximum total rated current (I_n) and the maximum input current (I_i) per switching contact and circuit must be observed. ➲ The equipment must be electrostatically earthed when in operation. Connection to the local equipotential bonding is therefore required. The requirements must be met. See section 11.2 Special conditions for use according to the X label ➲ Only accessories that meet all the requirements of European directives and national legislation may be used in potentially explosive atmospheres.

14.2 Requirements in regard to functional safety

	➲ Electrical connection is only permitted in a voltage-free state. ➲ Connect the safety sensor according to the indicated wire identification (21 Technical illustration, circuit diagram). ➲ Please ensure that the voltage does not fall below the required minimum input voltage of the downstream safety processing unit. For that reason observe the voltage drop at the safety sensor (series resistor) and in the connection cable. ➲ For series connection of the safety sensors (verify approval in advance) their respective NO paths must be connected in series and the respective NC paths must be connected in parallel. ➲ Observe the operating instructions of the safety evaluation system used. ➲ In addition, the Ex-specific requirements must be observed and fulfilled.

15 Commissioning

15.1 Requirements according to potentially explosive areas

- The information in chapter 11 Conditions for safe use in potentially explosive atmospheres must be taken into consideration.
- Ensure that the safety sensors are only operated in the approved Ex areas (See section 3 Intended use). The data on the type plate must be taken into consideration.
- Ensure that all equipment is electrostatically grounded during operation.
- When used as non-intrinsically safe equipment (mb), an adapted fuse must be present in the circuit. See section 11.2 Special conditions for use according to the X label
- The intrinsically safe version must be supplied by approved intrinsically safe circuits.
- Make sure that the safety sensor and the supply cable are not damaged.

15.2 Requirements in regard to functional safety

When commissioning, the following points must be ensured in advance:

- The safety sensor and actuator must be positioned correctly and mounted in a fixed position
- Integrity of the supply line
- There are no iron filings on the safety sensor and actuator.

The safety sensor and the connected control unit must then be tested for correct functionality.

16 Maintenance and servicing

Danger to life due to improper installation!

- Ensure that maintenance and servicing of the safety sensor is only carried out by specially trained, authorised personnel.
- The safety sensors must be cleaned regularly. The intervals are determined by the operator according to the environmental stresses on site, e.g., in the case of a dust deposit of approx. 0.5 to 1mm
- The safety sensors and actuators must be checked regularly for damage and tight fit.
- Do not change the safety sensors.
- Only replace components with original spare parts that are approved for use in potentially explosive atmospheres.
- We recommend that a general visual inspection and functional test be carried out at regular intervals

17 Faults

No modification may be made to equipment operated in connection with potentially explosive atmospheres. Defective safety sensors must be replaced.

18 Dismantling

- The interface may only be dismantled in a voltage-free state.
- Observe the requirements for use in hazardous areas (to be determined by the user)

19 Disposal

Dispose of packaging and used parts according to the regulations of the country in which the device is installed.

20 Exclusion of liability

No liability shall be accepted for any damage or operational faults caused by a failure to observe these operating instructions. The manufacturer is not liable for damage resulting from the use of spare parts or accessories not approved by the manufacturer.

No unauthorized repairs, conversions or modifications are permitted for reasons of safety and the manufacturer shall not be liable for any resulting damage.

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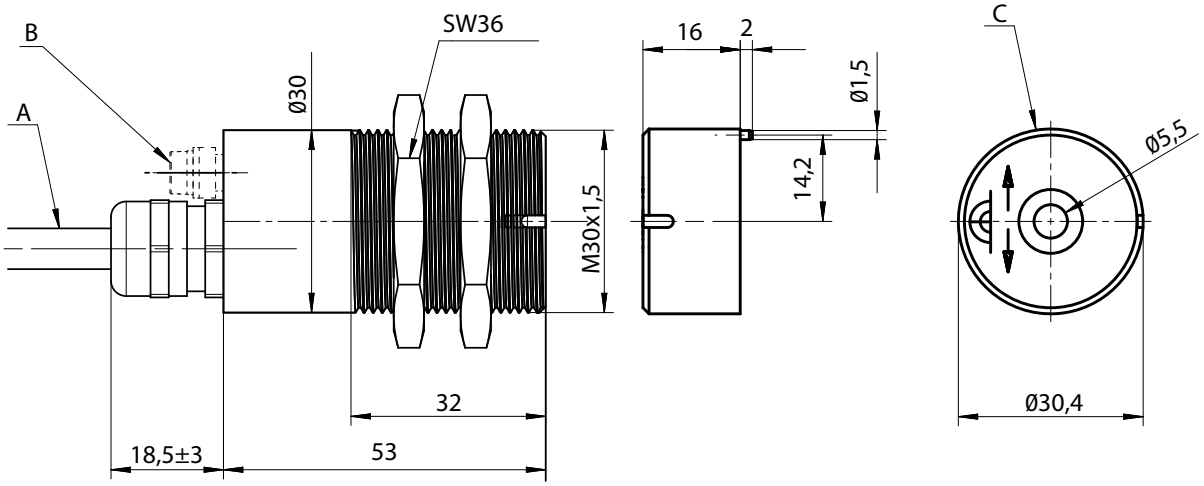
Web:www.elobau.de

21 Technical illustration, circuit diagram

21.1 Technical illustration of the safety sensor



On illustrations 21.1 and 21.2, the possible variants are shown in the form of technical drawings and contact variants. The individual position numbers mean the following:

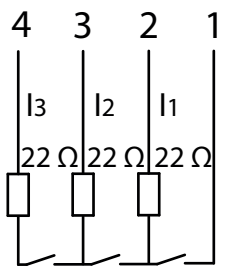
➔ Technical drawings
- → (A) Cable, standard 1 m
- → (B) Optional potential terminal
- → (C) Switching solenoid 30420000*
  (See section 12.3 Actuator)

21.2 Contact variants, circuit diagrams

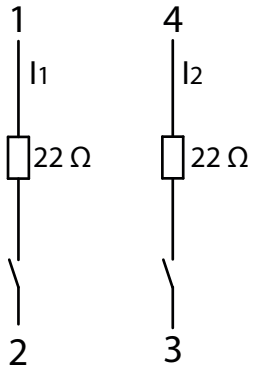
All safety sensor contacts are shown in a non-actuated state (actuator outside the detection range). The strands of the connecting cable are black (bk) and marked with numbers (1-4).

The strand arrangement corresponds to the specification in the circuit diagram.

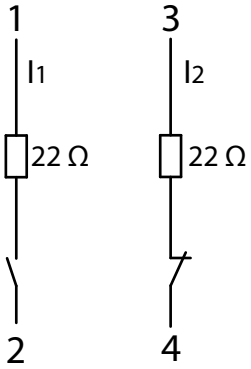
671261 *** **-**



671V62 *** **-**



671271 *** **-**

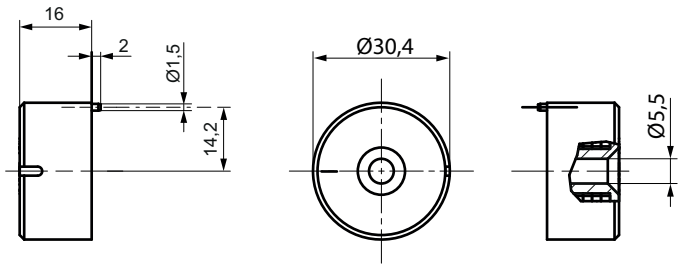


21.3 Technical illustration of the actuator

Material: Stainless steel

30420000V

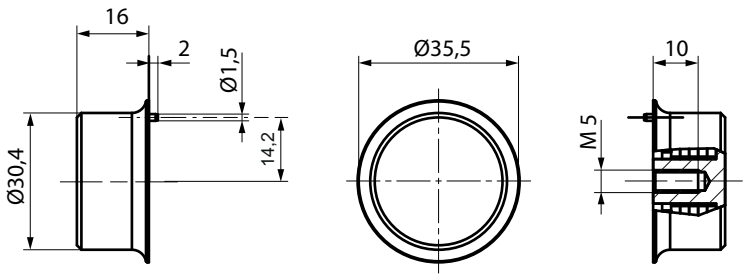
30420000VS



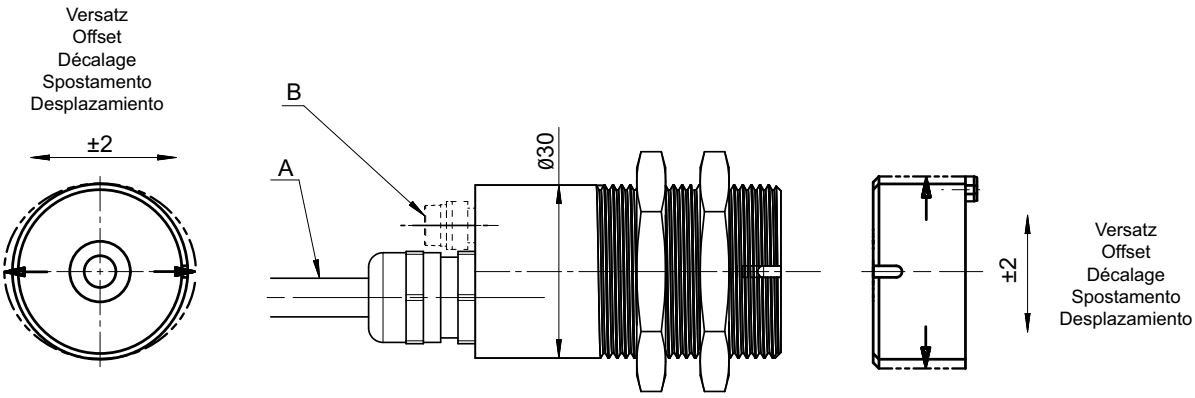
Material: Stainless steel

30420000SH

30420000VH

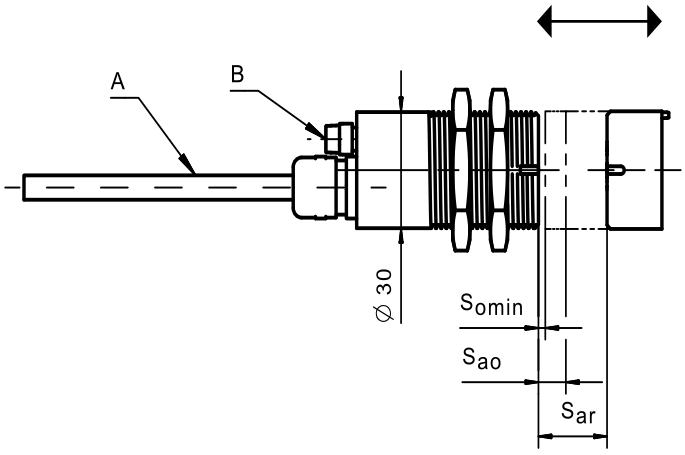


21.4 Installation tolerance

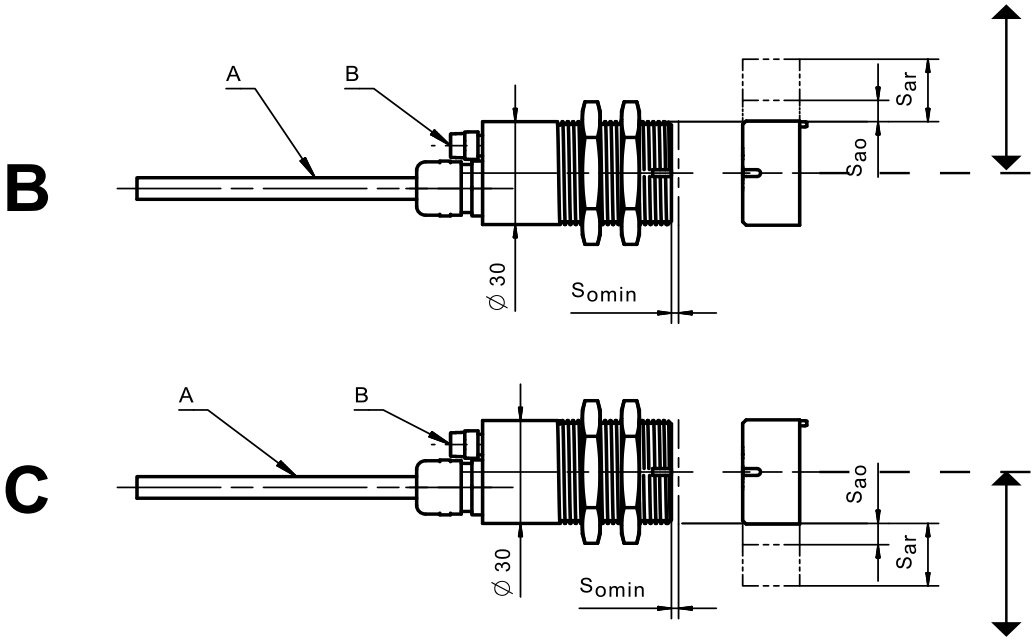


21.5 Control direction

Control direction A (front side)



Lateral control options B and C



(S_{ao})	Secured sensing distance
(S_{ar})	Secured switch-off distance
(S_{omin})	Minimum air gap

22 Declaration of Conformity

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elobau
sustainable solutions

EU-Konformitätserklärung

EC Declaration of Conformity

Original DE

Translation EN

Hiermit erklären wir, dass das nachfolgend aufgeführte Produkt aufgrund der Konzipierung und Bauart den Sicherheits- und Gesundheitsanforderungen der unten genannten EU-Richtlinien entspricht.

Hereby we officially validate that the below listed component comply with the requirements of the following European Directive because of their design and construction:

Bezeichnung des Produkts: **Name of component:**	Sicherheitssensor mit Betätiger **Safety Sensor with actuator**
Beschreibung des Produkts: **Description of component:**	kodierter magnetisch wirkender Sicherheitssensor mit Betätiger zur Überwachung von beweglich trennenden Schutzeinrichtungen in explosionsgefährdeten Bereichen **coded magnetically acting safety sensor** in Verbindung mit einer Sicherheitsauswerteeinheit der Firma elobau oder eine vergleichbare Sicherheitsauswerteeinheit, die mindestens den Anforderungen der DIN EN ISO 13849-1 oder der DIN EN 62061 genügt. Combined with Safety Control Units by elobau or any comparable Safety Control Unit that minimum complies with the requirements of DIN EN ISO 13849-1 or of DIN EN 62061
elobau Artikel-Nr.: **elobau PN:**	**Sensor:** 671 261 xxx xx-xx 671 V62 xxx xx-xx 671 271 xxx xx-xx **Betätiger:** 30420000V 30420000VH 30420000VS 30420000SH
einschlägige EU-Richtlinien: **Relevant EC-Directives:**	ATEX-Richtlinie 2014/34/EU Maschinen-Richtlinie 2006/42/EG **ATEX Directive 2014/34/EU** **Machinery Directive 2006/42/EC**
angewandte harmonisierte Standards: **harmonized standards:**	EN 60079-0:2018 EN 60079-11:2012 EN 60079-18:2015/A1:2017 EN 60079-26:2015 EN ISO 13849-1:2015 EN ISO 13849-2:2012 EN 60947-5-3:2013

Änderungsindex: M
Modification Index:

998H0001K0003

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Die CE-Kennzeichnung von Sensor und Betätiger hat nur in kombinierter Anwendung Gültigkeit.
The CE marking of sensor and actuator is only valid in combined use.

Die Übereinstimmung eines Baumusters des bezeichneten Produktes mit der oben benannten Richtlinie wurde bescheinigt durch:
The conformity of a model of the designated product with the above-mentioned Directive has been certified by:

Name und Anschrift benannte Stelle:	DEKRA Testing and Certification GmbH, Handwerkstr. 15 70565 Stuttgart ZLS-NB-0351
Nummerierung der Bescheinigung: **Certification number:**	BVS 03 ATEX E 126 X, 4. Nachtrag

Leutkirch, den 08.07.2022

08.07.2022 13:20
Sandrina Kratzer
CE-Beauftragte / EC authorized Representative
Dokumentation-Bevollmächtigte / Documentation Representative

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