



Switch systems –
Economy meets safety



Sensor systems –
Compact intelligence



Enclosure systems –
Function and design

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Complete Range Sensor Systems



BERNSTEIN AG

A Success Story



Safety for man and machine

In-depth market knowledge, the close proximity to end users as well as years of experience in mechanical engineering and electronics are reflected down to the last detail in our products.

Against this backdrop, BERNSTEIN ranks among the world's leading providers of industrial safety technology. With our comprehensive range of switches, sensors, enclosures and operator terminals, we offer our customers effective and versatile solutions. By conforming to international safety guidelines, our products perfectly integrate in individual system solutions. Our focus is complete commitment to safety for man, machine and industrial processes.

Our expertise for your safety

With sound application expertise we support our customers from all branches of industry in the planning and implementation of systems designed to meet stringent safety requirements. In addition to classic plant and machine construction, we look after customers in the lift construction, automotive, agriculture, conveyor construction, automation engineering, wood-working, renewable energy and medical technology industries.

We welcome direct dialogue with our customers to enable us to provide them with the best possible solutions for their specific applications.



Future-proof solutions

Our objective is to actively influence technical innovation and modern application solutions. BERNSTEIN has therefore always been at the centre of defining trends in technology. With an unwavering commitment to the future we will continue providing the best possible answers in terms of technology, ecology and economic efficiency.

That is our definition of progress!

BERNSTEIN AG

The Product Lines

Switch Systems



Switch systems – Economy meets safety

BERNSTEIN electromechanical switches offer a convincing price/performance ratio and impress with their extreme reliability for many different operating voltages. The range extends from limit switches, encapsulated in insulating material or metal, through foot switches to safety switching devices. The AS-i compatible products save time and material in installation and provide cost advantages in operation. The comprehensive range of designs and sizes, the possible switching functions and the choice of actuators make virtually any application reality.

Sensor Systems



Sensor systems – Compact intelligence

The extremely fast and exceptionally precise BERNSTEIN sensors operate without interference and wear in all applications. The tried-and-tested reliability and the compact dimensions are greatly appreciated in all branches of industry. Matching the specific application, in addition to ultrasonic sensors and float switches, customers can choose from a wide range of inductive, capacitive, magnetic or optical sensors. Alongside the complete standard range of sensors, we also offer comprehensive development and design for individual solutions.

Enclosure Systems



Enclosure systems – Function and design

With its long tradition in manufacturing enclosures, BERNSTEIN combines superior enclosure technology, designed for encapsulating a diverse range of applications, with ultramodern and variable suspension systems. An extensive range of aluminium and plastic terminal boxes as well as the wiring and circuitry in standard and control enclosures conforming to specific customer requirements round off the product portfolio. Our enclosures conform to standards used in medical technology, industry as well as food and EX applications.

Product Line

Sensor Systems



Sensor systems – Compact intelligence

BERNSTEIN AG is an established manufacturer of high quality electromechanical and electronic low voltage switching devices and sensors. Our products are used in the most diverse range of applications, ranging from lift construction through wood-working and packaging machines through to machine tools.

Contactless sensors are characterised by absolute reliability, suitability for a wide range of applications and optimum cost-benefit ratio. Their main purpose is to convert mechanical movement into electrical signals that are processed in control systems.

In modern day applications, however, sensors directly connected to bus systems are being used to an ever greater extent to monitor mechanical movement and convert it into digital information.

Selecting the right sensor for the job depends on the prevailing ambient and operating conditions as well as corresponding technical requirements. In addition to the detection method (inductive, capacitive, optical, ultrasonic or magnetic) it is also necessary to select the corresponding output function (PNP, NPN, AC, normally-closed or normally-open contact). Sensing distances as well as the direction and type of approach are also important selection criteria. In view of the large number of possible combinations, the scope of application is virtually unlimited.

Maximum functions – minimum space

The range of applications in which limit switches are used has changed in line with increasing automation. Sensors are no longer used purely for the purpose of detecting position but rather they must be able to output analogue values for the purpose of calculating the distance with the necessary signal processing already taking place in the sensor itself. A sensor can also be used to sample two switching points in order to reduce the number of components in machines and systems.



This functionality is achieved by the use of state-of-the-art microcontrollers and advanced sensor technologies. Modern sensors from BERNSTEIN therefore open up new applications, extend the range of functions and as a result significantly increase efficiency.

Complementing our product range we offer attractive customer services:

- Risk assessment training, DIN EN ISO 13849, EN 62061
- Assistance in assessing risk and configuring safety functions
- Preassembly of products with standard power supply lines or customised cables
- Supply of M8, M12 or Ultralock connection technology
- Development of sensors to customer specifications
- Development and manufacture of customer-specific system solutions

Inductive Sensors

Type	Page
General	12
 <ul style="list-style-type: none"> • ø 3 mm • ø 4 mm • ø 6,5 mm • M4 • M5 	14
 <ul style="list-style-type: none"> • M8 	16
 <ul style="list-style-type: none"> • M12 	18
 <ul style="list-style-type: none"> • M18 	22
 <ul style="list-style-type: none"> • M30 	28
 <ul style="list-style-type: none"> • ø 34 mm 	32
 <ul style="list-style-type: none"> • 5 x 5 x 25 mm • 8 x 8 x 40 mm • 8 x 8 x 56 mm • 12 x 12 x 55 mm 	32
 <ul style="list-style-type: none"> • 16 x 8 x 5 mm • 27 x 10 x 5 mm • 28 x 16 x 11 mm • 40 x 26 x 12 mm • 50 x 25 x 10 mm • 60 x 36 x 10 mm 	33
 <ul style="list-style-type: none"> • 68 x 30 x 15 mm • 40 x 40 mm 	36

Capacitive Sensors

Type	Page
General	38
 <ul style="list-style-type: none"> • M12 • M18 	42
 <ul style="list-style-type: none"> • M30 • M32 	44
 <ul style="list-style-type: none"> • ø 20 mm • ø 34 mm 	46
 <ul style="list-style-type: none"> • 50 x 25 x 10 mm • 68 x 30 x 15 mm 	47

Optoelectronic Sensors

Type	Page
General	48
 <ul style="list-style-type: none"> • M12 	50
 <ul style="list-style-type: none"> • M18 • M30 	51
 <ul style="list-style-type: none"> • 12 x 12 x 55 mm • 12 x 12 x 60 mm • 12 x 12 x 65 mm 	60
 <ul style="list-style-type: none"> • 30 x 30 x 15 mm • 40 x 26 x 12 mm 	61
 <ul style="list-style-type: none"> • 50 x 50 x 15 mm 	63
 <ul style="list-style-type: none"> • 88 x 63 x 24 mm 	64
 <ul style="list-style-type: none"> • ø 20 mm 	67

Magnetic Switches

Type **Page**

General **68**



Electromechanical magnetic switches **72**

- Plastic
- Metal

General **80**



Electronic magnetic sensors **82**

- Plastic
- Metal

Ultrasonic Sensors

Type **Page**

General **98**



- M12
- M18
- M30

- 40 x 26 x 12 mm
- 80 x 80 x 50 mm



Accessories

Magnets **136**



Cable couplers **141**



- Reflectors **144**
- Mounting brackets



Sensor tester **147**



Slot Sensors

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General **90**



• **E22** **92**

- E30
- Teachable
- Electronic
- Reed contact

Float Switches

Type **Page**

General **106**



Standard float switches **112**

- Stainless
- Brass
- PVC



Miniature float switches **120**

- Stainless
- Brass
- PP
- PVC



Adjustable float switches **124**

- Stainless
- PVC



Accessories **128**

- Range of floats
- Technical data
- Chemical resistance table
- Enquiry/order form

Magnetic Monitoring Systems

Type **Page**

General **94**



• **Magnetic monitoring stations** **96**

- Coded magnetic switches

Annex

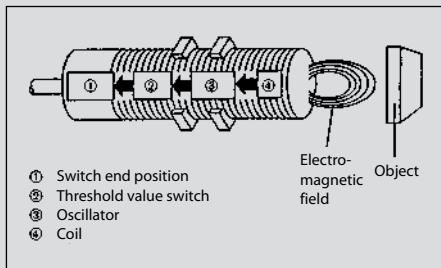
Type code **148**

Wiring diagrams **162**

Inductive Sensors

Functional principle

In general, inductive proximity switches consist of four basic elements: a coil, an oscillator, a threshold switch and an output stage with short-circuit protection. The oscillator generates a high frequency, electromagnetic alternating field which is emitted from the active face of the coil. Eddy currents are induced in a metal object that enters this field. These eddy currents draw energy from both the electromagnetic field and from the oscillator which is consequently attenuated. The more energy taken the closer the metal object moves towards the active face. The threshold switch switches on the output stage at a defined attenuation value. In proximity switches with a DC voltage supply, this switch is designed as an NPN transistor which switches the connected load to the negative pole or as a PNP transistor which switches the load to the positive pole. The output stage is a thyristor or a triac in AC voltage switches.

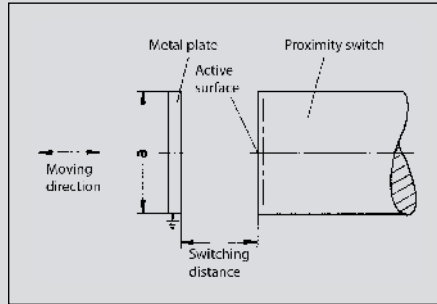


Sensing distance

The sensing distance (gap) is determined by the coil diameter, i.e. larger sensors are required for larger sensing distances. The sensing distance is also dependent on the size of the metal object to be detected as well as the material it is made from.

Target

The sensing distance is measured with a 1 mm thick square measuring plate made of steel (ST 37) referred to as a target. The edge length is equal to the diameter of the active face or equal to three times the sensing distance depending on which value is the greater.



Nominal sensing distance: (Sn)

The nominal sensing distance is a device-specific characteristic value that is dependent on the coil diameter.

Real sensing distance: (Sr)

The real sensing distance is measured at nominal voltage and nominal temperature. It must be between 90 % – 110 % of the nominal sensing distance.

Useable sensing distance: (Su)

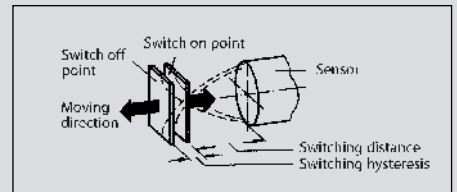
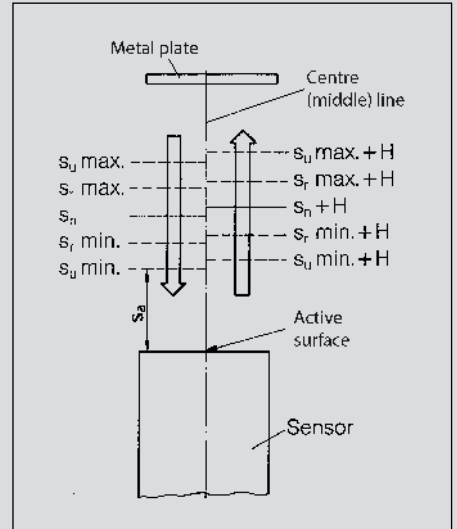
The useable sensing distance is measured within the permissible temperature and voltage ranges and is 90 % – 110 % of the real sensing distance.

Operational sensing distance: (Sa) (Assured operation distance)

The operational sensing distance takes into account the influence of the supply voltage, temperature and control systems. Reliable switching under all permissible operating conditions is assured within 0 % – 81 % of the nominal sensing distance. $S_a \sim 0.81 S_n$

Hysteresis: (H)

Hysteresis refers to the difference between the switch-on point as an object approaches and the switch-off point as the object moves away. This hysteresis is specified as a percentage of the nominal sensing distance and is typically 10 %. It is required to prevent the output chattering in response to slowly approaching objects, temperature drift, electrical interference or vibration.

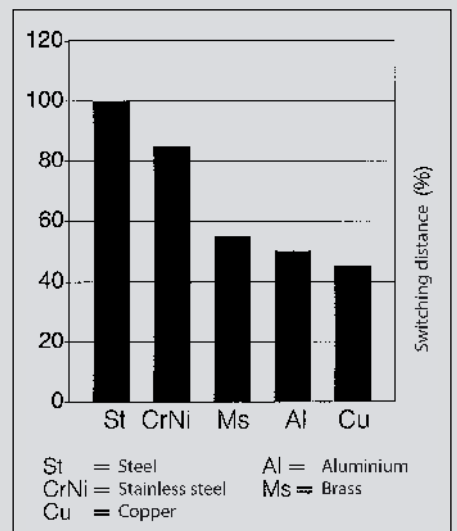


Repeatability

Repeatability is the ability of a sensor to repeatedly detect an object at the same distance away from the sensing surface. The typical deviation is < 5 %.

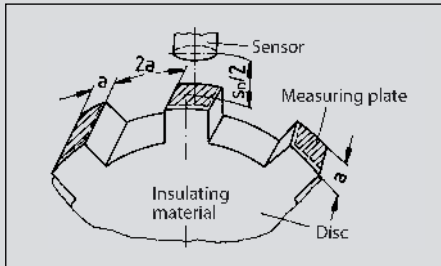
Reduction factors

The definition of the sensing distance is based on the measurement performed with a standardised square target made of steel. If other materials with the same dimensions are used, the sensing distance will be reduced as shown in the following graphic.



Switching frequency

The switching frequency is measured with a rotating, non-conductive plate, on which the standard targets are mounted as illustrated (size of targets as previously defined).



The distance between the targets and sensor is equal to half the nominal sensing distance. The maximum switching frequency is reached when the switch-on or switch-off signal time drops below 50 μ s.

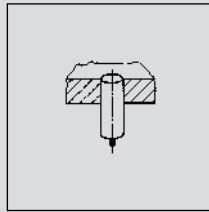
Temperature range

For most sensors, the permissible ambient temperature range is between -25 °C and +70 °C (-13 °F to +158 °F). Sensors with an extended temperature range of -40 °C to +100 °C are also available.

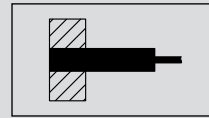
Assembly

Inductive sensors contain a coil on a ferromagnetic core that bundles the electromagnetic alternating field. The core is installed in the enclosure in such a way that the field emerges from the switch at the active face. A part of the magnetic field, however, also emerges from the side of the core. The sensor in a flush mount arrangement would already be influenced by the metal on the sides. For this reason, a metal band is fitted about the core in plastic enclosures, thus restricting the lateral magnetic field in a flush mount configuration. Due to the pre-attenuation attributed to the metal ring or a metal enclosure, flush mount versions have a shorter sensing distance than non-flush mount sensors and can be mounted closer to each other.

Flush mount

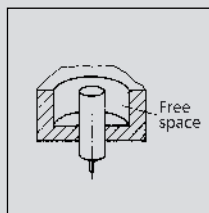


The active face can be flush with a metal surface.

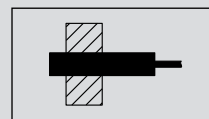


Catalogue symbol for flush mount

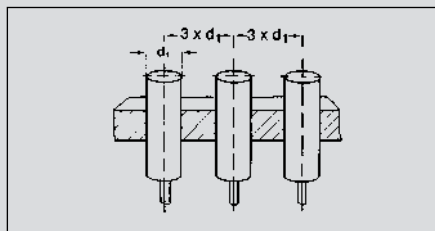
Non-flush mount



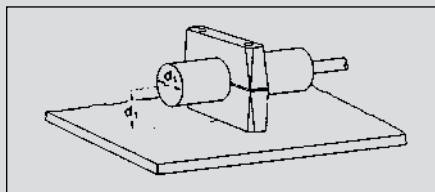
Sensors for non-flush mount require a clearance equal to three times the sensor enclosure diameter and a min. depth of 2x Sn.



Catalogue symbol for non-flush mount



Minimum spacing between non-flush mount sensors



Installation with a mounting bracket parallel to a steel wall

NAMUR sensors

(Standardization association for measurement and control in chemical industries)

Protection class

Corresponding to their ID code, the enclosures are dustproof and waterproof in accordance with IP65 or IP67 (EN 60529).

Short-circuit protection

Standard sensors are protected against short-circuit (cyclic) and polarity reversal.

Tightening torque requirements

BERNSTEIN supplies corresponding mounting nuts with its sensors. Refer to the respective datasheets for the required tightening torque.

Tightening torque examples for sensors in brass enclosure:

M4	0.8 Nm
M5	1.5 Nm
M8	8 Nm
M12	10 Nm
M18	25 Nm
M30	70 Nm

Materials

The sensors are protected by a glass fibre reinforced thermoplastic, brass or stainless steel enclosure. The connection cable has PVC or PU sheathing.

Connection systems

The following connection systems are available for standard sensors:

- Cable variants (2 m) with PVC or PUR sheathing
- Connector variants with M8, M12 connector or connector conforming to DIN 43650
- Quick-connect system with Ultralock connectors

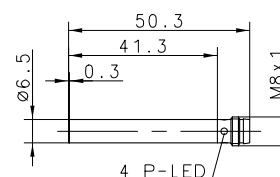
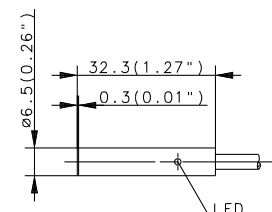
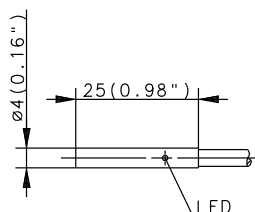
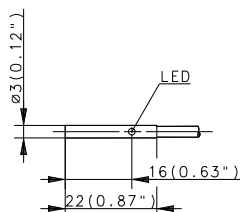
Standards and approvals

All sensors are CE-certified. The following European standards apply in accordance with CENELEC:

- EN 60947-5-2 Proximity switches
- EN 60947-5-6 NAMUR sensors

Inductive Sensors (Type Ø 3 mm, Ø 4 mm, Ø 6.5 mm, M4, M5)

Type	Ø 3 mm	Ø 4 mm	Ø 6.5 mm	
Type of installation	Flush	Flush	Flush	Flush
Nominal sensing distance	0.6 mm	0.8 mm	1.5 mm	1.5 mm
Type of connection	Cable 2 m	Cable 2 m	Cable 2 m	Connector M8
Special feature				



PNP	DC	NO contact NC contact Antivalent NO/NC	6502999019 6502799007	6502999004 6502799002	6502999010 6502799011	6502999012
NPN	DC	NO contact NC contact Antivalent NO/NC		6502399004	6502399009	
PNP/NPN	DC	NO/NC prog. push-pull operation				
NAMUR	DC					
Analogue	DC					
2-wire	DC	NO contact NC contact				
	AC	NO contact NC contact Changeover contact				

Technical data

Rated operating voltage	U_B	10-30 VDC	10-30 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_B	≤ 100 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	3000 Hz	3000 Hz	1000 Hz	1000 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-
Sensing distance, adjustable					

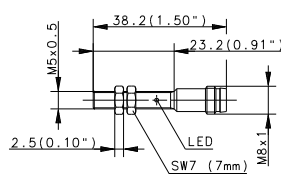
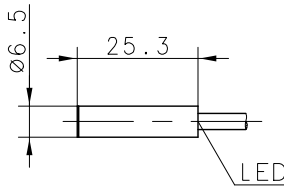
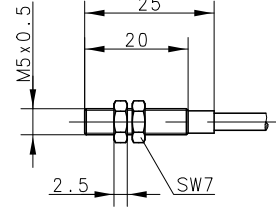
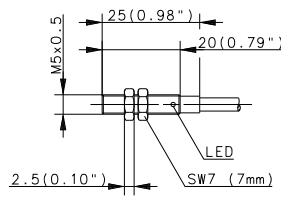
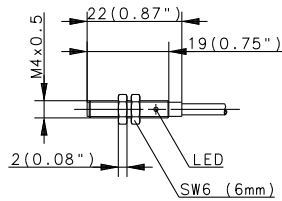
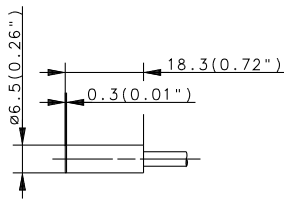
Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67
Enclosure material		Stainless steel 1.4305	Stainless steel 1.4401	Stainless steel 1.4401	Stainless steel 1.4401
Connection		3 x 0.055 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	M8 x 1

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



Ø 6.5 mm		M4	M5	M5	
Flush	Flush	Flush	Flush	Flush	Flush
1.5 mm	1.5 mm	0.6 mm	1 mm	1 mm	1 mm
Cable 2 m	Cable 5 m	Cable 2 m	Cable 2 m	Connector M8	Cable 2 m
					NAMUR



6502999034	6602999460	6502999020 6502799008	6502999003 6502799001	6502999018 6502799019	
			6502399003		
					6501699008

10-36 VDC	10-36 VDC	10-30 VDC	10-30 VDC	10-30 VDC	5-25 VDC
≤ 200 mA	≤ 200 mA	≤ 100 mA	≤ 200 mA	≤ 200 mA	-
1000 Hz	1000 Hz	3000 Hz	3000 Hz	3000 Hz	≈ 3 kHz
Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	-
-/-	LED/-	LED/-	LED/-	LED/-	-/-

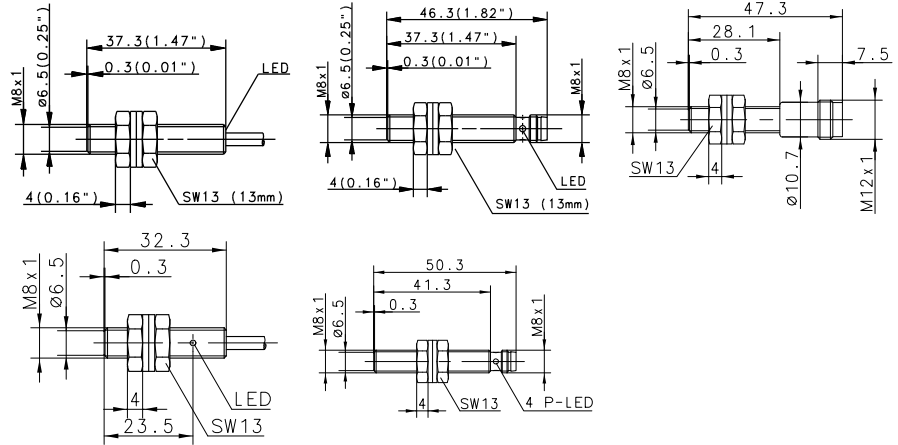
-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67
Stainless steel 1.4401	Stainless steel 1.4401	Stainless steel 1.4305	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.055 mm ²	3 x 0.14 mm ²	M8 x 1	2 x 0.14 mm ²

You will find detailed data sheets to the products under www.bernstein.eu



Inductive Sensors (Type M8)

Type	M8		M8		M8
Type of installation	Flush	Flush	Flush	Flush	Flush
Nominal sensing distance	1.5 mm	1.5 mm	1.5 mm	1.5 mm	1.5 mm
Type of connection	Cable 2 m	Cable 6 m	Connector M8	Connector M8	Connector M12
Special feature					



PNP	DC	NO contact NC contact Antivalent NO/NC	6932901001	6502901004 6502701001	6932942001	6502742001	6502942007
NPN	DC	NO contact NC contact Antivalent NO/NC	6932301001		6932342001		
PNP/NPN	DC	NO/NC prog. push-pull operation					
NAMUR	DC						
Analogue	DC						
2-wire	DC	NO contact NC contact					
	AC	NO contact NC contact Changeover contact					

Technical data

Rated operating voltage	U_B	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_B	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	1000 Hz	1000 Hz	1000 Hz	1000 Hz	1000 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	-/-
Sensing distance, adjustable						

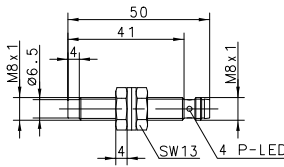
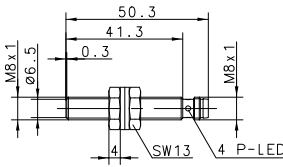
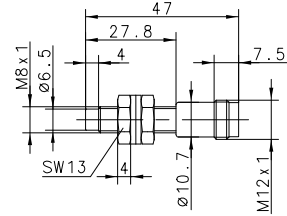
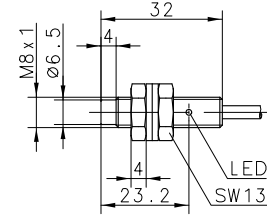
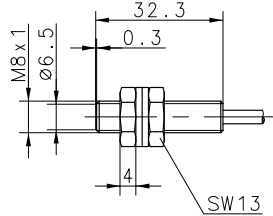
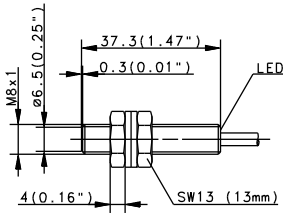
Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67
Enclosure material		Stainless steel 1.4305	Stainless steel 1.4305	Stainless steel 1.4305	Stainless steel 1.4305	Stainless steel 1.4305
Connection		3 x 0.14 mm ²	3 x 0.14 mm ²	M8 x 1	M8 x 1	M12 x 1

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



M8		M8		M8		M8	
Flush	Flush	Flush	Non-flush	Non-flush	Non-flush	Non-flush	
1.5 mm	1.5 mm	1.5 mm	2 mm	2 mm	2 mm	2 mm	
Cable 2 m	Connector M8	Cable 2 m	Cable 2 m	Connector M8	Connector M12		
Temperature	Temperature	NAMUR					



6502901008	6502942013		6502916003	6502942006	6502942008	
6502301006						
		6501601003				

10-36 VDC	10-36 VDC	5-25 VDC	10-36 VDC	10-36 VDC	10-36 VDC
≤ 200 mA	≤ 200 mA	-	≤ 200 mA	≤ 200 mA	≤ 200 mA
1000 Hz	1000 Hz	≈ 1 kHz	750 Hz	750 Hz	750 Hz
Cyclic	Cyclic	-	Cyclic	Cyclic	Cyclic
LED/-	LED/-	-/-	LED/-	LED/-	-/-

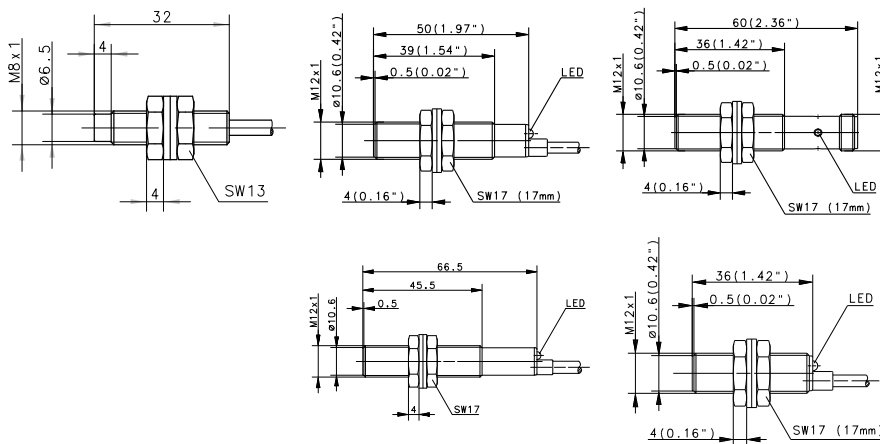
-40°C/+100°	-40°C/+100°	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67
Stainless steel 1.4305	Stainless steel 1.4305	Stainless steel 1.4305	Stainless steel 1.4305	Stainless steel 1.4305	Stainless steel 1.4305
3 x 0.14 mm ²	M8 x 1	2 x 0.25 mm ²	3 x 0.14 mm ²	M8 x 1	M12 x 1

You will find detailed data sheets to the products under www.bernstein.eu



Inductive Sensors (Type M8, M12)

Type	M8	M12	M12
Type of installation	Non-flush	Flush	Flush
Nominal sensing distance	2 mm	2 mm	2 mm
Type of connection	Cable 2 m	Cable 2 m	Connector M12
Special feature	NAMUR		



PNP	DC	NO contact NC contact Antivalent NO/NC	6932903001	6932943001 6602743112	6502903016 6502703005
NPN	DC	NO contact NC contact Antivalent NO/NC	6932303001	6932343001	6502303007 6502103003
PNP/NPN	DC	NO/NC prog. push-pull operation			
NAMUR	DC		6501601005		
Analogue	DC				
2-wire	DC	NO contact NC contact		6503503001 6503403001	
	AC	NO contact NC contact Changeover contact			

Technical data

Rated operating voltage	U_B	5-25 VDC	10-36 VDC	76-250 V AC	10-36 VDC	10-36 VDC
Rated operating current	I_B	-	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	≈ 1 kHz	800 Hz	≈ 10 Hz	800 Hz	800 Hz
Short circuit-protection		-	Cyclic	-	Cyclic	Cyclic
Function/operating voltage indicator		-/-	LED/-	LED/-	LED/-	LED/-
Sensing distance, adjustable						

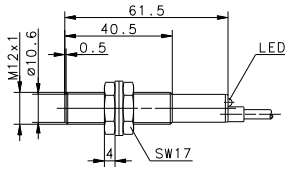
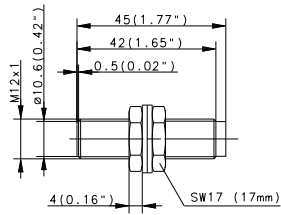
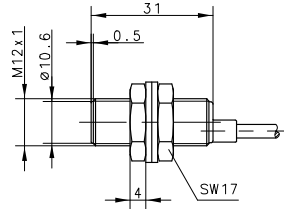
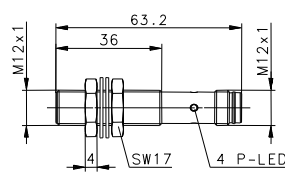
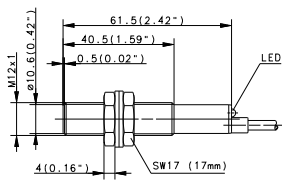
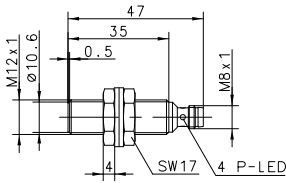
Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN60 529		IP67	IP67	IP67	IP67	IP67
Enclosure material		Stainless steel 1.4305	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Connection		2 x 0.25 mm ²	3 x 0.14 mm ²	2 x 0.14 mm ²	M12 x 1	3 x 0.14 mm ²

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



M12		M12		M12		M12	
Flush	Flush	Flush	Flush	Flush	Flush	Flush	
2 mm	2 mm	2 mm	2 mm	2 mm	2 mm	2 mm	
Connector M8	Connector M12	Cable 2 m	Cable 2 m	Connector M12	Cable 2 m	Cable 2 m	
		4000 Hz	Temperature	Ultralock	NAMUR		



6502943008	6502943006 6502743005	6502903012	6502903026	6502943017		
				6502343009		
					6501624760	

10-30 VDC	10-36 VDC	10-60 VDC	10-30 VDC	10-36 VDC	5-25 VDC
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	-
800 Hz	800 Hz	4000 Hz	800 Hz	800 Hz	≤ 800 Hz
Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	-
LED/-	-/-	LED/-	LED/-	LED/-	-/-

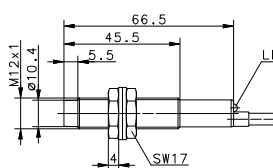
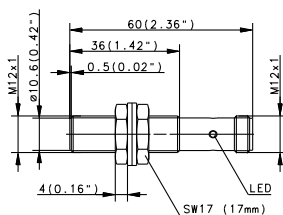
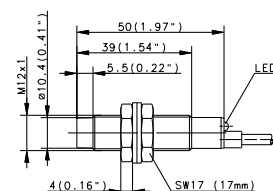
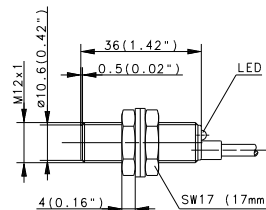
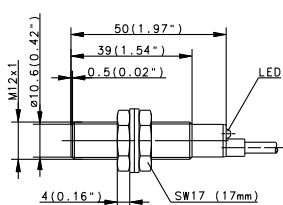
-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-40°C/+100°	-25°C/+70°C	-25°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67
CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
M8 x 1	M12 x 1	3 x 0.14 mm ²	3 x 0.14 mm ²	M12 x 1	2 x 0.25 mm ²

You will find detailed data sheets to the products under www.bernstein.eu



Inductive Sensors (Type M12)

Type	M12		M12		M12	
Type of installation	Flush	Flush	Flush	Non-flush	Non-flush	
Nominal sensing distance	4 mm	4 mm	4 mm	4 mm	4 mm	
Type of connection	Cable 2 m	Connector M12	Cable 2 m	Cable 2 m	Cable 2 m	
Special feature	Sensing dist.	Sensing dist.	Sensing dist.			



PNP	DC	NO contact NC contact Antivalent NO/NC	6502903025	6502943015	6502903023	6932904001 6932704001
NPN	DC	NO contact NC contact Antivalent NO/NC				6932304001 6932104001
PNP/NPN	DC	NO/NC prog. push-pull operation				
NAMUR	DC					
Analogue	DC					
2-wire	DC	NO contact NC contact				
	AC	NO contact NC contact Changeover contact				6503504001 6503404001

Technical data

Rated operating voltage	U_B	10-30 VDC	10-36 VDC	10-36 VDC	10-36 VDC	76-250 V AC
Rated operating current	I_B	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	800 Hz	800 Hz	800 Hz	400 Hz	≈ 10 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	-
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-
Sensing distance, adjustable						

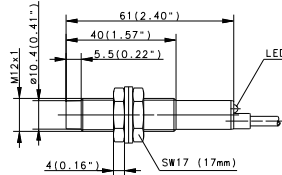
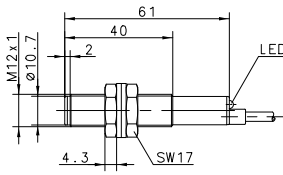
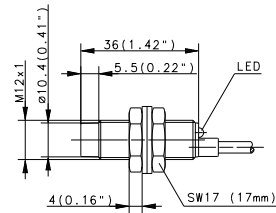
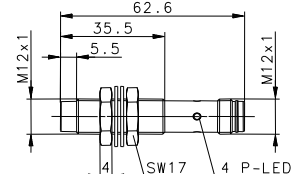
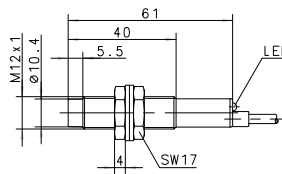
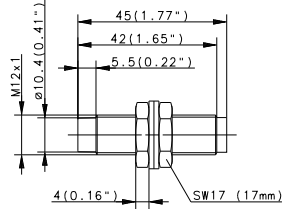
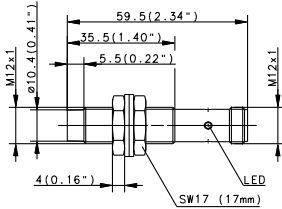
Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67
Enclosure material		CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Connection		3 x 0.14 mm ²	M12 x 1	3 x 0.14 mm ²	3 x 0.14 mm ²	2 x 0.14 mm ²

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



M12		M12		M12		M12	
Non-flush 4 mm Connector M12	Non-flush 4 mm Cable 2 m	Non-flush 4 mm Connector M12	Non-flush 4 mm Cable 2 m Plastic	Non-flush 4 mm Cable 2 m	Non-flush 4 mm Cable 2 m 3000 Hz	Non-flush 4 mm Connector M12	



6932944001 6502744003	6502904014	6502944006	6502919001	6502904010	6502944015	
6932344001	6502304007				6502344010	
				6501304001		

10-36 VDC ≤ 200 mA 400 Hz Cyclic LED/-	10-36 VDC ≤ 200 mA 400 Hz Cyclic LED/-	10-36 VDC ≤ 200 mA 400 Hz Cyclic -/-	10-30 VDC ≤ 200 mA 400 Hz Cyclic LED/-	10-60 VDC ≤ 200 mA 400 Hz -	10-60 VDC ≤ 200 mA 3000 Hz Cyclic LED/-	10-36 VDC ≤ 200 mA 400 Hz Cyclic LED/-
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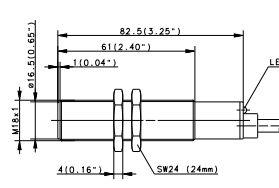
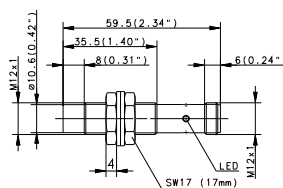
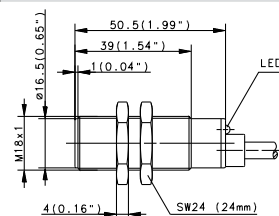
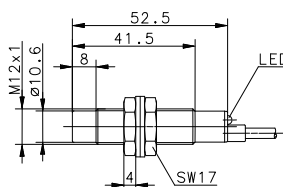
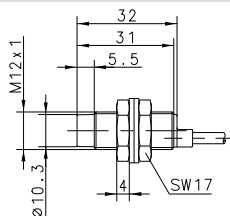
-25°C/+70°C IP67 CuZn39Pb3 M12 x 1	-25°C/+70°C IP67 CuZn39Pb3 3 x 0.14 mm ²	-25°C/+70°C IP67 CuZn39Pb3 M12 x 1	-25°C/+70°C IP67 PA, red 3 x 0.14 mm ²	-25°C/+70°C IP67 CuZn39Pb3 2 x 0.14 mm ²	-25°C/+70°C IP67 CuZn39Pb3 3 x 0.14 mm ²	-25°C/+70°C IP67 CuZn39Pb3 M12 x 1
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You will find detailed data sheets to the products under www.bernstein.eu



Inductive Sensors (Type M12, M18)

Type	M12	M12	M12	M18	M18
Type of installation	Non-flush	Non-flush	Non-flush	Flush	Flush
Nominal sensing distance	4 mm	8 mm	8 mm	5 mm	5 mm
Type of connection	Cable 2 m	Cable 2 m	Connector M12	Cable 2 m	Cable 2 m
Special feature	NAMUR	Sensing dist.	Sensing dist.		



PNP	DC	NO contact NC contact Antivalent NO/NC	6502904021	6502944013	6932905001 6932705001
NPN	DC	NO contact NC contact Antivalent NO/NC		6602344458	6932105001
PNP/NPN	DC	NO/NC prog. push-pull operation			
NAMUR	DC		6501625761		
Analogue	DC				
2-wire	DC	NO contact NC contact			
	AC	NO contact NC contact Changeover contact			6503505004 6503405001

Technical data

Rated operating voltage	U_B	5-25 VDC	10-36 VDC	10-36 VDC	10-36 VDC	20-250 V AC
Rated operating current	I_B	-	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 400 mA
Switching frequency (max)	F	≤ 400 Hz	400 Hz	400 Hz	500 Hz	≈ 10 Hz
Short circuit-protection		-	Cyclic	Cyclic	Cyclic	-
Function/operating voltage indicator		-/-	LED/-	LED/-	LED/-	LED/-
Sensing distance, adjustable						

Mechanical data

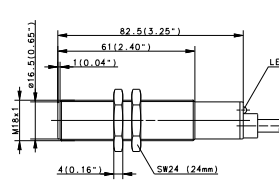
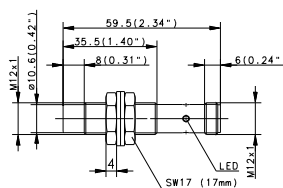
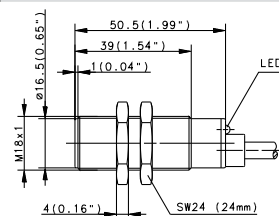
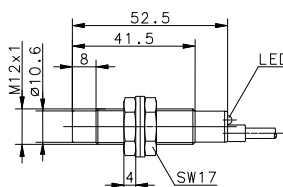
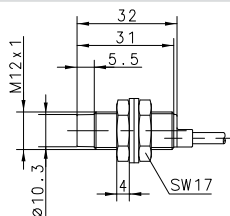
Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67
Enclosure material		CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Connection		2 x 0.25 mm ²	3 x 0.14 mm ²	M12 x 1	3 x 0.5 mm ²	2 x 0.5 mm ²

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



Inductive Sensors (Type M12, M18)

Type	M12	M12	M12	M18	M18
Type of installation	Non-flush	Non-flush	Non-flush	Flush	Flush
Nominal sensing distance	4 mm	8 mm	8 mm	5 mm	5 mm
Type of connection	Cable 2 m	Cable 2 m	Connector M12	Cable 2 m	Cable 2 m
Special feature	NAMUR	Sensing dist.	Sensing dist.		



PNP	DC	NO contact NC contact Antivalent NO/NC	6502904021	6502944013	6932905001 6932705001
NPN	DC	NO contact NC contact Antivalent NO/NC		6602344458	6932105001
PNP/NPN	DC	NO/NC prog. push-pull operation			
NAMUR	DC		6501625761		
Analogue	DC				
2-wire	DC	NO contact NC contact			
	AC	NO contact NC contact Changeover contact			6503505004 6503405001

Technical data

Rated operating voltage	U_B	5-25 VDC	10-36 VDC	10-36 VDC	10-36 VDC	20-250 V AC
Rated operating current	I_B	-	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 400 mA
Switching frequency (max)	F	≤ 400 Hz	400 Hz	400 Hz	500 Hz	≈ 10 Hz
Short circuit-protection		-	Cyclic	Cyclic	Cyclic	-
Function/operating voltage indicator		-/-	LED/-	LED/-	LED/-	LED/-
Sensing distance, adjustable						

Mechanical data

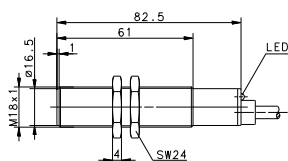
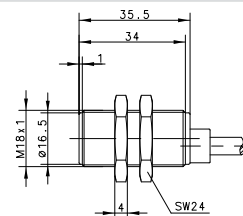
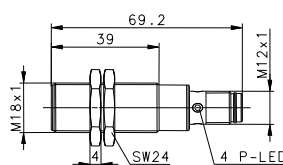
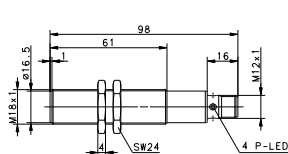
Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67
Enclosure material		CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Connection		2 x 0.25 mm ²	3 x 0.14 mm ²	M12 x 1	3 x 0.5 mm ²	2 x 0.5 mm ²

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



Inductive Sensors (Type M18)

Type	M18		M18		M18	
Type of installation	Flush	Flush	Flush	Flush	Flush	Flush
Nominal sensing distance	5 mm	5 mm	5 mm	5 mm	5 mm	5 mm
Type of connection	Connector M12	Cable 2 m	Connector M12	Connector M12	Cable 2 m	Cable 2 m
Special feature	Temperature	Temperature	Ultralock		NAMUR	



PNP	DC	NO contact NC contact Antivalent NO/NC	6502940006	6502905023	6502905026	
NPN	DC	NO contact NC contact Antivalent NO/NC			6502305013	
PNP/NPN	DC	NO/NC prog. push-pull operation				
NAMUR	DC					6501626762
Analogue	DC					
2-wire	DC	NO contact NC contact				
	AC	NO contact NC contact Changeover contact				

Technical data

Rated operating voltage	U_B	10-30 VDC	10-30 VDC	10-36 VDC	5-25 VDC
Rated operating current	I_B	≤ 200 mA	≤ 200 mA	≤ 200 mA	-
Switching frequency (max)	F	500 Hz	500 Hz	500 Hz	≤ 400 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	-
Function/operating voltage indicator		LED/-	LED/-	LED/-	-/-
Sensing distance, adjustable					

Mechanical data

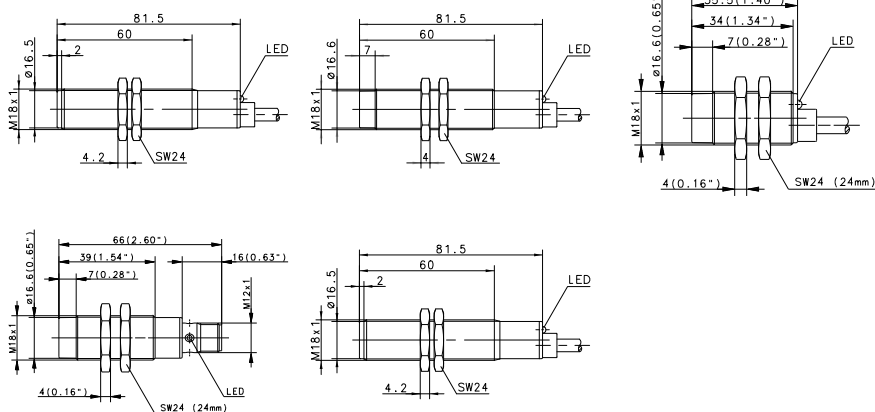
Ambient temperature (min/max)		-40°C/+100°	-40°C/+100°	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67
Enclosure material		CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Connection		M12 x 1	3 x 0.5 mm ²	M12 x 1	2 x 0.5 mm ²

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



Inductive Sensors (Type M18)

Type	M18		M18		M18
Type of installation	Non-flush	Non-flush	Non-flush	Non-flush	Non-flush
Nominal sensing distance	8 mm	8 mm	8 mm	8 mm	8 mm
Type of connection	Cable 2 m	Connector M12	Cable 2 m	Cable 2 m	Cable 2 m
Special feature	Plastic			Plastic	



PNP	DC	NO contact NC contact Antivalent NO/NC	6932906004 6932706002	6502921975	6502906006 6502706002
NPN	DC	NO contact NC contact Antivalent NO/NC	6932306004		6502306004
PNP/NPN	DC	NO/NC prog. push-pull operation			
NAMUR	DC				
Analogue	DC				
2-wire	DC	NO contact NC contact		6501306001	
	AC	NO contact NC contact Changeover contact	6503521705 6503421704		

Technical data

Rated operating voltage	U_B	24-250 V AC	10-36 VDC	10-60 VDC	10-60 VDC	10-60 VDC
Rated operating current	I_B	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	≈ 10 Hz	200 Hz	200 Hz	200 Hz	200 Hz
Short circuit-protection		-	Cyclic	-	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-
Sensing distance, adjustable						

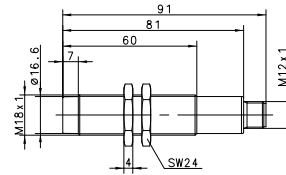
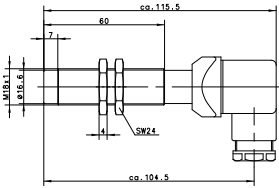
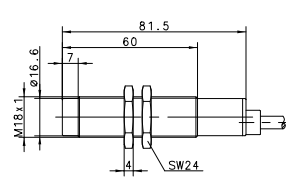
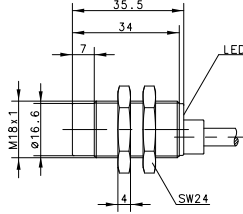
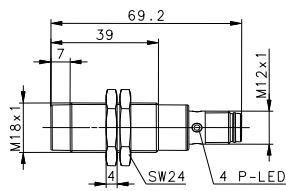
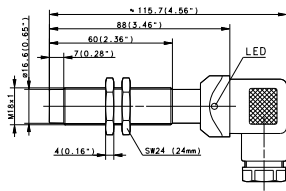
Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67
Enclosure material		PA, red	CuZn39Pb3	CuZn39Pb3	PA, red	CuZn39Pb3
Connection		2 x 0.5 mm ²	M12 x 1	2 x 0.5 mm ²	3 x 0.5 mm ²	3 x 0.5 mm ²

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



M18	M18	M18	M18		
Non-flush 8 mm DIN Connector	Non-flush 8 mm DIN Connector	Non-flush 8 mm Connector M12 Ultralock	Non-flush 8 mm Cable 2 m NAMUR	Non-flush 8 mm Cable 2 m	Non-flush 8 mm Connector M12



6502941001 6502741001	6502906021				
6602841421					
	6502306011				
			6501627763		
				6502006001	6602006111

10-60 VDC	10-60 VDC	10-36 VDC	5-25 VDC	10-36 VDC	10-36 VDC
≤ 200 mA	≤ 200 mA	≤ 200 mA	-	-	-
200 Hz	200 Hz	200 Hz	≤ 200 Hz	-	-
Cyclic	-	Cyclic	-	Cyclic	-
LED/-	-/-	LED/-	-/-	-/-	-/-

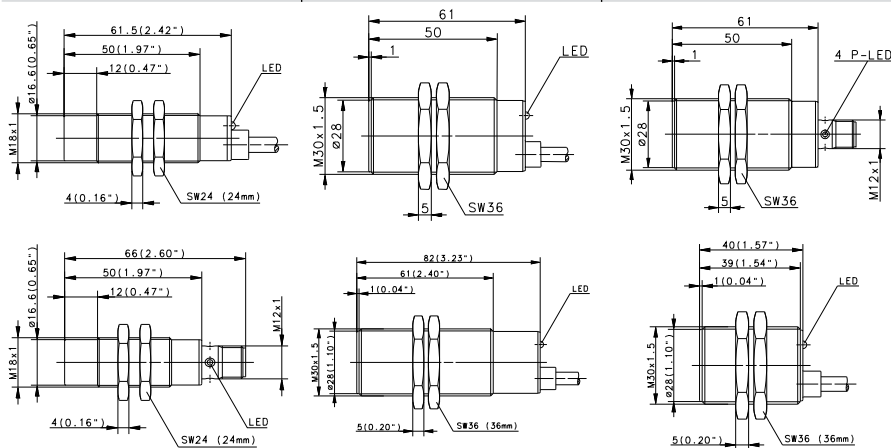
-25°C/+70°C	-40°C/+80°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
IP65	IP65	IP67	IP67	IP67	IP67
CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
DIN 43650	DIN 43650	M12 x 1	2 x 0.5 mm ²	3 x 0.5 mm ²	M12 x 1

You will find detailed data sheets to the products under www.bernstein.eu



Inductive Sensors (Type M18, M30)

Type	M18		M30		M30	
Type of installation	Non-flush	Non-flush	Flush	Flush	Flush	Flush
Nominal sensing distance	16 mm	16 mm	10 mm	10 mm	10 mm	10 mm
Type of connection	Cable 2 m	Connector M12	Cable 2 m	Cable 2 m	Connector M12	Cable 2 m
Special feature	Sensing dist.	Sensing dist.				



PNP	DC	NO contact NC contact Antivalent NO/NC	6502906018	6502941004	6932907001	6932907002	6502907003 6502707001
NPN	DC	NO contact NC contact Antivalent NO/NC					
PNP/NPN	DC	NO/NC prog. push-pull operation					
NAMUR	DC						
Analogue	DC						
2-wire	DC	NO contact NC contact					
	AC	NO contact NC contact Changeover contact			6503507378 6503407240		

Technical data

Rated operating voltage	U_B	10-36 VDC	10-36 VDC	10-36 VDC	20-250 V AC	10-36 VDC	10-60 VDC
Rated operating current	I_B	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 400 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	200 Hz	200 Hz	300 Hz	≈ 10 Hz	300 Hz	300 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	-	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-	LED/-
Sensing distance, adjustable							

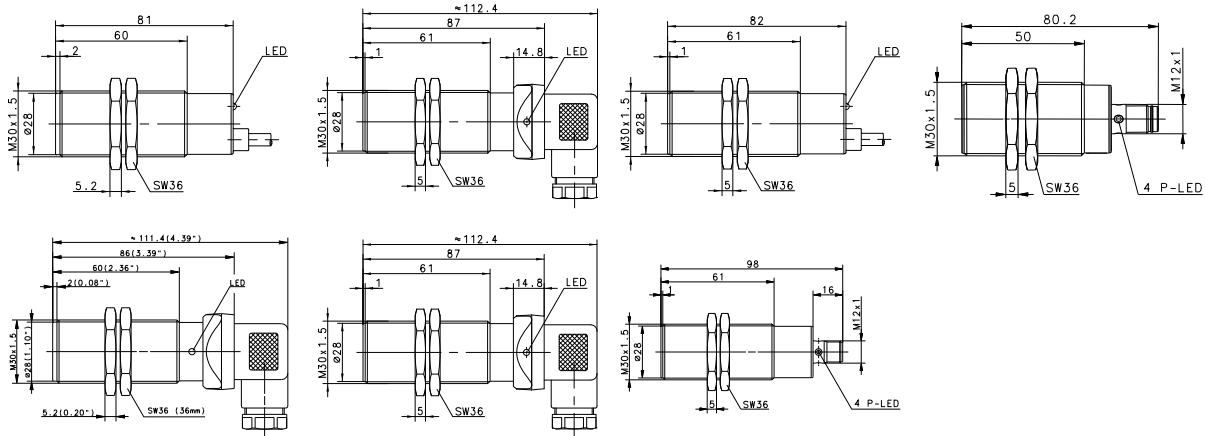
Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material		CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Connection		3 x 0.5 mm ²	M12 x 1	3 x 0.5 mm ²	2 x 0.5 mm ²	M12 x 1	3 x 0.5 mm ²

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



M30		M30		M30		M30	
Flush	Flush	Flush	Flush	Flush	Flush	Flush	
10 mm	10 mm	10 mm	10 mm	10 mm	10 mm	10 mm	
Cable 2 m	DIN Connector	DIN Connector	DIN Connector	Cable 2 m	Connector M12	Connector M12	
Plastic	Plastic			Temperature	Temperature	Ultralock	



6502722708	6502939001	6502907013	6502939006	6502907014	
6502822862					
	6503535960 6503435959				

10-60 VDC	10-60 VDC	10-60 VDC	20-265 V AC	10-30 VDC	10-30 VDC	10-36 VDC
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 500 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
300 Hz	300 Hz	300 Hz	20 Hz	300 Hz	300 Hz	300 Hz
Cyclic	Cyclic	Cyclic	-	Cyclic	Cyclic	Cyclic
LED/-	LED/-	LED/-	LED/-	LED/-	LED/-	LED/-

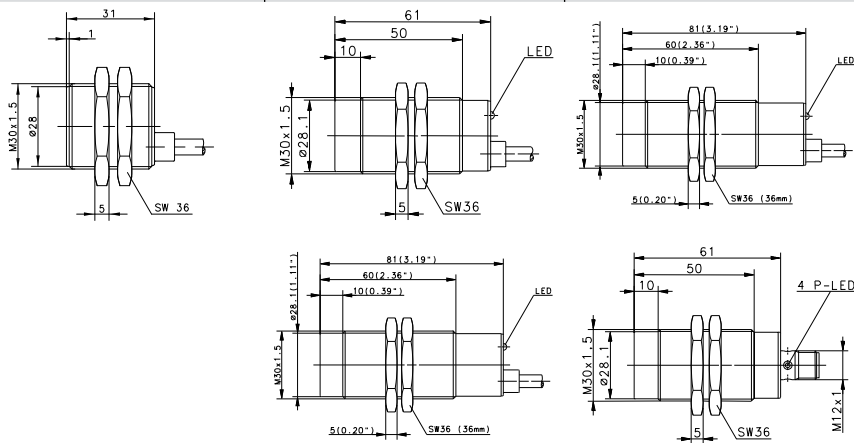
-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-40°C/+100°	-40°C/+100°	-25°C/+70°C
IP67	IP65	IP65	IP65	IP67	IP67	IP67
PA, red	PA, red	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
3 x 0.5 mm ²	DIN 43650	DIN 43650	DIN 43650	3 x 0.5 mm ²	M12 x 1	M12 x 1

You will find detailed data sheets to the products under www.bernstein.eu



Inductive Sensors (Type M30)

Type	M30	M30	M30	M30
Type of installation	Flush	Non-flush	Non-flush	Non-flush
Nominal sensing distance	10 mm	15 mm	15 mm	15 mm
Type of connection	Cable 2 m	Cable 2 m	Cable 2 m	Connector M12
Special feature	NAMUR			



PNP	DC	NO contact NC contact Antivalent NO/NC	6932908001	6502908002	6932908002 6602308459
NPN	DC	NO contact NC contact Antivalent NO/NC		6502808001 6502308001	
PNP/NPN	DC	NO/NC prog. push-pull operation			
NAMUR	DC		6501699012		
Analogue	DC				
2-wire	DC	NO contact NC contact			
	AC	NO contact NC contact Changeover contact			6503508246

Technical data

Rated operating voltage	U_B	5-25 VDC	10-36 VDC	10-60 VDC	20-250 V AC	10-36 VDC
Rated operating current	I_B	-	≤ 200 mA	≤ 200 mA	≤ 400 mA	≤ 200 mA
Switching frequency (max)	F	≤ 300 Hz	100 Hz	100 Hz	≈ 10 Hz	100 Hz
Short circuit-protection		-	Cyclic	Cyclic	-	Cyclic
Function/operating voltage indicator		-/-	LED/-	LED/-	LED/-	LED/-
Sensing distance, adjustable						

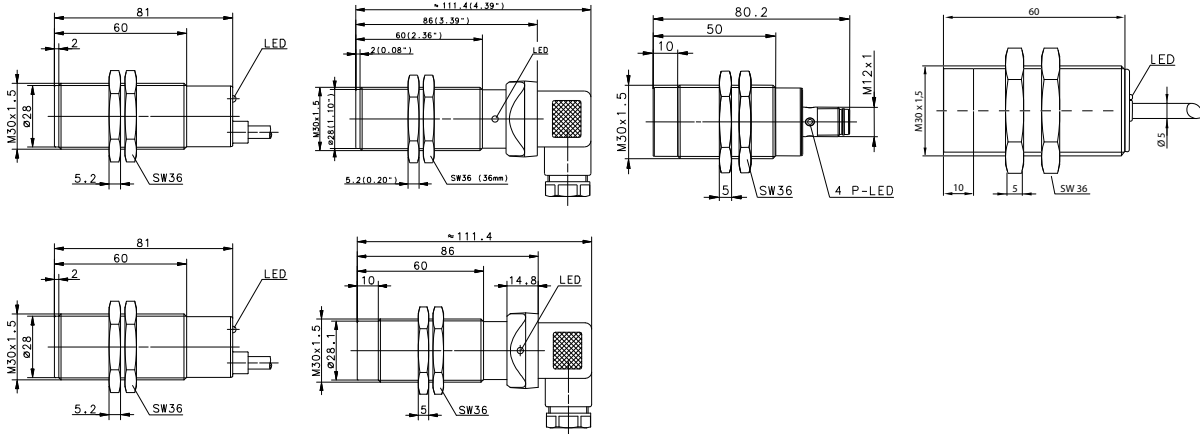
Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67
Enclosure material		CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Connection		2 x 0.5 mm ²	3 x 0.5 mm ²	3 x 0.5 mm ²	2 x 0.5 mm ²	M12 x 1

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



M30		M30		M30		M30	
Non-flush 15 mm	Non-flush 15 mm	Non-flush 15 mm	Non-flush 15 mm	Non-flush 15 mm	Non-flush 40 mm		
Cable 2 m	Cable 2.5 m	DIN Connector	DIN Connector	Connector M12	Cable 2 m		
Plastic	Plastic	Plastic		Ultralock	Sensing dist.		



6502923981	6502935001	6502908008	6502908009	
	6502836860			
		6502008001		
6503523956 6503423955				

10-60 VDC	20-250 V AC	10-60 VDC	10-60 VDC	10-36 VDC	10-30 VDC
≤ 200 mA	≤ 400 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
100 Hz	≈ 10 Hz	100 Hz	100 Hz	100 Hz	≤ 100 Hz
Cyclic	-	Cyclic	Cyclic	Cyclic	Cyclic
LED/-	LED/-	LED/-	LED/-	LED/-	LED/-

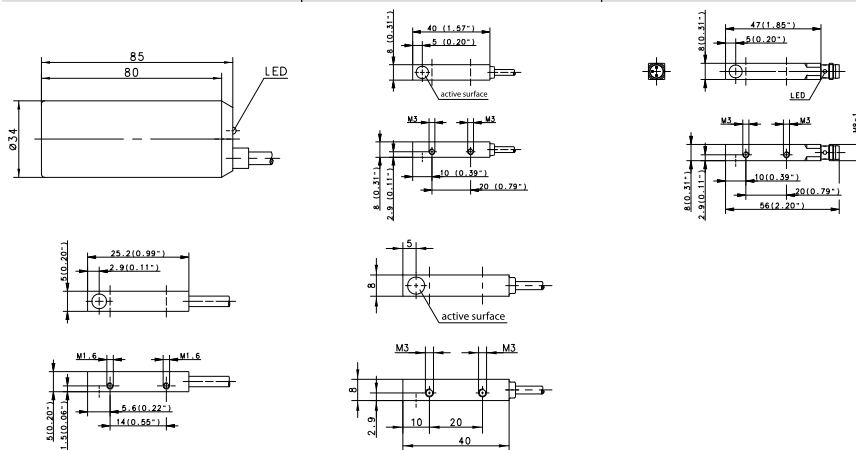
-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
IP67	IP67	IP65	IP65	IP67	IP67
PA, red	PA, red	PA, red	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
3 x 0.5 mm ²	2 x 0.5 mm ²	DIN 43650	DIN 43650	M12 x 1	3 x 0.34 mm ²

You will find detailed data sheets to the products under www.bernstein.eu



Inductive Sensors (Type Ø 34 mm, 5 x 5, 8 x 8, 12 x 12, 16 x 8, 27 x 10, 28 x 16)

Type	Ø 34 mm	5 x 5 x 25 mm	8 x 8 x 40 mm		8 x 8 x 56 mm
Type of installation	non-flush	Flush	Flush	Flush	Flush
Nominal sensing distance	20.0 mm	1.5 mm	1.5 mm	1.5 mm	1.5 mm
Type of connection	Cable 2 m	Cable	Cable 2 m	Cable 2 m	Connector M8
Special feature					



PNP	DC	NO contact NC contact Antivalent NO/NC	6502915002 6502715001	6502999026 6502799010	6502980004 6502780001	6602980087	6502980002 6502780002
NPN	DC	NO contact NC contact Antivalent NO/NC			6502380001		
PNP/NPN	DC	NO/NC prog. push-pull operation	6502915001				
NAMUR	DC						
Analogue	DC						
2-wire	DC	NO contact NC contact					
	AC	NO contact NC contact Changeover contact					

Technical data

Rated operating voltage	U_B	10-60 VDC	10-30 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_B	≤ 200 mA	200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	100 Hz	1000 Hz	1000 Hz	1000 Hz	1000 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	-/-	-/-	-/-	LED/-
Sensing distance, adjustable						

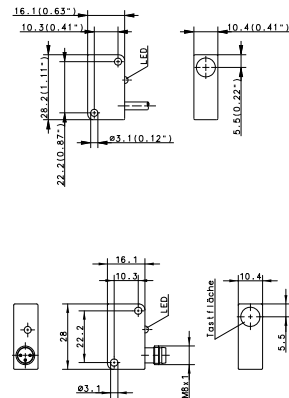
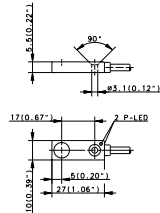
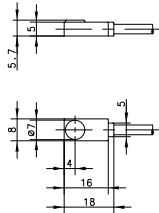
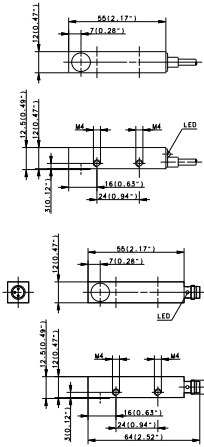
Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	0°C/+100°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67
Enclosure material		PBT, red	CuZn39PB3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Connection		3 x 0.5 mm ²	3 x 0.05 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	M8 x 1

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



12x12x55mm		16 x 8 x 5 mm	27 x 10 x 5 mm	28x 16x11 mm	
Flush 4 mm Cable 2 m	Flush 4 mm Connector M8	Flush 1.5 mm Cable 2 m	Flush 1.5 mm Cable 2 m	Flush 2 mm Cable 2 m	Flush 2 mm Connector M8



6502999028	6502999030	6502985002	6502993001	6502973001 6502773002	6502973002 6502773001
	6502399021		6502393001		

10-60 VDC	10-60 VDC	10-36 VDC	10-30 VDC	10-30 VDC	10-30 VDC
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
800 Hz	800 Hz	1000 Hz	1000 Hz	800 Hz	800 Hz
Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
LED/-	LED/-	-/-	LED/-	LED/-	LED/-

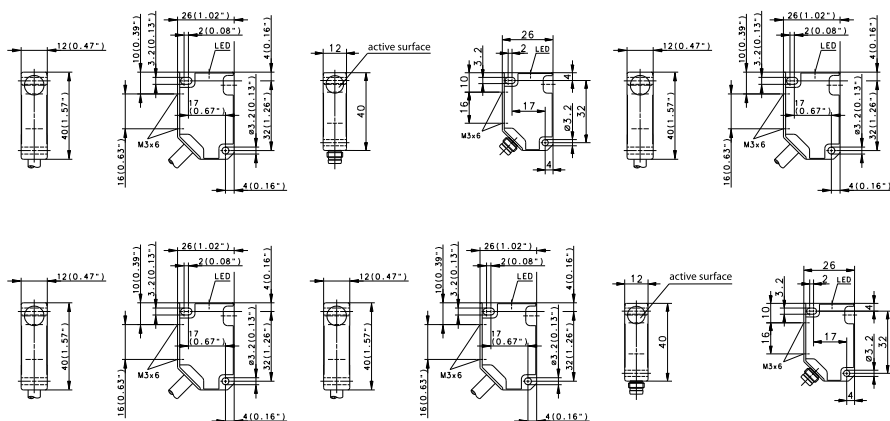
-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67
CuZn39Pb3	CuZn39Pb3	PA, black	PA, black	PA, black	PA, black
3 x 0.14 mm ²	M8 x 1	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	M8 x 1

You will find detailed data sheets to the products under www.bernstein.eu



Inductive Sensors (Type 28 x 16 mm, 40 x 26 mm, 50 x 25 mm, 60 x 36 mm)

Type	40x26x12 mm		40x26x12 mm		40x26x12 mm	
Type of installation	Flush	Flush	Flush	Non-flush	Non-flush	Non-flush
Nominal sensing distance	2 mm	2 mm	2 mm	4 mm	4 mm	4 mm
Type of connection	Cable 2 m	Cable 2 m	Connector M8	Cable 2 m	Cable 2 m	Connector M8
Special feature						



PNP	DC	NO contact NC contact Antivalent NO/NC	6502984023 6502784006	6502984025	6502984024 6502784007	6502984026 6502784008
NPN	DC	NO contact NC contact Antivalent NO/NC				
PNP/NPN	DC	NO/NC prog. push-pull operation				
NAMUR	DC					
Analogue	DC					
2-wire	DC	NO contact NC contact	6503584004 6503484003			6503584005 6503484004
	AC	NO contact NC contact Changeover contact				

Technical data

Rated operating voltage	U_B	10-36 VDC	20-250 V AC	10-36 VDC	10-36 VDC	20-250 V AC	10-36 VDC
Rated operating current	I_B	≤ 200 mA	≤ 300 mA	≤ 200 mA	≤ 200 mA	≤ 300 mA	≤ 200 mA
Switching frequency (max)	F	800 Hz	10 Hz	800 Hz	400 Hz	10 Hz	400 Hz
Short circuit-protection		Cyclic	-	Cyclic	Cyclic	-	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-	LED/-
Sensing distance, adjustable							

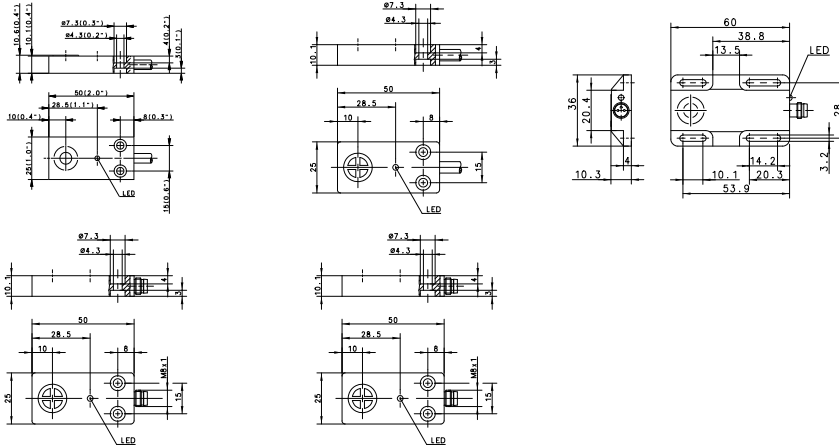
Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material		PBT, black	PBT, black	PBT, black	PBT, black	PBT, black	PBT, black
Connection		3 x 0.5 mm ²	2 x 0.5 mm ²	M8 x 1	3 x 0.5 mm ²	2 x 0.5 mm ²	M8 x 1

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



50x25x10 mm		50x25x10 mm		60x36x10 mm			
Flush	Flush	Non-flush	Non-flush	Non-flush			
5 mm	5 mm	8 mm	8 mm	8 mm			
Cable 2 m	Connector M8	Cable 2 m	Connector M8	Connector M8			



6502990001	6502990005	6502990003	6502990006	6602799048		
6502390001		6502390002				

10-60 VDC	10-60 VDC	10-60 VDC	10-60 VDC	10-60 VDC		
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 400 mA		
500 Hz	500 Hz	200 Hz	200 Hz	200 Hz		
Cyclic	Cyclic	Cyclic	Cyclic	Cyclic		
LED/-	LED/-	LED/-	LED/-	LED/-		

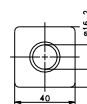
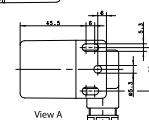
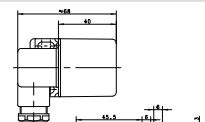
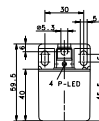
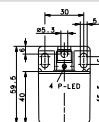
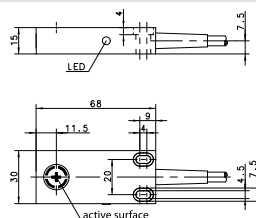
-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C		
IP67	IP67	IP67	IP67	IP67		
PA, black	PA, black	PA, black	PA, black	PA, black		
3 x 0.5 mm ²	M8 x 1	3 x 0.5 mm ²	M8 x 1	M8 x 1		

You will find detailed data sheets to the products under www.bernstein.eu



Inductive Sensors (Type 68 x 30 mm, 40 x 40 mm)

Type	68 x 30 x 15 mm	40 x 40 mm		40 x 40 mm	
Type of installation	Non-flush	Flush	Non-flush	Non-flush	Non-flush
Nominal sensing distance	7 mm	15 mm	20 mm	15 mm	0 mm
Type of connection	Cable 2 m	Connector M12	Connector M12	DIN Connector	Cable 6 m
Special feature					Ring sensor



PNP	DC	NO contact NC contact Antivalent NO/NC	6502956076	6502988001	6502982003	6502999036
NPN	DC	NO contact NC contact Antivalent NO/NC	6502156058			
PNP/NPN	DC	NO/NC prog. push-pull operation				6502982001
NAMUR	DC					
Analogue	DC					
2-wire	DC	NO contact NC contact				
	AC	NO contact NC contact Changeover contact				

Technical data

Rated operating voltage	U_B	10-60 VDC	10-36 VDC	10-36 VDC	10-60 VDC	10-30 VDC
Rated operating current	I_B	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 400 mA	≤ 200 mA
Switching frequency (max)	F	200 Hz	100 Hz	50 Hz	100 Hz	-
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-
Sensing distance, adjustable						

Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP65	IP67
Enclosure material		PBT, black	PA, red/black	PA, red/black	PA, red	PA, black
Connection		3 x 0.5 mm ²	M12 x 1	M12 x 1	DIN 43650	3 x 0.5 mm ²

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



Capacitive Sensors

Functional principle

Capacitive proximity switches detect conductive and non-conductive materials that can be in a solid or liquid state. They serve the purpose of monitoring product levels in containers, checking contents in filling and packaging systems as well as detecting, positioning, monitoring and counting objects, e.g. in sequence control systems, conveyor belts.

Used for detecting media such as:

- **Solid:**
Wood, ceramic, glass, paper stacks, plastic, stone, rubber, ice, nonferrous metals, potatoes
- **Liquid:**
Water, oil, beverages, adhesives, paints
- **Granular:**
Plastic pellets, granulated products, grain, fodder, wood chip
- **Powder:**
Dyes, detergents, sand, cement, fertilizer, salt, sugar, flour, coffee

Technical description

The function of the capacitive proximity switch is based on evaluating the influence exerted by an actuator on the electrical field at the active face of the switch. The approach of an influencing object increases the capacitance of the capacitor, which consists of a sensor electrode located behind the active face and the actuator connected to earth/mass.

This increase in capacitance is dependent on the conductance and the dielectric constant of the actuator as well as its mass, surface area and its distance from the sensor electrode. The capacitive limit switch is equipped with an RC oscillator with a gain factor that increases as a result of the rise in capacitance of the previously described capacitor to such an extent that oscillation is induced. In limit switches, the capacitance required to induce oscillation can be determined by the built-in potentiometer intervening in the feedback of the oscillator.

The response sensitivity, i.e. the sensing distance with a given actuator can be ad-justed in this way. The oscillator output signal is fed to an evaluation circuit that actuates the switching amplifier.

In response to the approach of **conductive** material the actuating object and the active face of the sensor form the plates of a capacitor. The change in capacitance and the consequently achievable sensing distance are large.

In response to the approach of **non-conductive** material $\epsilon > 1$ only the change in the dielectric constant is effective. The increase in capacitance is less than is the case for conductive materials. The resulting sensing distance is small.

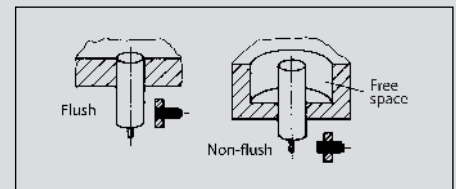
Sensitivity table	
St37 or other metals, earthed	1.00
Surface of water	1.00
St37 150 x 150 x 1 mm, not earthed	0.85
Marble 150 x 150 x 12.5 mm	0.65
Glass 150 x 150 x 7.5 mm	0.55
Stack of paper DIN A 4, 80 g/m ² , 500 sheets	0.55
Fibre board 150 x 150 x 16 mm	0.45
Ceramic tile 150 x 150 x 6 mm	0.25
PVC 150 x 150 x 4 mm	0.15

These values only indicate the expected magnitude of the response sensitivity as the specific properties of the actuating object and of the surroundings in actual applications have a considerable influence on the response distance. It is important to take into account the influence of moisture in order to ensure trouble-free operation. A high water content in the material to be detected, e.g. wood or paper, increases the sensing distance considerably.

In terms of capacitive proximity switches a distinction is made between

- flush mount and
- non-flush mount

limit switches.



In the case of non-flush mount limit switches a clearance that must contain no influencing material must be created about the switch. Due to the adjustment facility available in capacitive proximity switches, the installation of non-flush mount devices is not problematic in connection with reduced clearance. Non-flush mount capacitive proximity switches are characterised by low sensitivity to soiling or condensation.

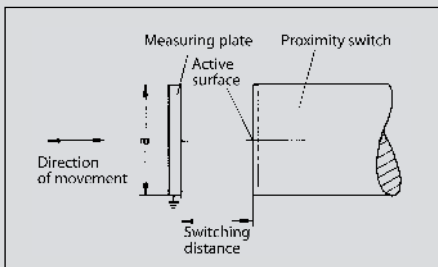
A screening electrode built into flush mount limit switches is connected to circuit ground. As both electrodes of the capacitor are now close together, flush mount capacitive proximity switches are particularly suitable for sensing dielectrics. The disadvantage is that this configuration has an increased sensitivity to condensation or soiling.

Capacitive proximity switches can mutually influence each other if they are mounted next to or opposite each other. In such configurations, the response of flush mount switches is considerably less sensitive than non-flush mount switches. Trials under actual application conditions should be carried out at distances from $> 2x$ to $< 8x$ enclosure diameter. Arrangements with distances $> 8x$ enclosure diameter are not problematic.

Active face: The active face of a capacitive proximity switch is the point at which the electrical field emerges. This point is located at the end face on types designed as threaded sleeves or smooth cylinders. Non-cylindrical limit switches are identified by a symbol on the corresponding face.

Influencing: In relation to a capacitive proximity switch the term influencing refers to the change in the switching status in response to the medium to be detected entering the electrical field.

Standard target: The standard target is defined as a square plate, 1 mm thick and made from FE 360.



The side length "a" of the square target corresponds to the diameter of the circle described by the active face. The length of its side is defined as the larger of either the active face diameter or three times the nominal sensing distance. The target must be earthed in order to ensure comparable sensing distances. The sensing distance of rectangular, capacitive proximity switches is determined by means of an earthed target with a size equal to the surface of the active side of the limit switch.

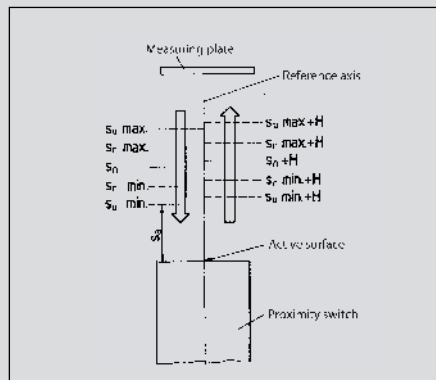
Sensing distance: The sensing distance, that changes the status of the output stage, is the distance of the influencing object in relation to the active face.

Nominal sensing distance (s_n): This is a device-specific characteristic value that does not take into account influences such as tolerance, temperature and changes in voltage.

Real sensing distance (s_r): The real sensing distance is measured at a rated voltage and an ambient temperature of 23 °C +/- 5 °C. It must be between 90 % and 110 % of the nominal sensing distance.

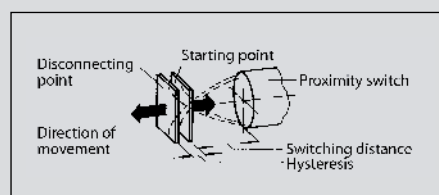
Useable sensing distance (s_u): The useable sensing distance is measured within the permissible temperature and voltage ranges and is 80 % - 120 % of the real sensing distance.

Assured sensing distance (s_a): (operational sensing distance): This is the distance that can be used effectively under the influence of temperature, voltage as well as tolerance variables. It is between 0 % and 72 % of the nominal sensing distance.

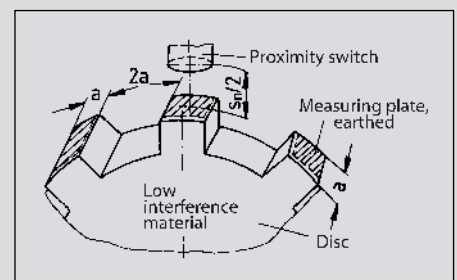


Reproducibility: The reproducibility of the switching distance is the repeat accuracy of the real sensing distance of two successive switching operations within a period of 8 hours at an ambient temperature between 18 °C and 28 °C and a supply voltage that may not deviate by more than 5 % from the rated voltage. The difference between any two measurements must not be more than 10 % of the real sensing distance.

Switching hysteresis: The switching hysteresis refers to the difference between the switch-on point as an object approaches the target and the switch-off point as the object moves away from the proximity switch. The value is specified as a percentage of the real sensing distance.



Switching frequency: The switching frequency is measured in accordance with EN 60947-5-2. The standard targets with the side length "a" are mounted on a plate that exerts minimum influence at "2a" intervals and are moved passed the proximity switch to be tested at half the nominal sensing distance. The maximum switching frequency is reached when the switch-on or switch-off time of the proximity switch is 50 µs. In the case of AC proximity switches, the maximum switching frequency is reached when the switch-on and switch-off time is equal to the half wave period of the supply frequency.



Temperature range: In accordance with DIN, the temperature range is from -25 °C to +70 °C. Reliable operation is ensured within this range.

Protection class

Corresponding to their ID code, the enclosures are dustproof and waterproof in accordance with IP65 or IP67 (DIN 40050).

Connection cable

A PVC-insulated connection cable is supplied as standard. Special versions with silicone sheathing, polyurethane sheathing, irradiation cross-linked PVC or Teflon insulation are also available.

Plug connection

Nowadays the plug connection is just as significant as the fixed cable on electronic proximity switches. The capacitive proximity switches in the BERNSTEIN range can be equipped with a wide variety of plug connections. As standard, this catalogue contains connector versions of virtually all types of limit switch.

Standards

All sensors conform to EN 60947-5-2



Capacitive Sensors

Important information

Capacitive sensors are able to detect conductive and non-conductive materials in solid, liquid, granular or powder form. However, certain criteria must be taken into account in practical applications.

Sensing distance

The nominal sensing distances are specified and set at the factory in accordance with DIN EN 60947-5-2/98. The maximum sensing distance is achieved on approach of **conductive** materials of corresponding size.

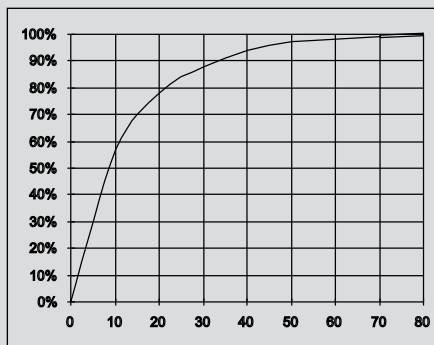
On approach of **non-conductive** materials, the dielectric constant ϵ of the material to be detected is of decisive significance. Depending on the application, the specified sensing distances vary by a certain factor in relation to the dielectric constant. The values determined according to the table only indicate the expected magnitude of the response sensitivity as the specific properties of the actuating object (diameter, thickness, moisture content etc.) and of the surroundings (earthing) in actual applications have a considerable influence on the response distance. In most cases adaptation to the specific application can be achieved by adjustment with the built-in potentiometer.

Clearance

In the case of non-flush mount capacitive sensors a clearance that must contain no influencing material must be created about the sensor. Non-flush mount capacitive sensors are characterised by low sensitivity to soiling or condensation. On account of their design, flush mount capacitive sensors are particularly suitable for sensing dielectrics. The increased sensitivity, however, may be detrimental in terms of the above mentioned parasitic effects.

If capacitive proximity switches are to be mounted opposite or next to each other, trials under actual application conditions should be carried out at distances between 2x and 8x enclosure diameter. Thanks to the adjustment facility, however, adaptation to specific applications is almost always possible.

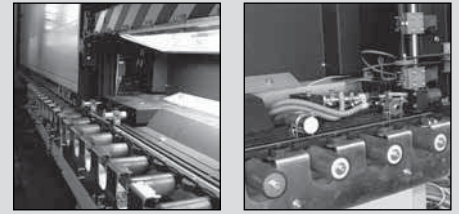
Examples of dielectric constants	
Glass	3 ... 14
Rubber	2.5 ... 3
Laminated paper	3.5 ... 6
Wood	2.5 ... 6.8
Marble	8.4 ... 14
Mineral oil	2.15
Epoxy resin	3.3 ... 3.6
Petroleum	2.2
Plexiglass	3.6
Polyamide	3 ... 8
PVC	3.3 ... 4.1
Porcelain	4.2 ... 6.5
Teflon PTFE	2
Air	1
Water	80.8
Paper (dry)	2



Variance of sensing distance as a function of ϵ

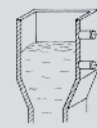
Application descriptions

A particular application of capacitive proximity switches is to detect levels in non-metallic containers from the outside. Advantage: There is no need to make a hole in the container wall for the purpose of detecting product level. The medium to be detected does not come in contact with the limit switch. The prerequisite is that the dielectric constant and the mass of the material to be detected are greater than that of the container. The response sensitivity of the proximity switch must be reduced with the built-in potentiometer to such an extent that the limit switch does not respond to the container wall but rather to the medium to be detected.

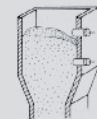


Above: Insulation glass production lines equipped with BERNSTEIN capacitive sensors

Further fields of application are illustrated below.



Level monitoring in non-metallic containers



Level monitoring of bulk material, e.g. granulated material, fodder



Stack height scanning, e.g. paper, chip board



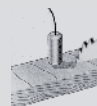
Fill level monitoring in paint and adhesive containers



Registering, counting, sorting or monitoring in conveyor belt systems



Detecting, positioning in sequence control systems



Detection in woodworking applications



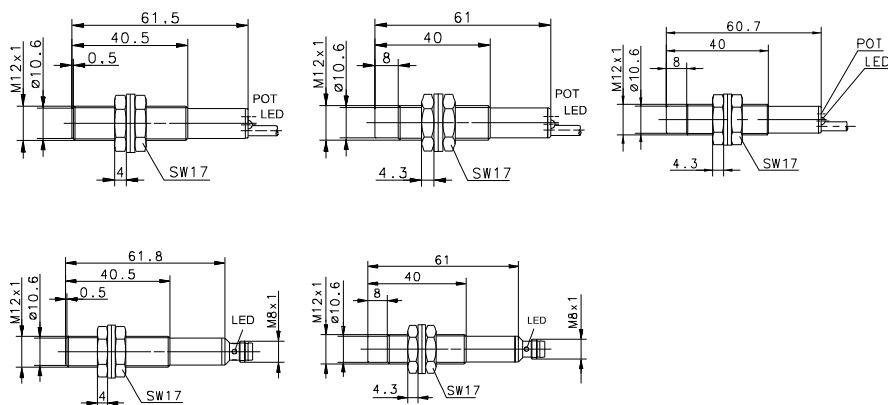
Belt breakage signalling



Level monitoring in packing systems

Capacitive Sensors (Type M12, M18)

Type	M12		M12		M12
Type of installation	Flush	Flush	Non-flush	Non-flush	Non-flush
Nominal sensing distance	2 mm	2 mm	4 mm	4 mm	6 mm
Type of connection	Cable 2 m	Connector M8	Cable 2 m	Connector M8	Cable 2 m
Special feature					Sensing dist.



PNP	DC	NO contact NC contact Antivalent NO/NC	6507903001	6507903004	6507919001	6507919004	6607919110
NPN	DC	NO contact NC contact Antivalent NO/NC	6507303001		6507319001		
PNP/NPN	DC	NO/NC prog. push-pull operation					
NAMUR	DC						
Analogue	DC						
2-wire	DC	NO contact NC contact					
	AC	NO contact NC contact Changeover contact					

Technical data

Rated operating voltage	U_B	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_B	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	25 Hz	25 Hz	25 Hz	25 Hz	25 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-
Sensing distance, adjustable		Poti	-	Poti	-	Poti

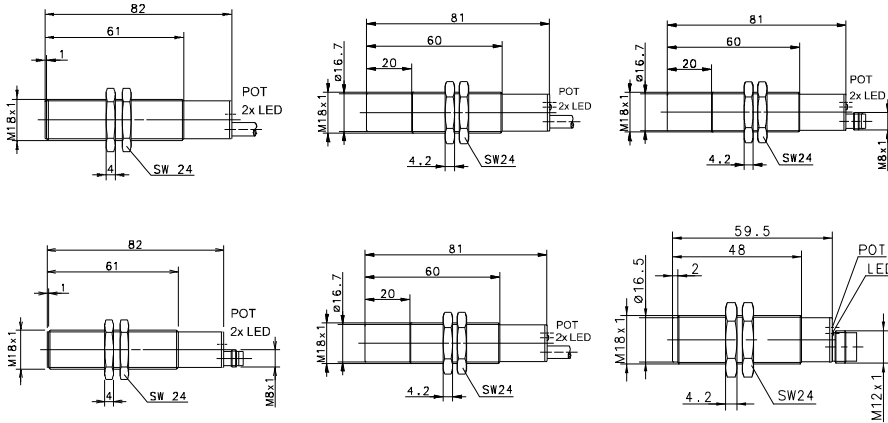
Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP65	IP65	IP65	IP65	IP65
Enclosure material		CuZn39Pb3	CuZn39Pb3	PBT, black	PBT, black	PBT, black
Connection		3 x 0.14 mm ²	M8 x 1	3 x 0.14 mm ²	M8 x 1	3 x 0.14 mm ²

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



M18		M18		M18			
Flush	Flush	Non-flush	Non-flush	Non-flush	Non-flush		
5.0 mm	5.0 mm	8.0 mm	8.0 mm	8.0 mm	13.5 mm		
Cable 2 m	Connector M8	Cable 2 m	Cable 2 m	Connector M8	Connector M12		
					Sensing dist.		



6507905001	6507905004	6507921724	6507921002	6507921004		
		6507821001 ^①				
6507305001		6507321723				
		6508521001				
		6508421001				

10-60 VDC	10-60 VDC	10-60 VDC	20-250 V AC	10-60 VDC	10-60 VDC		
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 300 mA	≤ 200 mA	≤ 200 mA		
25 Hz	25 Hz	25 Hz	15 Hz	25 Hz	25 Hz		
Cyclic	Cyclic	Cyclic	-	Cyclic	Cyclic		
LED/LED	LED/LED	LED/LED	LED/LED	LED/LED	LED/LED		
Poti	Poti	Poti	Poti	Poti	Poti		

-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C		
IP65	IP65	IP65	IP65	IP65	IP65		
CuZn39Pb3	CuZn39Pb3	PBT, black	PBT, black	PBT, black	PBT, black		
3 x 0.5 mm ²	M8 x 1	3 x 0.5 mm ²	2 x 0.5 mm ²	M8 x 1	M12 x 1		

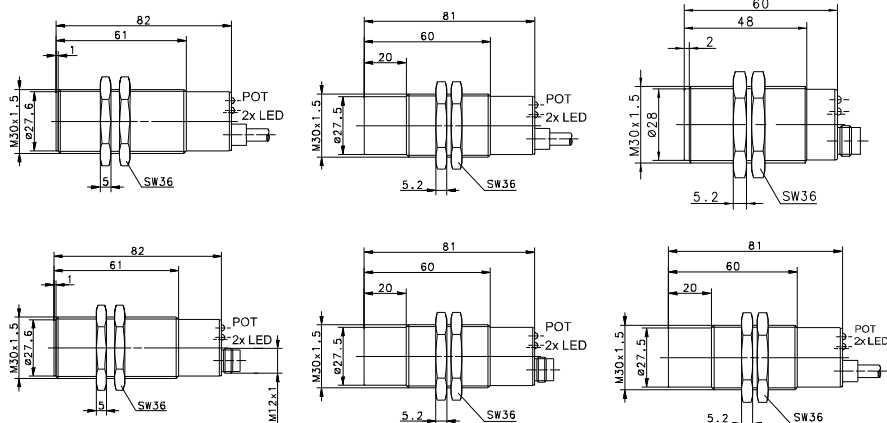
You will find detailed data sheets to the products under www.bernstein.eu

① Length 65 mm



Capacitive Sensors (Type M30, M32)

Type	M30		M30		M30	
Type of installation	Flush	Flush	Non-flush	Non-flush	Non-flush	Non-flush
Nominal sensing distance	10 mm	10 mm	20 mm	20 mm	20 mm	20 mm
Type of connection	Cable 2 m	Connector M12	Cable 2 m	Connector M12	Connector M12	Cable 2 m
Special feature					Short form	



PNP	DC	NO contact NC contact Antivalent NO/NC	6507907001	6507907004	6507923727	6507923004	6507923006
NPN	DC	NO contact NC contact Antivalent NO/NC	6507707001		6507323001	6507323004	
PNP/NPN	DC	NO/NC prog. push-pull operation					
NAMUR	DC						
Analogue	DC						
2-wire	DC	NO contact NC contact					
	AC	NO contact NC contact Changeover contact					6508523001 6508423001

Technical data

Rated operating voltage	U_B	10-60 VDC	10-60 VDC	10-60 VDC	10-60 VDC	10-60 VDC	20-250 V AC
Rated operating current	I_B	≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 300 mA
Switching frequency (max)	F	25 Hz	25 Hz	25 Hz	25 Hz	25 Hz	15 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	-
Function/operating voltage indicator		LED/LED	LED/LED	LED/LED	LED/LED	LED/LED	LED/LED
Sensing distance, adjustable		Poti	Poti	Poti	Poti	Poti	Poti

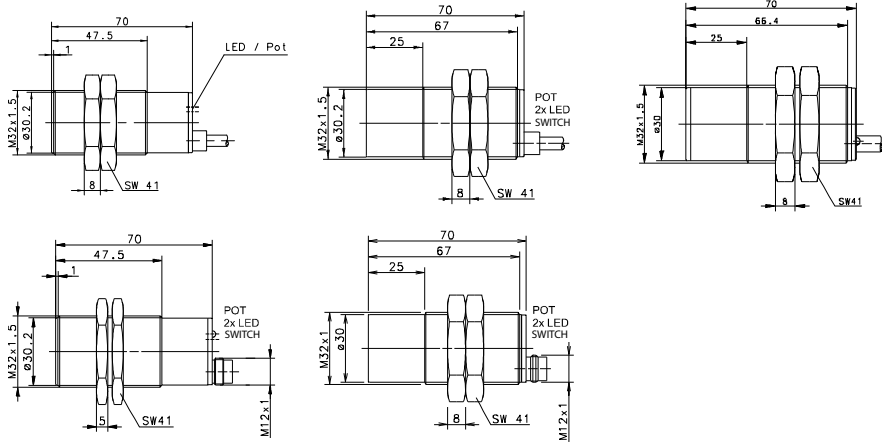
Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP65	IP65	IP65	IP65	IP65	IP65
Enclosure material		CuZn39Pb3	CuZn39Pb3	PBT, black	PBT, black	PBT, black	PBT, black
Connection		3 x 0.5 mm ²	M12 x 1	3 x 0.5 mm ²	M12 x 1	M12 x 1	2 x 0.5 mm ²

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



M32		M32		M32			
Flush	Flush	Non-flush	Non-flush	Non-flush			
15 mm	15 mm	30 mm	30 mm	30 mm			
Cable 6 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m			
				Timer/Relay			



6507013013	6507013015	6507013001	6507013004				
6507013012							
				6508613001			

10-60 VDC	10-60 VDC	10-60 VDC	10-60 VDC	180-250 V AC		
≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 8 A		
25 Hz	25 Hz	25 Hz	25 Hz	-		
Cyclic	Cyclic	Cyclic	Cyclic	-		
LED/LED	LED/-	LED/-	LED/-	LED/LED		
Poti	Poti	Poti	Poti	Poti		

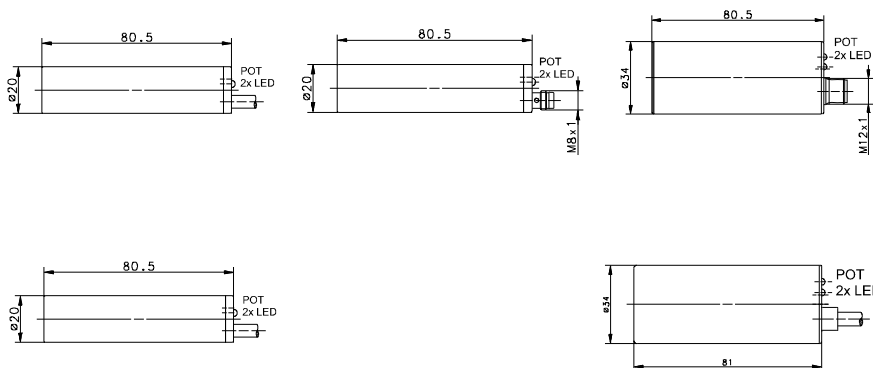
-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C		
IP65	IP65	IP65	IP65	IP65		
CuZn39Pb3	CuZn39Pb3	PBT, black	PBT, black	PBT, black		
3 x 0.5 mm ²	M12 x 1	3 x 0.5 mm ²	M12 x 1	5 x 0.5 mm ²		

You will find detailed data sheets to the products under www.bernstein.eu



Capacitive Sensors (Type Ø 20 mm, Ø 34 mm, E50, E68)

Type	Ø 20 mm		Ø 20 mm	Ø 34 mm	
Type of installation	Non-flush	Non-flush	Non-flush	Flush	Non-flush
Nominal sensing distance	15 mm	15 mm	15 mm	20 mm	30 mm
Type of connection	Cable 2 m	Cable 2 m	Connector M8	Connector M12	Cable 2 m
Special feature					



PNP	DC	NO contact NC contact Antivalent NO/NC	6507910001	6507910004	6507915006	6507915001
NPN	DC	NO contact NC contact Antivalent NO/NC	6507310002	6507310004		6507315001
PNP/NPN	DC	NO/NC prog. push-pull operation				
NAMUR	DC					
Analogue	DC					
2-wire	DC	NO contact NC contact				
	AC	NO contact NC contact Changeover contact	6508510001 6508410001			

Technical data

Rated operating voltage	U_b	10-60 VDC	20-250 V AC	10-60 VDC	10-60 VDC	10-60 VDC
Rated operating current	I_b	≤ 400 mA	≤ 300 mA	≤ 400 mA	≤ 200 mA	≤ 400 mA
Switching frequency (max)	F	25 Hz	15 Hz	25 Hz	25 Hz	25 Hz
Short circuit-protection		Cyclic	-	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/LED	LED/LED	LED/LED	LED/LED	LED/LED
Sensing distance, adjustable		Poti	Poti	Poti	Poti	Poti

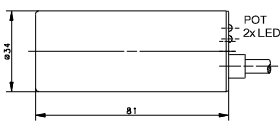
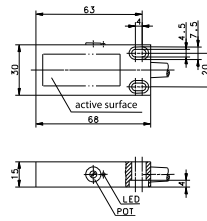
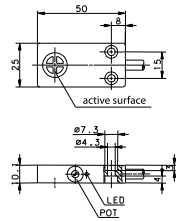
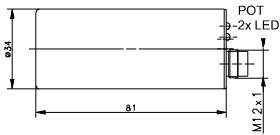
Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP65	IP65	IP65	IP65	IP65
Enclosure material		PBT, red	PBT, red	PBT, red	CuZn39Pb3	PBT, red
Connection		3 x 0.5 mm ²	2 x 0.5 mm	M8 x 1	M12 x 1	3 x 0.5 mm ²

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



Ø 34 mm		E50	E68		
Non-flush	Non-flush	Flush	Flush		
30 mm	30 mm	8 mm	10 mm		
Connector M12	Cable 2 m	Cable 2 m	Cable 2 m		



6507915004	6507990001	6507956001		
	6507390001	6507356001		
6508515001 6508415001				

10-60 VDC	20-250 V AC	10-36 VDC	10-36 VDC		
≤ 400 mA	≤ 300 mA	≤ 200 mA	≤ 200 mA		
25 Hz	15 Hz	25 Hz	25 Hz		
Cyclic	-	Cyclic	Cyclic		
LED/LED	LED/LED	LED/-	LED/-		
Poti	Poti	Poti	Poti		

-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C		
IP65	IP65	IP65	IP65		
PBT, red	PBT, red	PBT, black	PBT, black		
M12 x 1	2 x 0.5 mm ²	3 x 0.34 mm ²	3 x 0.5 mm ²		

You will find detailed data sheets to the products under www.bernstein.eu



Optoelectronic Sensors

BERNSTEIN optoelectronic sensors can be divided into three basic types (operating modes):

- Through-beam sensor
- Retro-reflective sensor
- Diffuse-reflection sensor

In accordance with EN 60947-5-2 the sensors are described as "photoelectric proximity switches" and CE-certified.

The use of the sensor systems depends primarily on the specific application and operating environment.

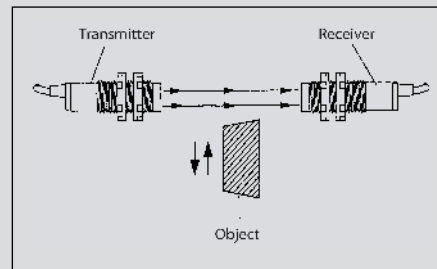
Several applications are outlined on these pages, illustrating the advantages and disadvantages of the individual operating modes.

Dividing all optoelectronic sensors into type groups simplifies device selection. The distinguishing criteria for the type families are the shape and material of the enclosure. The available operating modes of the individual type groups are specified in the Technical Data section of this catalogue.

In general, BERNSTEIN optoelectronic sensors operate using pulsating red or infrared light. This technology offers the following advantages:

- High immunity to ambient light
- Maximum sensing range
- Lower heat built-up and therefore longer service life of transmit diodes

Through-beam sensors



Through-beam sensors consist of a light transmitter (light source) and a spatially separated receiver. The light emitted by the transmitter is analysed by the receiver. An interruption in the light path, e.g. by an object, is evaluated and causes the output to switch.

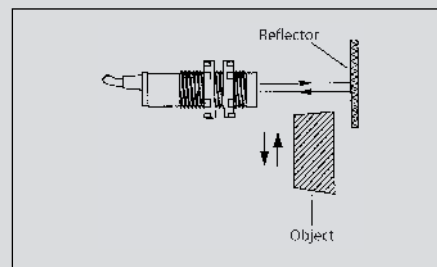
Advantages:

- Long sensing distance; the light beam needs only to travel in one direction from the transmitter to the receiver
- High operational reliability; interference reflections rarely trigger the receiver
- Detection of even the smallest objects by additionally mounting lenses or screens

Disadvantages:

- High installation cost with two devices having to be mounted, wired and adjusted

Retro-reflective sensors



The light transmitter and receiver in retro-reflective sensors are accommodated in one enclosure. The light beam emitted by the transmitter is reflected back to the receiver by a reflector (e.g. triple reflector or reflective film). An interruption in the light paths is evaluated and changes the output signal at the receiver.

The ranges of these types of sensor specified in the Technical Data section in this catalogue relate to an 83 mm diameter triple reflector. Different ranges by using other types or sizes of reflector are available on request.

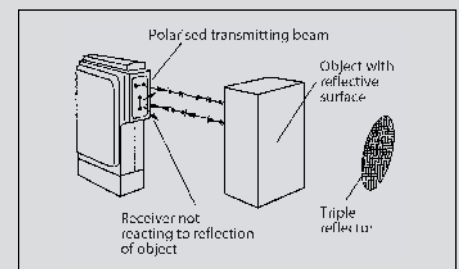
Advantages:

- Easy installation of light barrier and reflector
- The reflector can be used as a moving signal generator, e.g. in conveyor systems

Disadvantages:

- Shorter sensing range than a through-beam system since the light beam has to travel from the transmitter (light source) to the reflector and back to the receiver
- Highly polished objects can act as reflectors and may cause malfunctions

Retro-reflective sensors with polarisation filter



This is a special type of retro-reflective sensor. A special linear or circular polarised filter element (film) is placed between the transmit or receive elements and the glass light emitting face of the sensor.

Advantages:

- Reflections from specular or transparent objects are suppressed

Disadvantages:

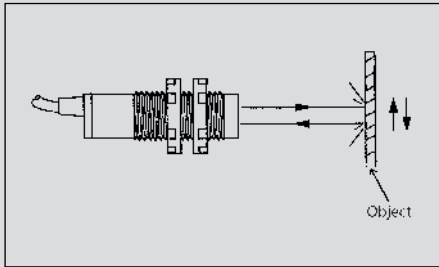
- The sensing range is reduced compared to standard sensors without polarisation filter

Special versions with autocollimation

Advantages:

- Transmit and receive channel use the same light source, i.e. no dead zone with reflectors in short distance range

Diffuse-reflection sensor



The light transmitter and receiver in a diffuse-reflection sensor are accommodated in one common enclosure. The light emitted from the transmitter is reflected diffused from the detected object. A part of this diffused reflection returns to the receiver and changes the switching status at the output when a certain intensity is exceeded. Accordingly, the texture and the colour of the object surface has a considerable influence on the object detection characteristics (presence – absence).

The sensing ranges specified in the Technical Data section of this catalogue are defined in accordance with DIN EN 60947-5-2: Sensing ranges up to 400 mm refer to a 100 x 100 mm white Kodak paper test card. 200 x 200 mm test cards are used for sensing ranges \geq 400 mm.

The reflectivity of the object surface to be sensed affects the sensing distance so that a correction or remission factor has to be specified. This value may vary from less than 10 % for matt-black plastic to 200 % for raw sheet aluminium (special values on request). An application-dependent test of the specific object is usually recommended to take ambient conditions such as dust and humidity into consideration for the selection of the optimum sensor.

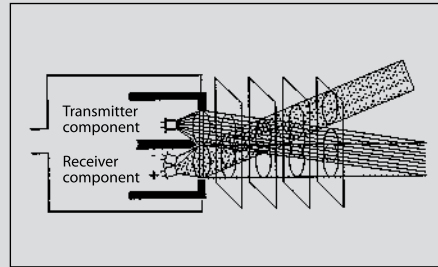
Advantages:

- Easy installation
- No reflector necessary

Disadvantages:

- Different sensing distances and sensitivity settings are required for different objects (surface, colour)

Diffuse-reflection sensor with background suppression



This is a special type of diffuse-reflection sensor. It is based on two receive modules or segmented receivers. Using the triangulation principle, reflections of objects beyond the target do not reach the active face of the receiver modules.

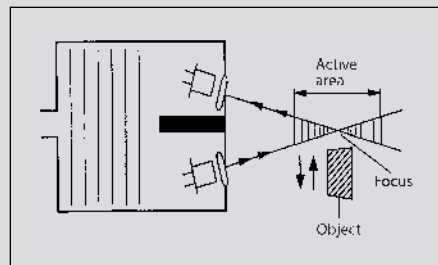
Advantages:

- No background effect on object detection (e.g. a faintly reflecting object may be detected in front of a high-gloss background)

Disadvantages:

- Short sensing distance
- Considerable technical expenditure

Convergent beam sensors, fixed focus



Convergent beam sensors, fixed focus
The transmit and receive modules of convergent beam sensors are arranged at a defined angle to each other. The light cone of the transmitter and receiver are joined at a fixed focal point. This results in the active zone for the detection of objects being defined around this focal point.

Advantages:

- Foreground/background suppression
- Defined active zone

Disadvantages:

- Short sensing distances (due to limited base width of sensor enclosure)

Angular optical system

The M18 series is available with a radial optical system (light outlet offset by 90°) for confined installation conditions. Compared to versions with an axial optical system, the sensing range of these sensors is slightly reduced due to optical displacement loss.

Reflectors

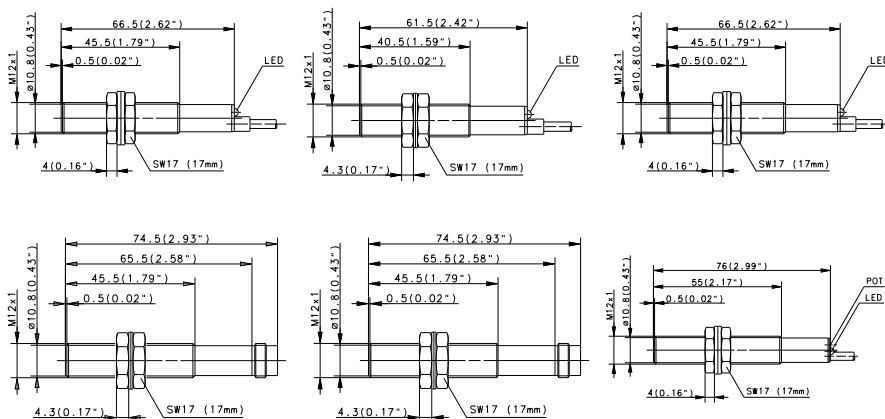
BERNSTEIN triple reflectors that consist of several triple mirrors arranged in a pyramid configuration are best suited for reflecting light in light barrier systems. The pyramid-like structure of these triple mirrors allows the reflector to be pivoted by up to 30° from the optical axis (e.g. caused by vibration or slight movement).

The specified sensing ranges of the retro-reflective sensors refer to the \varnothing 83 mm reflector (6572107003); the range is reduced accordingly with smaller reflectors.

Essentially, the size of the reflector should be selected according to the sensing range and the size of the object to be detected. The object should ideally be larger than the reflector so that it completely covers the reflector.

Optoelectronic Sensors (Type M12, M18)

Type	M12		M12		M12	
Operating mode	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D
Sensing range	60 mm	60 mm	60 mm	60 mm	200 mm	200 mm
Type of connection	Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Cable 2 m
Special feature						



PNP	Light activated Dark activated Programmable	6557928002	6557927001	6557930002	6557929002	6557928004	6557928003
NPN	Light activated Dark activated Programmable	6557728001					
Transmitter							
Relay output							
NAMUR							
Analogue	Current output Voltage output						
2-wire	DC AC						

Technical data

Rated operating voltage	U_b	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_b	50 mA	50 mA	50 mA	50 mA	50 mA	50 mA
Switching frequency (max)	F	> 100 Hz	> 100 Hz	> 100 Hz	> 100 Hz	> 250 Hz	> 250 Hz
Short circuit protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	-/-	LED/-	-/-	LED/-	LED/-
Sensitivity adjustable		-	-	-	-	-	Yes
Teachable							
Timer function							
Diagnostic function							
Type of light		IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm

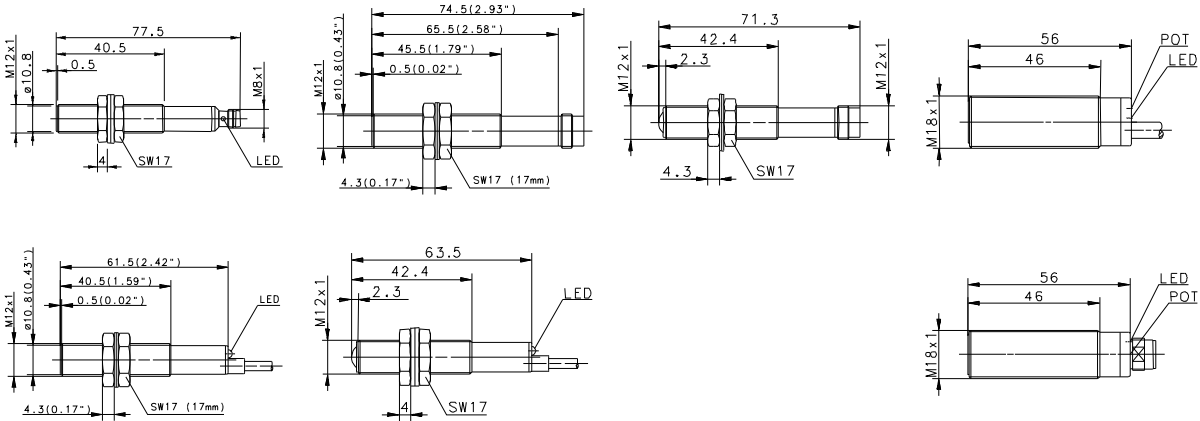
Mechanical data

Ambient temperature (min/max)		-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67	IP65
Enclosure material		CuZn39Pb3	CuZn39Pb3	PA	PA	CuZn39Pb3	CuZn39Pb3
Connection		3 x 0.14 mm ²	M12 x 1	3 x 0.14 mm ²	M12 x 1	3 x 0.14 mm ²	3 x 0.14 mm ²

Please refer to Accessories for reflectors, mounting brackets, cable couplers and sensor tester.



M12		M12		M12		M18	
Retro-reflective sensor Type D 200 mm Connector M12	Retro-reflective sensor Type D 200 mm Cable 2 m	Retro-reflective sensor Type D 200 mm Connector M12	Through-beam sensor Type D 6 m Cable 2 m	Through-beam sensor Type D 6 m Connector M12	Retro-reflective sensor Type D 40 mm Cable 2 m	Retro-reflective sensor Type D 40 mm Connector M12	



6557927004	6557930001	6557929001	6551728001	6551729001	6558817001	6558816001
			6551028001	6551029001		

10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
50 mA	50 mA	50 mA	50 mA	50 mA	50 mA	50 mA
> 250 Hz	> 250 Hz	> 250 Hz	> 100 Hz	> 100 Hz	500 Hz	500 Hz
Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
LED/-	LED/-	-/-	LED/-	-/-	LED/-	LED/-
-	-	-	-	-	-	-
IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm

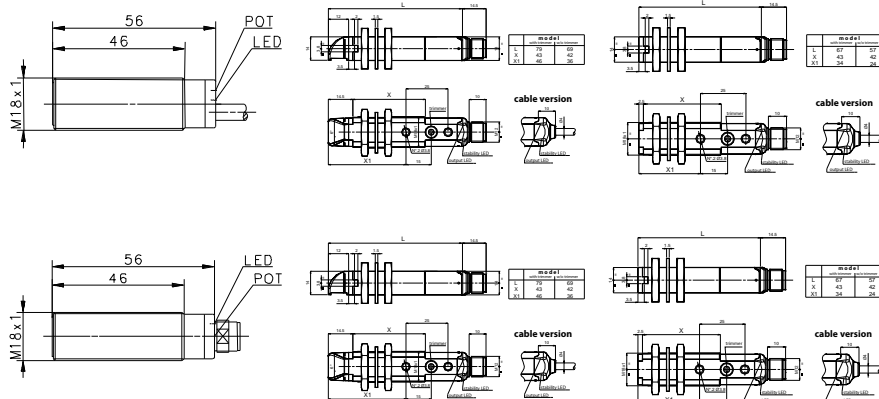
-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67	IP67
CuZn39Pb3	PA 12	PA 12	CuZn39Pb3	PA. red	CuZn39Pb3	CuZn39Pb3
M12 x 1	3 x 0.14 mm ²	M12 x 1	3 x 0.14 mm ²	M12 x 1	4 x 0.34 mm ²	M12 x 1

You will find detailed data sheets to the products under www.bernstein.eu



Optoelectronic Sensors (Type M18)

Type	M18		M18		M18	
Operating mode	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D
Sensing range	40 mm	40 mm	80 mm	80 mm	100 mm	100 mm
Type of connection	Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12
Special feature			Angle optic	Angle optic		



PNP	Light activated Dark activated Programmable	6558819001	6558818002	6557819010	6557818010	6557819008	6557818008
NPN	Light activated Dark activated Programmable						
Transmitter							
Relay output							
NAMUR							
Analogue	Current output Voltage output						
2-wire	DC AC						

Technical data

Rated operating voltage	U_b	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_b	50 mA	50 mA	200 mA	200 mA	200 mA	200 mA
Switching frequency (max)	F	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz
Short circuit protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-	LED/-
Sensitivity adjustable		-	-	-	-	-	-
Teachable							
Timer function							
Diagnostic function							
Type of light		IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm

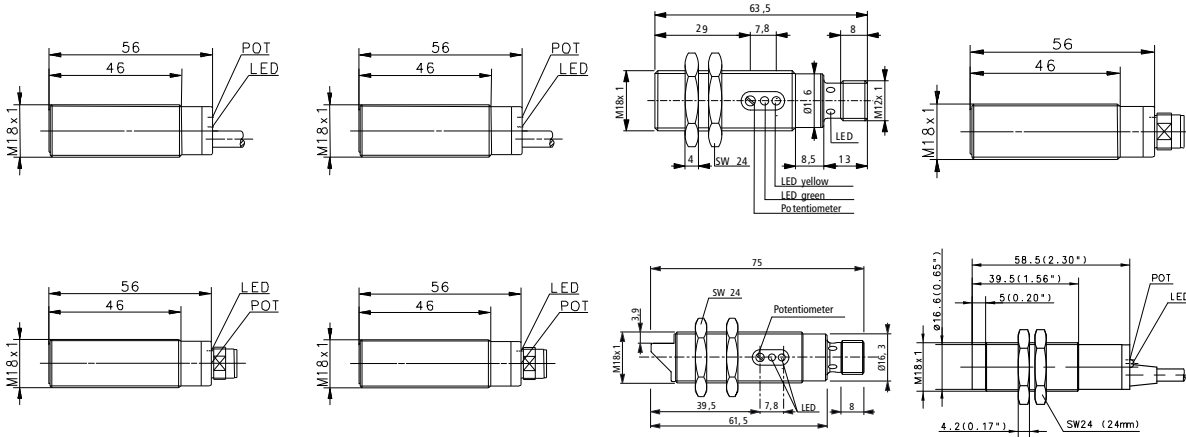
Mechanical data

Ambient temperature (min/max)		-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material		PBT	PBT	PBT	PBT	PBT	PBT
Connection		4 x 0.34 mm ²	M12 x 1	4 x 0.34 mm ²	M12 x 1	4 x 0.34 mm ²	M12 x 1

Please refer to Accessories for reflectors, mounting brackets, cable couplers and sensor tester.



M18		M18		M18		M18		
Retro-reflective sensor Type D 100 mm Cable 2 m	Retro-reflective sensor Type D 100 mm Connector M12	Retro-reflective sensor Type D 100 mm Cable 2 m	Retro-reflective sensor Type D 100 mm Connector M12	Retro-reflective sensor Type D 120 mm Connector M12	Retro-reflective sensor Type D 120 mm Connector M12	Retro-reflective sensor Type D 200 mm Connector M12	Retro-reflective sensor Type D 200 mm Cable 2 m	



6557817002		6557816001		6557819004		6557818002		6558916001		6558916002		6557016002		6557819001	

10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-30 VDC	10-36 VDC	
200 mA	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA	
500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	> 250 Hz	
Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	
LED/-	LED/-	LED/-	LED/-	LED/LED	LED/LED	LED/-	LED/-	
-	-	-	-	Yes	Yes	Yes	Yes	
IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	

-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+55°C	-20°C/+55°C	-5°C/+70°C	-20°C/+80°C	
IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP65	
CuZn39Pb3	CuZn39Pb3	PBT	PBT, black	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	PA, red	
4 x 0.34 mm ²	M12 x 1	4 x 0.34 mm ²	M12 x 1	M12 x 1	M12 x 1	M12 x 1	4 x 0.25 mm ²	

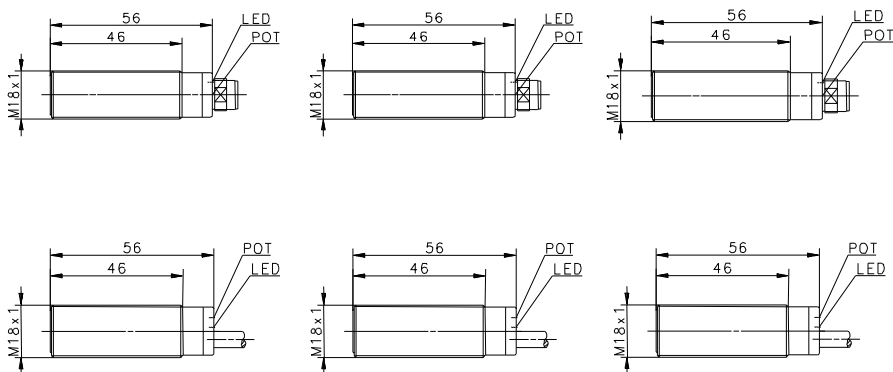
You will find detailed data sheets to the products under www.bernstein.eu

① Background suppression



Optoelectronic Sensors (Type M18)

Type	M18		M18		M18	
Operating mode	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D
Sensing range	300 mm	300 mm	300 mm	300 mm	300 mm	500 mm
Type of connection	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m
Special feature						



PNP	Light activated Dark activated Programmable	6557821002	6557817003	6557816002	6557819005	6557818003
NPN	Light activated Dark activated Programmable			6557216003	6557219005	6557218005 6557222003
Transmitter						
Relay output						
NAMUR						
Analogue	Current output Voltage output					
2-wire	DC AC					

Technical data

Rated operating voltage	U_b	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_b	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
Switching frequency (max)	F	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz
Short circuit protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-	LED/-
Sensitivity adjustable		Yes	Yes	Yes	Yes	Yes	Yes
Teachable							
Timer function							
Diagnostic function							
Type of light		IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm

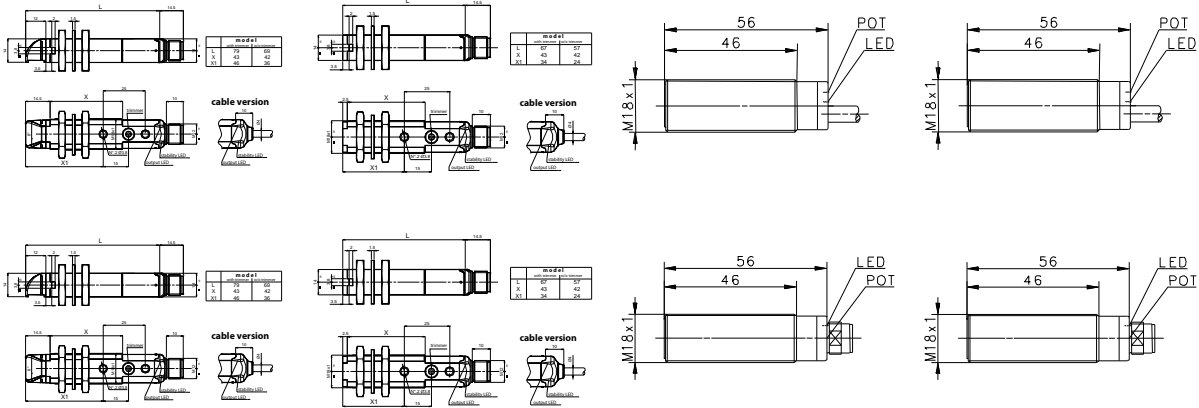
Mechanical data

Ambient temperature (min/max)		-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material		Stainl. st. 1.4305	CuZn39Pb3	CuZn39Pb3	PBT	PBT	Stainl. st. 1.4305
Connection		M12 x 1	4 x 0.34 mm ²	M12 x 1	4 x 0.34 mm ²	M12 x 1	4 x 0.34 mm ²

Please refer to Accessories for reflectors, mounting brackets, cable couplers and sensor tester.



M18		M18		M18		M18	
Retro-reflective sensor Type D 300 mm Cable 2 m Angle optic	Retro-reflective sensor Type D 300 mm Connector M12 Angle optic	Retro-reflective sensor Type D 400 mm Cable 2 m	Retro-reflective sensor Type D 400 mm Connector M12	Retro-reflective sensor Type D 500 mm Cable 2 m	Retro-reflective sensor Type D 500 mm Connector M12	Retro-reflective sensor Type D 500 mm Cable 2 m	Retro-reflective sensor Type D 500 mm Connector M12



6557819009	6557818009	6557819007	6557818007	6557817004	6557816006	6557819006	6557818006
				6557217003	6557216004	6557219006	6557218006

10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
200 mA	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz
Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
LED/-	LED/-	LED/-	LED/-	LED/-	LED/-	LED/-	LED/-
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm

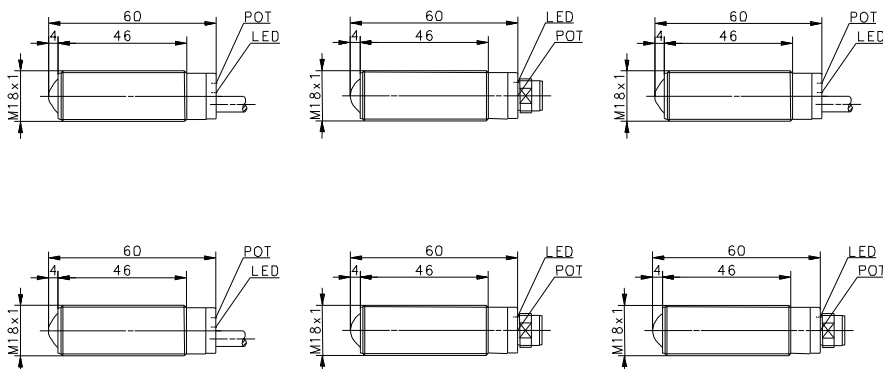
-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67
PBT	PBT	PBT	PBT	CuZn39Pb3	CuZn39Pb3	PBT	PBT
4 x 0.34 mm ²	M12 x 1	4 x 0.34 mm ²	M12 x 1	4 x 0.34 mm ²	M12 x 1	4 x 0.34 mm ²	M12 x 1

You will find detailed data sheets to the products under www.bernstein.eu



Optoelectronic Sensors (Type M18)

Type	M18		M18		M18	
Operating mode	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R
Sensing range	800 mm	800 mm	800 mm	2.5 m	2.5 m	2.5 m
Type of connection	Cable 2 m	Cable 2 m	Connector M12	Connector M12	Cable 2 m	Connector M12
Special feature	Glass lens	Glass lens	Glass lens	Glass lens	Glass lens	Glass lens



PNP	Light activated Dark activated Programmable	6555817002	6555819004	6555818002	6555821001	6555817001	6555816001
NPN	Light activated Dark activated Programmable			6555218002			6555216001
Transmitter							
Relay output							
NAMUR							
Analogue	Current output Voltage output						
2-wire	DC AC						

Technical data

Rated operating voltage	U_b	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_b	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
Switching frequency (max)	F	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz
Short circuit protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-	LED/-
Sensitivity adjustable		Yes	Yes	Yes	Yes	Yes	Yes
Teachable							
Timer function							
Diagnostic function							
Type of light		red 660 nm	red 660 nm	red 660 nm	red 660 nm	red 660 nm	red 660 nm

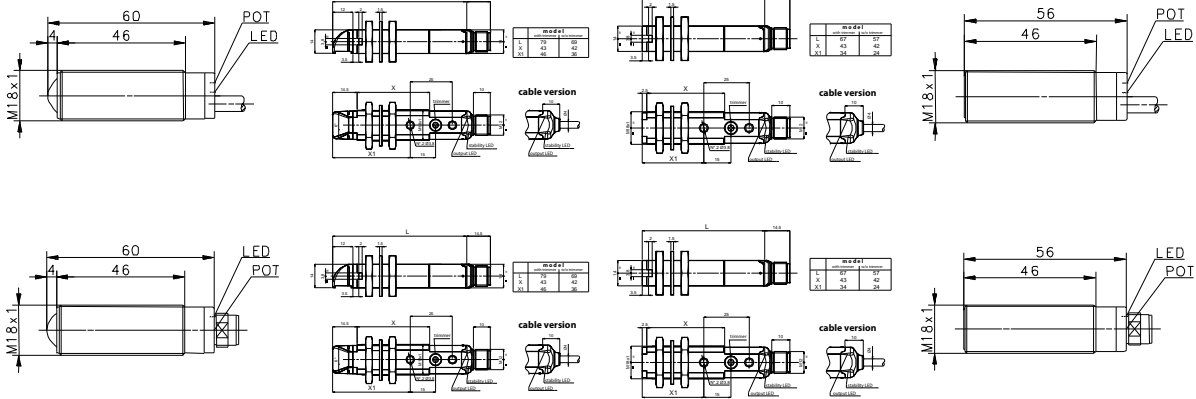
Mechanical data

Ambient temperature (min/max)		-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material		CuZn39Pb3	PBT, black	PBT, black	Stainless steel 1.4305	CuZn39Pb3	CuZn39Pb3
Connection		4 x 0.34 mm ²	4 x 0.34 mm ²	M12 x 1	M12 x 1	4 x 0.34 mm ²	M12 x 1

Please refer to Accessories for reflectors, mounting brackets, cable couplers and sensor tester.



M18		M18		M18		M18	
Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R
2.5 m	2.5 m	2.5 m	2.5 m	3 m	3 m	3 m	3 m
Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12
Glass lens	Glass lens	Angle optic	Angle optic				



6555819003	6555818001	6555819006	6555818004	6555819005	6555818003	6554819003	6554818001
6555219001						6554219002	6554218001

10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
200 mA	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz
Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
LED/-	LED/-	LED/-	LED/-	LED/-	LED/-	LED/-	LED/-
Yes	Yes	Yes	Yes	Yes	Yes	-	-
red 660 nm	red 660 nm	red 660 nm	red 660 nm	red 660 nm	red 660 nm	IR 880 nm	IR 880 nm

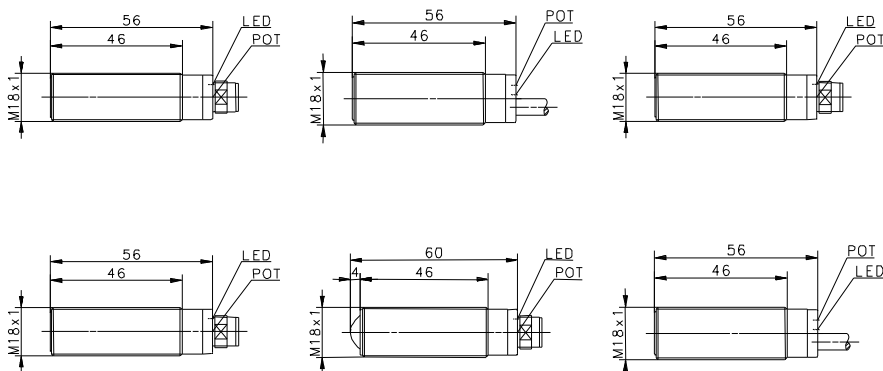
-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67
PBT, black	PBT, black	PBT	PBT	PBT	PBT	PBT, black	PBT, black
4 x 0.34 mm ²	M12 x 1	4 x 0.34 mm ²	M12 x 1	4 x 0.34 mm ²	M12 x 1	4 x 0.34 mm ²	M12 x 1

You will find detailed data sheets to the products under www.bernstein.eu



Optoelectronic Sensors (Type M18, M30)

Type	M18		M18		M18	
Operating mode	Retro-reflective sensor Type R	Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D
Sensing range	3 m	8 m	8 m	8 m	8 m	8 m
Type of connection	Connector M12	Connector M12	Cable 2 m	Connector M12	Connector M12	Cable 2 m
Special feature						



PNP	Light activated Dark activated Programmable	6554816001	6551821001	6551817001	6551816101	6551816001	6551819001
NPN	Light activated Dark activated Programmable						
Transmitter		6551021001				6551019001	
Relay output							
NAMUR							
Analogue	Current output Voltage output						
2-wire	DC AC						

Technical data

Rated operating voltage	U_b	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_b	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA
Switching frequency (max)	F	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz
Short circuit protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-	LED/-
Sensitivity adjustable		-	-	-	-	-	-
Teachable							
Timer function							
Diagnostic function							
Type of light		IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm

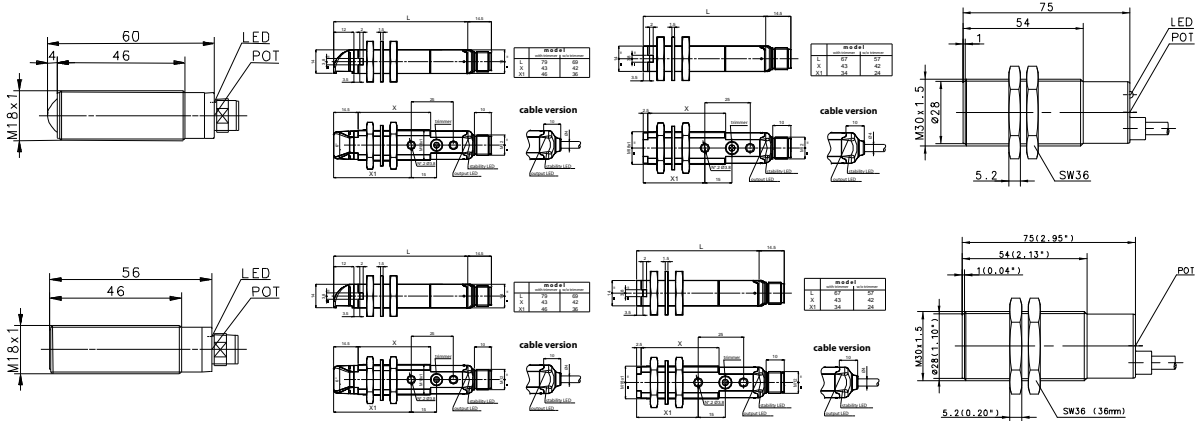
Mechanical data

Ambient temperature (min/max)		-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material		CuZn39Pb3	Stainless steel 1.4305	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	PBT, black
Connection		M12 x 1	M12 x 1	4 x 0.34 mm ²	M12 x 1	M12 x 1	4 x 0.34 mm ²

Please refer to Accessories for reflectors, mounting brackets, cable couplers and sensor tester.



M18		M18		M18		M30	
Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D
8 m	8 m	15 m	15 m	18 m	18 m	200 mm	500 mm
Connector M12	Connector M12	Cable 2 m	Connector M12	Cable 2 m	Connector M12	Cable 6 m	Cable 2 m
		Angle optic	Angle optic				



655181801		6551818001		6551819004		6551818003		6551819003		6551818002		6557005006		6557905008	

10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-30 VDC
200 mA	200 mA	200 mA	200 mA	200 mA	200 mA	200 mA	-
500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	500 Hz	> 250 Hz	-
Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Yes	Yes
LED/-	LED/-	LED/-	LED/-	LED/-	LED/-	LED/-	-/-
-	-	-	-	-	-	Yes	Yes
IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm

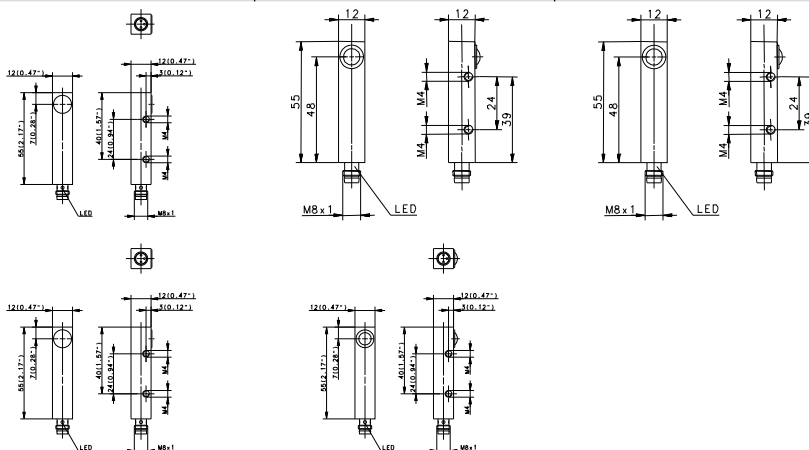
-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+80°C	-20°C/+80°C
IP67	IP67	IP67	IP67	IP67	IP67	IP65	IP65
PBT, black	PBT, black	PBT	PBT	PBT	PBT	PA	PA
M12 x 1	M12 x 1	4 x 0.34 mm ²	M12 x 1	4 x 0.34 mm ²	M12 x 1	3 x 0.5 mm ²	3 x 0.5 mm ²

You will find detailed data sheets to the products under www.bernstein.eu



Optoelectronic Sensors (Type 12 x 12 mm, 30 x 30 mm)

Type	12x12x55 mm		12x12x55 mm		12x12x55 mm
Operating mode	Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D
Sensing range	1 m	1 m	6 m	6 m	10 m
Type of connection	Connector M8	Connector M8	Connector M8	Connector M8	Connector M8
Special feature	Core beam				



PNP	Light activated Dark activated Programmable	6551955002 6551755002	6551755004	6551955001 6551755001	6551755003	6551955005
NPN	Light activated Dark activated Programmable			6551355001 6551155001		
Transmitter		6551055003		6551055002		
Relay output						
NAMUR						
Analogue	Current output Voltage output					
2-wire	DC AC					

Technical data

Rated operating voltage	U_b	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_b	200 mA	200 mA	200 mA	200 mA	200 mA
Switching frequency (max)	F	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
Short circuit protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-
Sensitivity adjustable		-	Yes	-	Yes	-
Teachable						
Timer function						
Diagnostic function		Yes		Yes		
Type of light		IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm

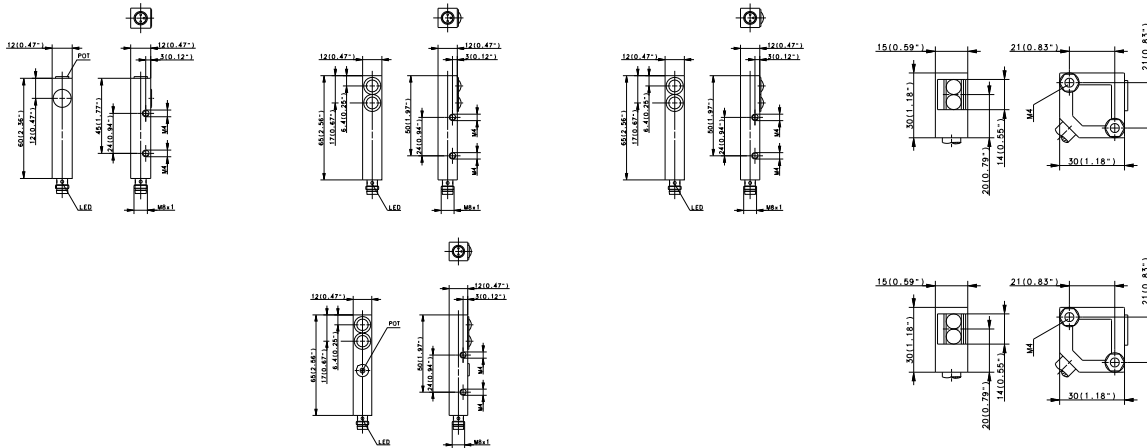
Mechanical data

Ambient temperature (min/max)		-5°C/+70°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP65	IP65	IP65	IP65	IP65
Enclosure material		CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Connection		M8 x 1	M8 x 1	M8 x 1	M8 x 1	M8 x 1

Please refer to Accessories for reflectors, mounting brackets, cable couplers and sensor tester.



12x12x60 mm	12x12x65 mm		12x12x65 mm	30x30x15 mm	
Retro-reflective sensor Type D 200 mm Connector M8	Retro-reflective sensor Type D 50 mm Connector M8 Fixed focus/...	Retro-reflective sensor Type D 1.2 m Connector M8	Retro-reflective sensor Type R 4 m Connector M8	Retro-reflective sensor Type D 1.2 m Cable 3 m	Retro-reflective sensor Type D 1.2 m Cable 3 m Antivalent [®]



6557955001 6557755001	6558955001	6557955002 6557755002	6554955001 6554755001	6557975004 6557875003 [®]

10-36 VDC 200 mA 100 Hz Cyclic LED/- Yes	10-36 VDC 200 mA 100 Hz Cyclic LED/- -	10-36 VDC 200 mA 100 Hz Cyclic LED/- Yes	10-36 VDC 200 mA 100 Hz Cyclic LED/- -	10-36 VDC 200 mA < 1000 Hz Yes LED/LED Yes	10-36 VDC 200 mA < 1 kHz Yes LED/LED Yes
IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm

-5°C/+70°C IP65 CuZn39Pb3 M8 x 1	-5°C/+70°C IP65 CuZn39Pb3 M8 x 1	-5°C/+70°C IP65 CuZn39Pb3 M8 x 1	-5°C/+70°C IP65 CuZn39Pb3 M8 x 1	-25°C/+70°C IP67 PBTB 4 x 0.14 mm ²	-25°C/+70°C IP67 PBTB 4 x 0.14 mm ²
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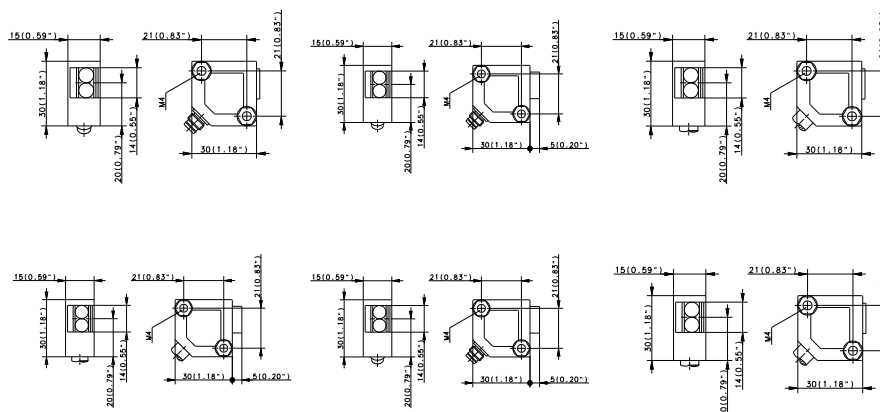
You will find detailed data sheets to the products under www.bernstein.eu

[®] Antivalent output



Optoelectronic Sensors (Type 30 x 30 mm, 40 x 26 mm, 50 x 50 mm)

Type	30x30x15 mm		30x30x15 mm		30x30x15 mm	
Operating mode	Retro-reflective sensor Type D	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Through-beam sensor Type D	Through-beam sensor Type D
Sensing range	1.2 m	4 m	4 m	4 m	12 m	12 m
Type of connection	Connec. M8/Ø 8	Cable 2 m polarised	Cable 3 m polarised	Connec. M8/Ø 8 polarised	Cable 3 m	Connec. M8/Ø 8
Special feature						



PNP	Light activated Dark activated Programmable	6557975003	6555975002	6555975001	6555875001 ②	6551875003 ③	6551875004 ③
NPN	Light activated Dark activated Programmable						
Transmitter						6551075003	6551075004
Relay output							
NAMUR							
Analogue	Current output Voltage output						
2-wire	DC AC						

Technical data

Rated operating voltage	U_b	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_b	200 mA	200 mA	200 mA	200 mA	-	200 mA
Switching frequency (max)	F	< 1000 Hz	< 1 kHz	< 1 kHz	< 1 kHz	-	> 1000 Hz
Short circuit protection		Yes	Yes	Yes	Yes	-	Yes
Function/operating voltage indicator		LED/LED	LED/LED	LED/LED	LED/LED	LED/LED	LED/LED
Sensitivity adjustable		Yes	Yes	Yes	Yes	Yes	Yes
Teachable							
Timer function							
Diagnostic function							
Type of light		IR 880 nm	red 660 nm	red 660 nm	red 660 nm	IR 880 nm	IR 880 nm

Mechanical data

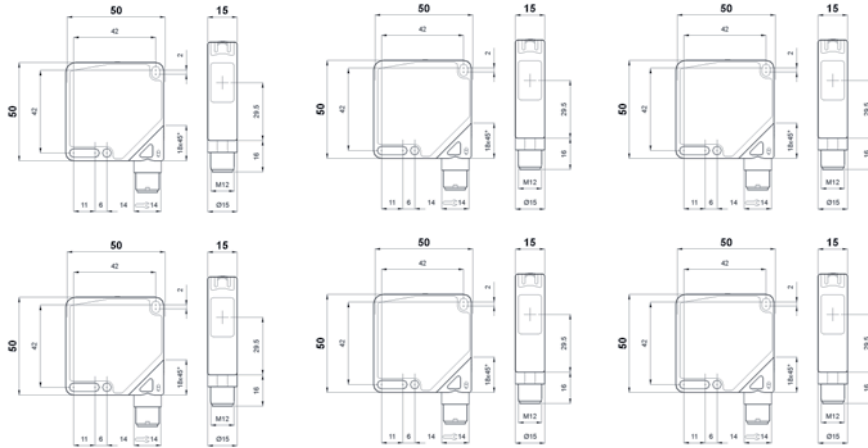
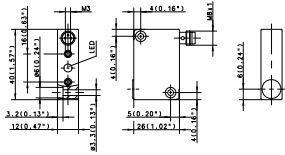
Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material		PBTB	PBTB	PBTB	PBTB	PBTB	PBTB
Connection		4-pin	4 x 0.14 mm ²	4 x 0.14 mm ²	4-pin	4 x 0.14 mm ²	4-pin

Please refer to Accessories for reflectors, mounting brackets, cable couplers and sensor tester.

② Antivalent output



40x26x12 mm	50x50x15 mm		50x50x15 mm		50x50x15 mm		
Retro-reflective sensor Type D 40 mm Connector M8	Retro-reflective sensor Type D 200 mm Cable 2 m ①	Retro-reflective sensor Type D 200 mm Connector M12 ①	Retro-reflective sensor Type D 1 m Cable 2 m Antivalent	Retro-reflective sensor Type D 1 m Connector M12 Antivalent ②	Retro-reflective sensor Type D 2 m Cable 2 m Antivalent ②	Retro-reflective sensor Type D 2 m Connector M12 Antivalent ②	



6557950006	6558866001	6558865001					
			6557866001 ②	6557865001 ②	6557866002	6557865002	

10-36 VDC	10-30 VDC	10-30 VDC	10-30 VDC	10-30 VDC	10-30 VDC	10-30 VDC	
200 mA	50 mA	50 mA	35 mA	35 mA	35 mA	35 mA	
> 100 Hz	1 kHz	1 kHz	500 Hz	500 Hz	500 Hz	500 Hz	
Cyclic	Yes	Yes	Yes	Yes	Yes	Yes	
LED/-	LED/LED	LED/LED	LED/LED	LED/LED	LED/LED	LED/LED	
-	Yes	Yes	Yes	Yes	Yes	Yes	
IR 880 nm	red 670 nm	red 670 nm	red 660 nm	red 660 nm	IR 880 nm	IR 880 nm	

-5°C/+70°C	-20°C/+70°C	-20°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	
IP65	IP67	IP67	IP67	IP67	IP67	IP67	
PA	ABS	ABS	ABS	ABS	ABS	ABS	
M8 x 1	Ø 4 mm	M12 x 1	Ø 4 mm	M12 x 1	Ø 4 mm	M12 x 1	

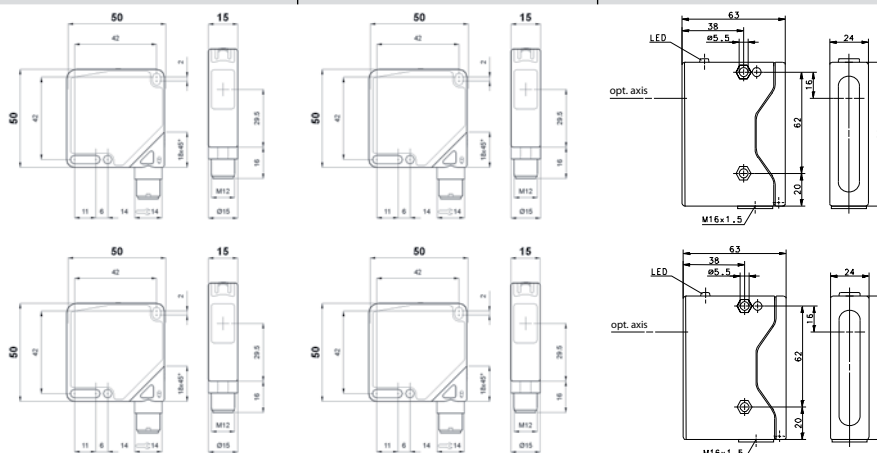
You will find detailed data sheets to the products under www.bernstein.eu

① Background suppression
② Antivalent output



Optoelectronic Sensors (Type 50 x 50 mm, 88 x 63 mm)

Type	50x50x15 mm		50x50x15 mm		88x63x24 mm	
Operating mode	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Through-beam sensor Type D	Through-beam sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D
Sensing range	8 m	8 m	20 m	20 m	400 mm	600 mm
Type of connection	Cable 2 m	Connector M12	Cable 2 m	Connector M12	Connect. space	Connect. space
Special feature	polarised	polarised	Antivalent ^②	Antivalent ^②		



PNP	Light activated Dark activated Programmable	6555866001 ^②	6555865001 ^②	6551866001 ^②	6551865001 ^②	6557886001
NPN	Light activated Dark activated Programmable					
Transmitter				6551066001	6551065001	
Relay output						6558686002
NAMUR						
Analogue	Current output Voltage output					
2-wire	DC AC					

Technical data

Rated operating voltage	U_b	10-30 VDC	10-30 VDC	10-30 VDC	10-30 VDC	12-265V AC/DC	10-36 VDC
Rated operating current	I_b	35 mA	35 mA	35	35 mA	3 A	200 mA
Switching frequency (max)	F	1 kHz	1 kHz	500 Hz	500 Hz	> 50 Hz	> 100 Hz
Short circuit protection		Yes	Yes	Yes	Yes	SCPD external	Cyclic
Function/operating voltage indicator		LED/LED	LED/LED	LED/LED	LED/LED	LED/-	LED/-
Sensitivity adjustable		Yes	Yes	Yes	Yes	Yes	Yes
Teachable							
Timer function						Yes	Yes
Diagnostic function							
Type of light		red 660 nm	red 660 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm

Mechanical data

Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-20°C/+70°C	-20°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP67	IP67	IP67	IP67	IP65	IP65
Enclosure material		ABS	ABS	ABS	ABS	PA	PA
Connection		Ø 4 mm	M12 x 1	Ø 4 mm	M12 x 1	Connect. space	Connect. space

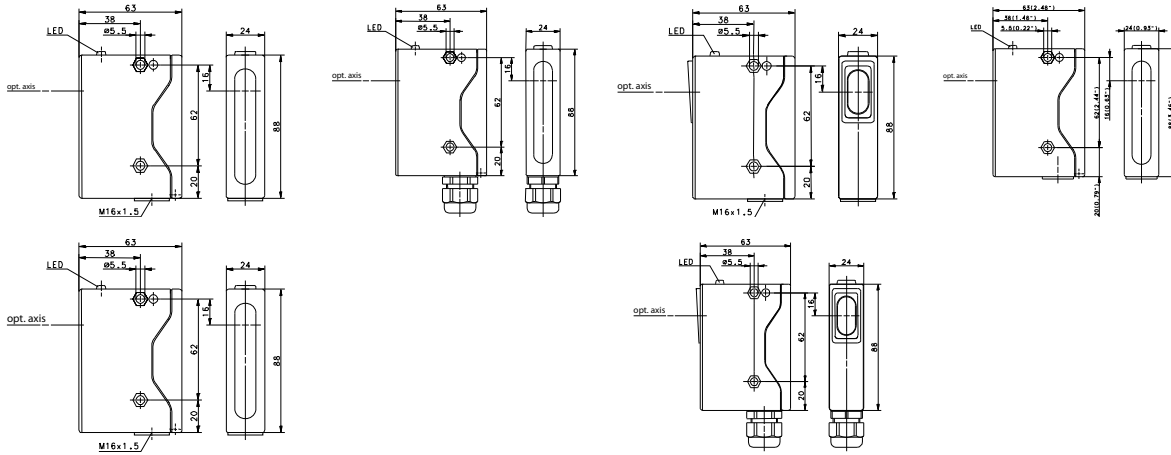
Please refer to Accessories for reflectors, mounting brackets, cable couplers and sensor tester.

① Background suppression

② Antivalent output



88x63x24 mm		88x63x24 mm		88x63x24 mm		88x63x24 mm	
Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	
600 mm	1.5 m	1.5 m	6 m	6 m	6 m	8 m	
Connect. space	Connect. space	Connect. space	Connect. space polarised	Connect. space polarised	Connect. space polarised	Connect. space	



6557886003		6555886001	6554886001	
6557686001	6557686004	6555686002		

12-265V AC/DC	10-36 VDC	12-265V AC/DC	10-36 VDC	12-265V AC/DC	10-36 VDC
3 A	200 mA	3 A	200 mA	3 A	200 mA
> 50 Hz	> 100 Hz	> 50 Hz	> 100 Hz	> 50 Hz	> 100 Hz
SCPD external	Cyclic	SCPD external S	Cyclic	SCPD external	Cyclic
LED/-	LED/-	LED/-	LED/-	LED/-	LED/-
Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes			
IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm

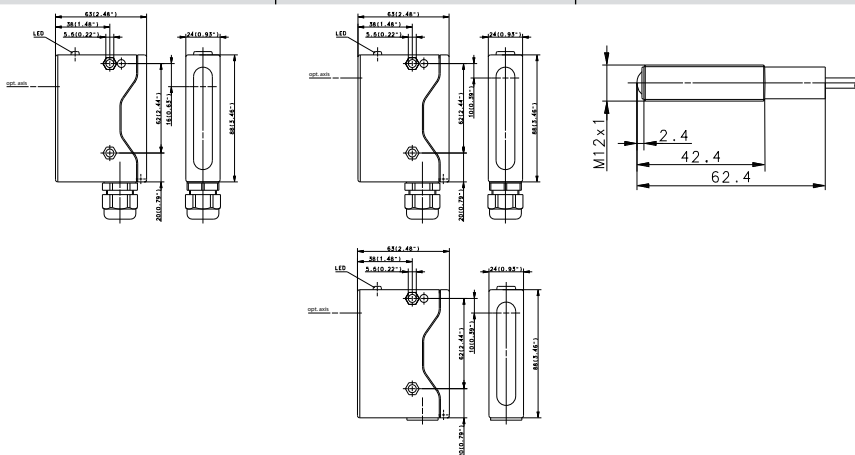
-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C
IP65	IP65	IP65	IP65	IP65	IP65
PA, red	PA	PA, red	PA, red	PA, red	PA, red
Connect. space	Connect. space	Connect. space	Connect. space	Connect. space	Connect. space

You will find detailed data sheets to the products under www.bernstein.eu



Optoelectronic Sensors (Type 88 x 63 mm, M12, Ø 20 mm)

Type	88x63x24 mm	88x63x24 mm		M12
Operating mode	Retro-reflective sensor Type R	Through-beam sensor Type D	Through-beam sensor Type D	Luminance sensor
Sensing range	8 m	20 m	20 m	
Type of connection	Connect. space	Connect. space	Connect. space	Cable 2 m
Special feature				Threshold 5 Lux



PNP	Light activated Dark activated Programmable			655093001
NPN	Light activated Dark activated Programmable		655188603	
Transmitter			655108603	655108602
Relay output		655468602		655168604
NAMUR				
Analogue	Current output Voltage output			
2-wire	DC AC			

Technical data

Rated operating voltage	U_B	12-265V AC/DC	10-36 VDC	12-265V AC/DC	12-39 VDC
Rated operating current	I_B	3 A	200 mA	-	-
Switching frequency (max)	F	> 50 Hz	> 100 Hz	-	1 Hz
Short circuit protection		SCPD external	Cyclic	SCPD external	-
Function/operating voltage indicator		LED/-	LED/-	-/LED	-/-
Sensitivity adjustable		Yes	Yes	-	-
Teachable					
Timer function		Yes	Yes	Yes	
Diagnostic function					
Type of light		IR 880 nm	IR 880 nm	IR 880 nm	IR 880 nm

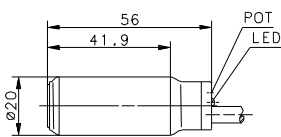
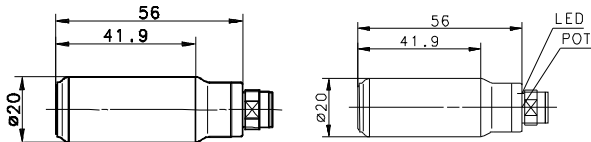
Mechanical data

Ambient temperature (min/max)		-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C
Protection class in accordance with IEC 529, EN 60529		IP65	IP65	IP65	IP67
Enclosure material		PA, red	PA, red	PA, red	PA, red
Connection		Connect. space	Connect. space	Connect. space	3 x 0.34 mm ²

Please refer to Accessories for reflectors, mounting brackets, cable couplers and sensor tester.



Ø 20 mm	Ø 20 mm			
Retro-reflective sensor Type D 200 mm Connector M12	Retro-reflective sensor Type D 500 mm Cable 2 m	Retro-reflective sensor Type D 500 mm Connector M12		



6557800005	6557800006			
6557000002				
6557000001				

10-30 VDC	10-36 VDC	10-36 VDC		
200 mA	200 mA	200 mA		
-	500 Hz	500 Hz		
-	Cyclic	Cyclic		
-/-	LED/-	LED/-		
Yes	Yes	Yes		
IR 880 nm	IR 880 nm	IR 880 nm		

-5°C/+70°C	-20°C/+70°C	-20°C/+70°C		
IP67	IP67	IP67		
Stainless steel 1.4305	Stainless steel 1.4305	Stainless steel 1.4305		
M12 x 1	4 x 0.34 mm ²	M12 x 1		

You will find detailed data sheets to the products under www.bernstein.eu



Magnetic Switches

General Information on BERNSTEIN Magnetic Switches

Electromechanical and electronic variants

BERNSTEIN has extended its range of electromechanical magnetic switches with electronic versions which operate according to the Hall and magneto-resistive principle.

Electromechanical and electronic magnetic switches have special properties which ensure optimum use in their respective environments.

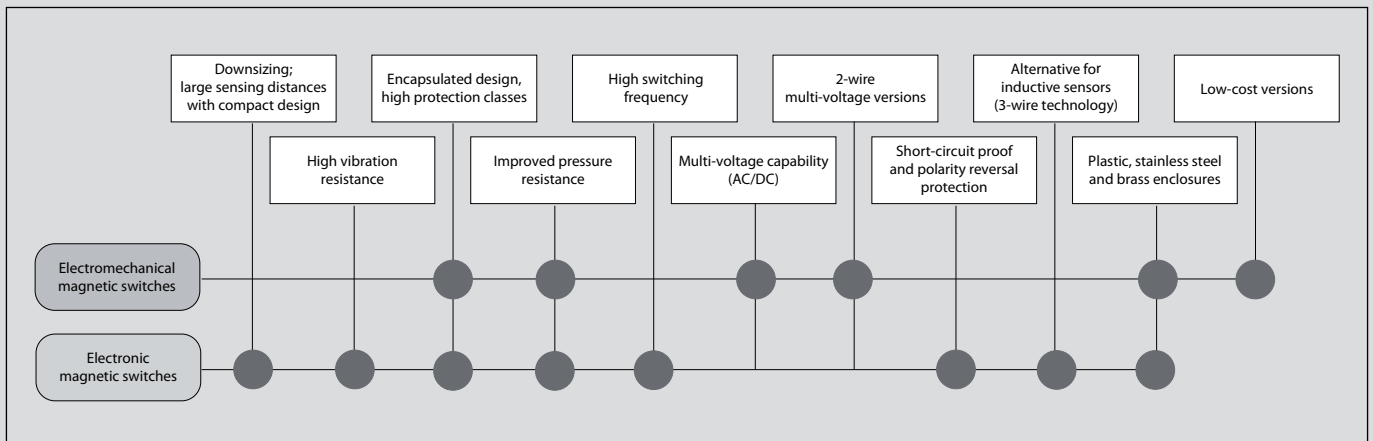
The electronic versions are characterised by their enhanced mechanical properties (extremely high resistance to vibration, shock or impact) and are not prone to wear in operation. Thanks to the use of only one single "active" component (reed contact), "traditional" electromechanical magnetic switches are extremely reliable in operation. The universal current capability and low procurement costs allow these switches to be used in a wide range of applications.

The matrix below highlights the main features of each functional principle and helps you to decide on which magnetic switch to use for your application.



Technical features and applications

More detailed information on the technical features and applications relating to the different functional principles are provided in the following sections.



Electromechanical Magnetic Switches

Special features of electro-mechanical magnetic switches

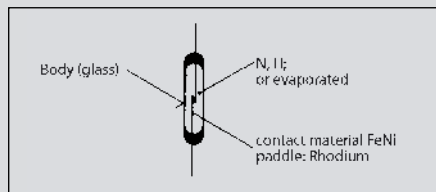
- Reliable under extreme ambient conditions such as dirt, humidity, gas, dust, etc.
- Protection class up to IP67
- Stable switching point, reproducible switching point accuracy of approx. 0.1 mm
- Can be operated from several directions
- Can be mounted in any position
- High operational reliability ensured by the use of only one single component
- Easy to install
- Long electrical service life (depending on the load to be switched) more than 108 switching cycles if contacts are suitably protected
- Special versions available for extreme temperatures from -40 °C to +150 °C
- Can be connected to direct and alternating voltage sources

Design, function and operating principle of an electromechanical magnetic switch

The basic elements of this type of switch are the components which change their electrical characteristics in response to the approach of an actuating magnet. The contact paddles assume opposing polarity (north and south pole) under the influence of a magnetic field.

The approach can be made by either permanent magnets or electromagnets; the sensitivity of the switch and the field strength of the magnet determine the distance between the switch and magnet. Opening and closing of the contact studs is determined by the magnet correspondingly approaching or moving away from the switch. Normally-closed, normally-open and changeover contacts as well as bistable versions are included in our range of products.

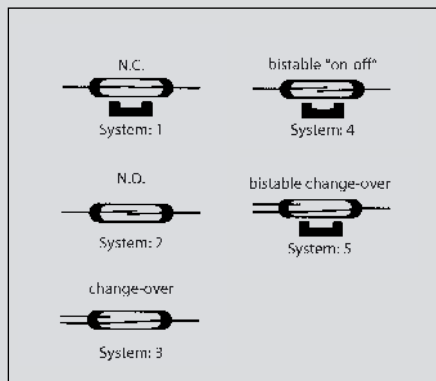
The magnetically influenced parts and their auxiliary components (resistor, diode, triac, output stage, etc.) are cast in high quality insulating material or casting compound to increase the vibration/impact strength and guarantee a protection class up to IP67. Metal versions (stainless steel, aluminium and brass) as well as standard plastic versions are available for use under extreme ambient conditions such as wider temperature ranges.



Design of a reed contact

Biasing (bistable)

Bias magnets energise or hold the contact closed. The contact of the bistable normally-open or normally-closed contact is held closed until a stronger magnet with opposite polarity neutralises the biasing.



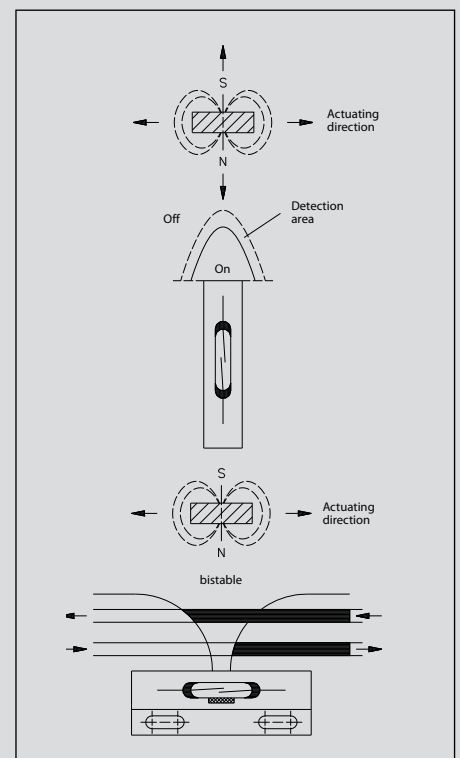
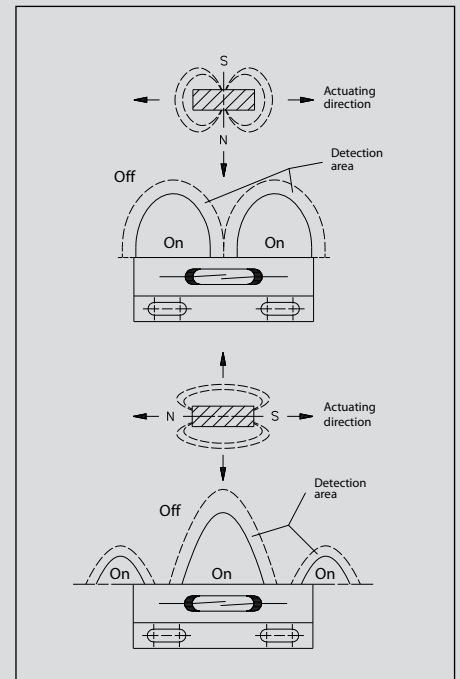
Types of reed contact switches

Actuation and switching characteristics

The switching characteristics are principally determined by the approach and polarity of the magnet. The following drawings show typical characteristics. Materials and external dimensions are specified in the product overview. Magnetic switches with reed contact output are identified by an "A" in the second position of the type code (MA...).

Switching frequency

Up to 200 Hz, depending on the size of load to be switched (considerably faster than relays, contactors etc.).



Magnetic Switches

Switching distances

Refer to the tables in this catalogue to identify which switching magnets may be used as well as the minimum achievable switching distance.

Temperature ranges

The standard version may be used in a temperature range from $-5\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$. Special types are also available offering an extended operating temperature range from $-40\text{ }^{\circ}\text{C}$ to $+150\text{ }^{\circ}\text{C}$.

Electrical service life

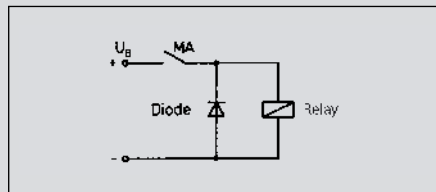
To maintain a long service life of the electrical contacts, it is important to ensure the maximum supply voltage and maximum switching current are not exceeded. Refer to the diagrams on Page 69 for the load values.

Guidelines for reed contact protection

The values for current, voltage and power specified in the catalogue apply only to purely resistive loads. Very often, however, these loads are exposed to inductive or capacitive components. In these cases it is advisable to protect the reed contacts against voltage and current peaks. Whilst it is not possible to recommend a safe contact protection concept that applies to all load ranges (each individual case will require its own evaluation), we would like to present general guidelines on how reed contacts may be connected to different loads in order to avoid premature failure.

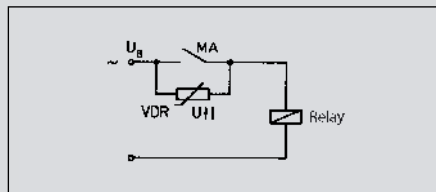
1. Inductive loads

In DC applications, contact protection is relatively easy to realise with the aid of a free-wheeling diode connected in parallel to the load. The diode polarity must be selected so that it blocks when normal operating voltage is applied but will short-circuit the voltage induced after the switch is opened (voltage peaks can significantly exceed the operating voltage).



Suppression of voltage peaks with a free-wheeling diode

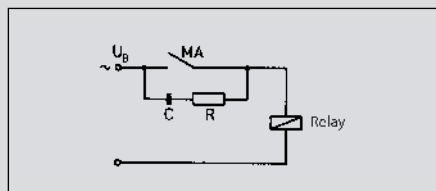
1) Voltage peaks induced by switching off inductive loads are suppressed by connecting a voltage-dependent resistor (VDR) in parallel to the reed contact.



Suppression of voltage peaks with a VDR

2) In AC voltage applications effective protection is achieved with a combination of a resistor and a capacitor (RC element).

Generally, the RC element is connected in parallel to the contact and therefore in series to the load (vice versa is also possible).



Suppression of voltage peaks with RC element

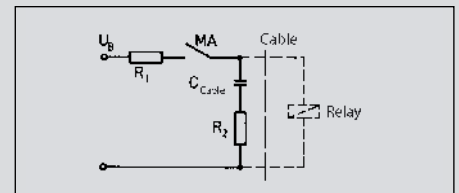
2. Capacitive loads

In contrast to inductive loads, increase making currents can occur in connection with capacitive loads and lamp loads that can damage and even weld contacts closed. When capacitors are switched (e.g. cable capacitance) a very high peak current occurs with its intensity depending on the capacitance and length of the cable leading to the switch.

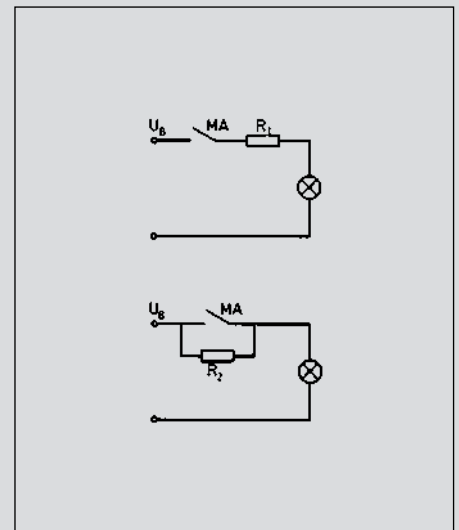
A resistor connected in series to the contact will reduce this current. The size of the resistor is determined by the characteristics of the corresponding electric circuit.

It should, however, be as large as possible to reduce the current to a permissible value, thus ensuring reliable contact protection.

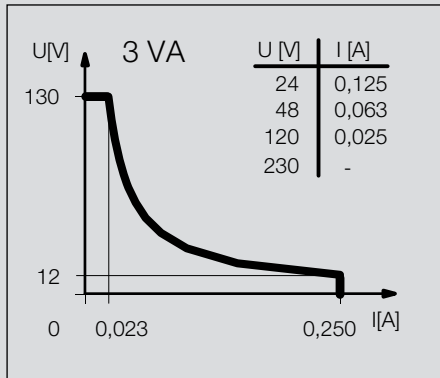
Contact protection with resistors for limiting current:



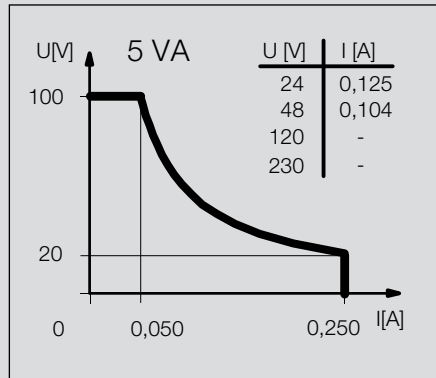
Capacitive load



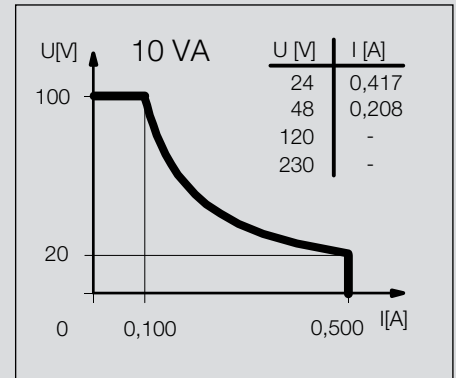
Lamp load

Performance diagrams for electromechanical magnetic switches


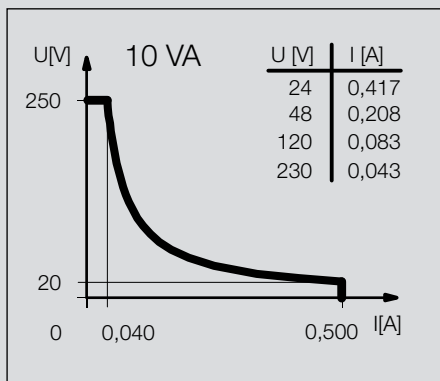
(1)



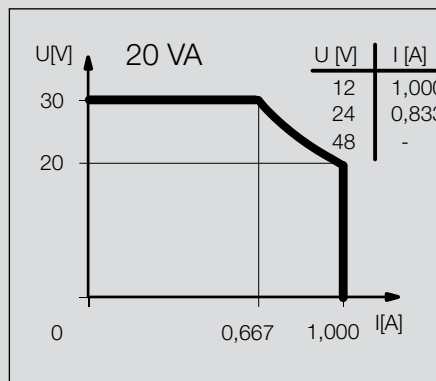
(2)



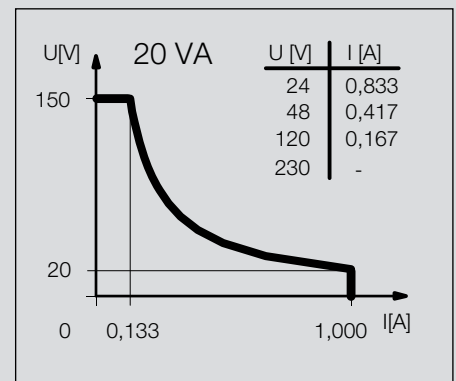
(3)



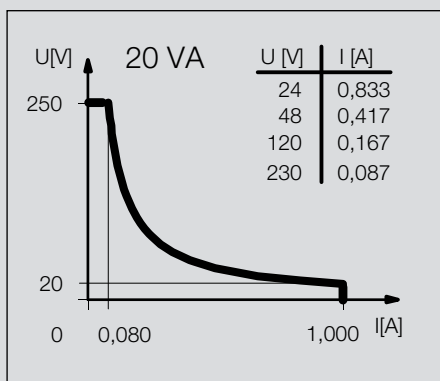
(4)



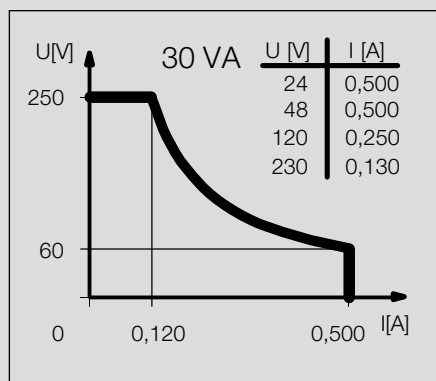
(5)



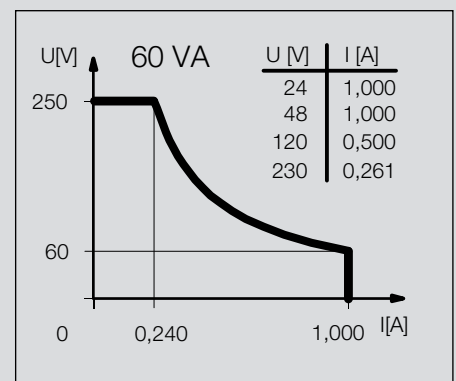
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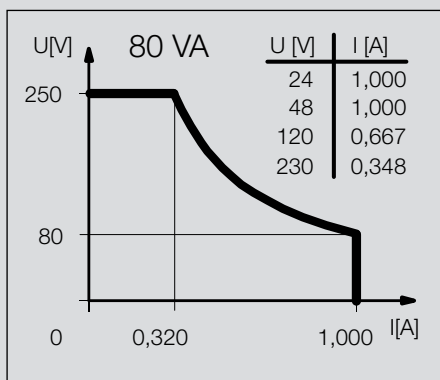
(7)



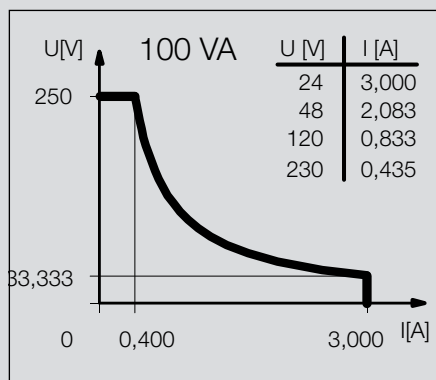
(8)



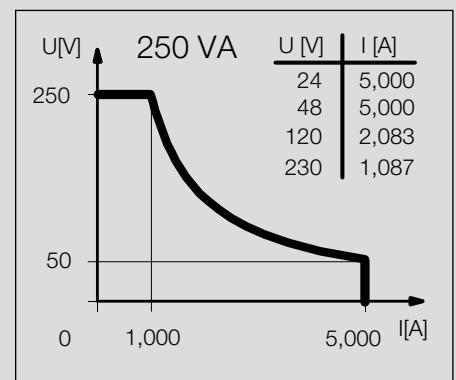
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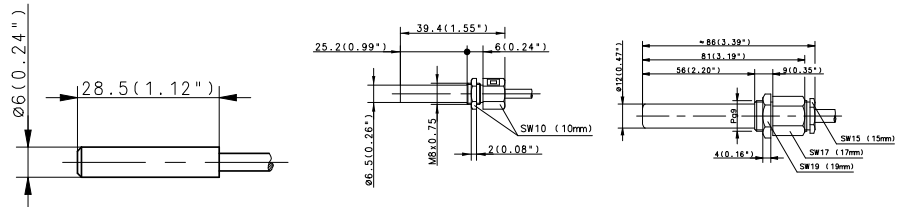
(11)



(12)

Magnetic Switches (Type Ø 6 mm, Ø 6.5 mm, Ø 12 mm, Ø 13 mm)

Type	Ø 6 mm		Ø 6.5 mm		Ø 12 mm	
Nominal switching distance (San)	19 mm	19 mm	18 mm		6 mm	7 mm
Type of connection	Cable 1 m	Cable 1 m	Cable 2 m		Cable 1 m	Cable 1 m
Reference magnet (Page)	T-62 N/S	T-62 N/S	T-62 N/S		T-62 N/S	T-62 N/S
Special feature						



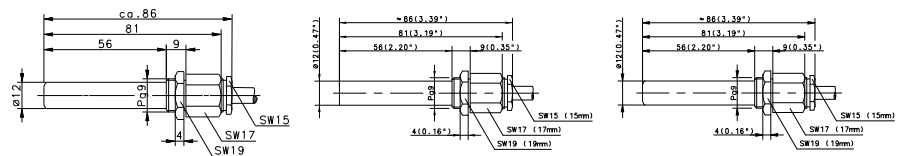
Switching function	NO contact	6311230571		6310246500		6314206246	
	NC contact	6310330572				6317306315	
	Changeover contact						
	Bistable						

Technical data	Ø 6 mm		Ø 6.5 mm		Ø 12 mm	
Max. switching voltage	100 VDC	250 VDC	250 VDC		250 VDC	250 VDC
Switching current (max)	0.25 A	0.5 A	0.5 A		1 A	3 A
Performance class (diagram No.)	5 VA	10 VA	20 VA		80 VA	100 VA
Shock resistance		50 g (11 ms)				

Mechanical data	Ø 6 mm		Ø 6.5 mm		Ø 12 mm	
Ambient temperature (min/max)	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C		-5°C/+70°C	-5°C/+70°C
Protection class in accordance with IEC529, EN60529	IP67	IP67	IP67		IP67	IP67
Enclosure material	PA	PA	PA		Aluminium	Al/CuZn39Pb3
Connection	3 x 0.14 mm ²	2 x 0.14 mm	2 x 0.14 mm ²		4 x 0.75 mm ²	3 x 0.75 mm ²

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

Type	Ø 12 mm		Ø 12 mm		Ø 12 mm	
Nominal switching distance (San)	7 mm	7 mm	7 mm	7 mm	8 mm	12 mm
Type of connection	Cable 1 m	Cable 3 m	Cable 8 m	Cable 2 m	Cable 1 m	Cable 1 m
Reference magnet (Page)	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S
Special feature			Temperature			



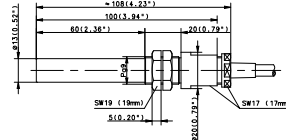
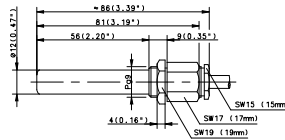
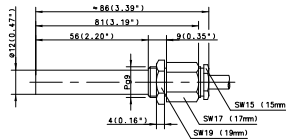
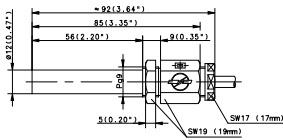
Switching function	NO contact	6312206321		6314216476		6314216585		6314226423	
	NC contact	6315306314		6316316259					
	Changeover contact								
	Bistable								

Technical data	Ø 12 mm		Ø 12 mm		Ø 12 mm	
Max. switching voltage	250 VDC	250 VDC	250 VDC	250 VDC	250 VDC	250 VDC
Switching current (max)	0.5 A	3 A	3 A	3 A	0.5 A	1 A
Performance class (diagram No.)	30 VA	100 VA	100 VA	100 VA	30 VA	60 VA
Shock resistance	50 g (11 ms)					

Mechanical data	Ø 12 mm		Ø 12 mm		Ø 12 mm	
Ambient temperature (min/max)	-5°C/+70°C	-5°C/+70°C	-40°C/+150°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C
Protection class in accordance with IEC529, EN60529	IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material	Aluminium	Stainless steel 1.4305	Stainless steel 1.4305	PA, red	Al/CuZn39Pb3	Stainless steel 1.4305
Connection	3 x 0.75 mm ²	3 x 0.75 mm ²	3 x 0.75 mm ²	2 x 0.5 mm ²	4 x 0.75 mm ²	4 x 0.75 mm ²

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

Ø 12 mm		Ø 12 mm		Ø 12 mm		Ø 13 mm	
12 mm	12 mm	16 mm	18 mm	19 mm	19 mm	9 mm	20 mm
Cable 1 m	Cable 1 m	Cable 4 m	Cable 1 m	Cable 1 m	Cable 4 m	Cable 1 m	Cable 1 m
T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-69 N/S	T-69 N/S	T-62 N/S	T-62 N/S
		Temperature			Temperature		



6316326426	6315326425	6410206399	6310406554	6316306248	6316306004	6310136616	6310536617
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250 VDC	250 VDC	250 VDC	250 VDC	250 VDC	250 VDC	250 VDC	250 VDC
1 A	0.5 A	1.5 A	5 A	1 A	1 A	5 A	1 A
60 VA	30 VA	50 VA	250 VA	60 VA	60 VA	250 VA	60 VA

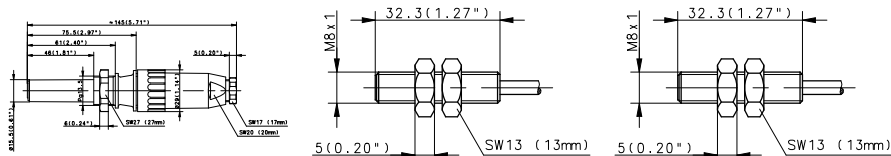
-5°C/+70°C	-5°C/+70°C	-40°C/+150°C	-5°C/+70°C	-5°C/+70°C	-40°C/+150°C	-5°C/+70°C	-5°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67
PA, red	PA, red	Al/CuZn39Pb3	Al/CuZn39Pb3	Al/CuZn39Pb3	Al/CuZn39Pb3	PA, black	PA, black
3 x 0.5 mm ²	3 x 0.5 mm ²	3 x 0.75 mm ²	3 x 0.75 mm ²	4 x 0.75 mm ²	4 x 0.75 mm ²	2 x 0.75 mm ²	3 x 0.75 mm ²

You will find detailed data sheets to the products under www.bernstein.eu



Magnetic Switches (Type Ø 15.5 mm, M8, M12, PG9, 28.6 x 18 mm)

Type	Ø 15.5 mm	M8	M8	M8
Nominal switching distance (San)	6 mm	13 mm	13 mm	18 mm
Type of connection	Connector	Cable 1 m	Connector	Cable 1 m
Reference magnet (Page)	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S
Special feature				



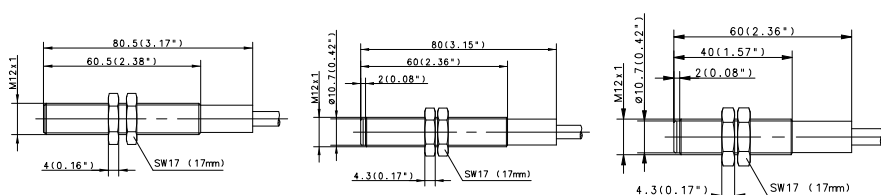
Switching function	NO contact NC contact Changeover contact Bistable	6317304313	6310308597	6310308595	6311208596

Technical data	6317304313	6310308597	6310308595	6311208596
Max. switching voltage	250 VDC	100 VDC	30 VDC	250 VDC
Switching current (max)	1 A	0.5 A	1 A	0.5 A
Performance class (diagram No.)	80 VA	10 VA	20 VA	10 VA
Shock resistance				

Mechanical data	6317304313	6310308597	6310308595	6311208596
Ambient temperature (min/max)	-5°C/+70°C	-20°C/+70°C	-5°C/+70°C	-5°C/+70°C
Protection class in accordance with IEC529, EN60529	IP65	IP67	IP65	IP67
Enclosure material	PC, grey	Stainless steel 1.4305	Stainless steel 1.4305	Stainless steel 1.4305
Connection	Amphenol	3 x 0.14 mm ²	Ø 6.5 mm	2 x 0.14 mm ²

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

Type	M12	M12	M12	M12
Nominal switching distance (San)	7 mm	7 mm	10 mm	12 mm
Type of connection	Cable 1 m	Cable 2 m	Cable 1 m	Cable 1 m
Reference magnet (Page)	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S
Special feature				



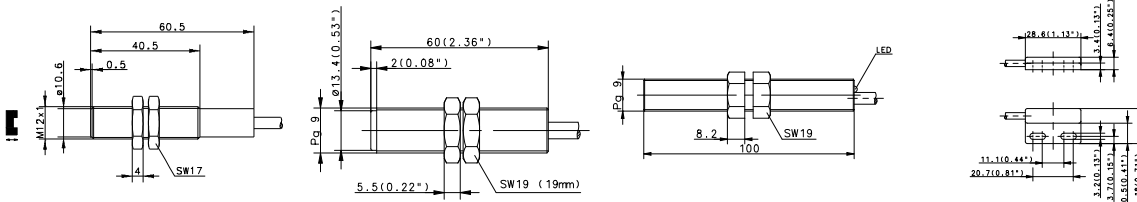
Switching function	NO contact NC contact Changeover contact Bistable	6314223268	6314233002	6316333005	6316318002	6416228260	6311218294

Technical data	6314223268	6314233002	6316333005	6316318002	6416228260	6311218294
Max. switching voltage	250 VDC	250 VDC	250 VDC	250 VDC	250 VDC	250 VDC
Switching current (max)	3 A	3 A	1 A	1 A	1 A	0.5 A
Performance class (diagram No.)	100 VA	100 VA	60 VA	60 VA	60 VA	10 VA
Shock resistance		50 g (11 ms)				50 g (11 ms)

Mechanical data	6314223268	6314233002	6316333005	6316318002	6416228260	6311218294
Ambient temperature (min/max)	-5°C/+70°C	-25°C/+70°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C
Protection class in accordance with IEC529, EN60529	IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material	CuZn39Pb3	PA, red	PA, red	CuZn39Pb3	PA, red	CuZn39Pb3
Connection	2 x 0.5 mm ²	2 x 0.5 mm ²	3 x 0.5 mm ²	3 x 0.5 mm ²	2 x 0.5 mm ²	2 x 0.34mm ²

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

M12		PG9		PG9	28.6x18x6.4mm	
18 mm	22 mm	12 mm	17 mm	20 mm	8 mm	8 mm
Cable 2 m	Cable 2 m	Cable 1 m	Cable 2 m	Cable 2 m	Cable 1 m	Cable 1.5 m
T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	TK-11-11	TK-11-11
				D		



6310118626	6315317001	6316343544	6310431569	6310311615	6410311368
6410433350					

175 VDC	250 VDC	250 VDC	250 VDC	250 VDC	130 VDC	130 VDC
0.25 A	1.5 A	0.5 A	1 A	1 A	0.25 A	0.25 A
5 VA	250 VA	30 VA	60 VA	120 VA	3 VA	3 VA
50 g (11 ms)						

-5°C/+70°C	-25°C/+70°C	-5°C/+70°C	-5°C/+80°C	-5°C/+80°C	-5°C/+70°C	-20°C/+70°C
IP67	IP67	IP67	IP65	IP65	IP67	IP67
CuZn39Pb3	PA, red	PA, red	CuZn39Pb3	CuZn39Pb3	PA, black	PA
2 x 0.34 mm ²	2 x 0.5 mm ²	3 x 0.5 mm ²	3 x 0.5 mm ²	2 x 0.5 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²

You will find detailed data sheets to the products under www.bernstein.eu



Magnetic Switches (Type 28.6 x 18, 45 x 13, 45 x 25.5, 50 x 19, 68 x 30, 80 x 20)

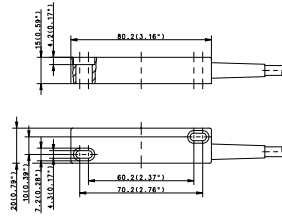
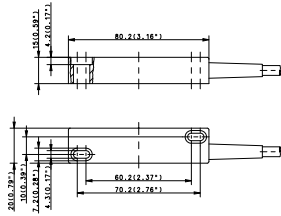
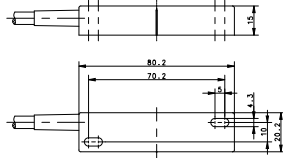
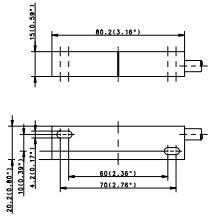
Type	28.6x18x6.4mm		45x13x9mm		45x13x9mm	
Nominal switching distance (San)	10 mm	25 mm	10 mm		5 mm	10 mm
Type of connection	Cable 1 m	Cable 5 m	Cable 2 m		Cable 1 m	Cable 1 m
Reference magnet (Page)	TK-11-11	T-67 N/S	TK-11-01		TK-45	TK-45
Special feature						
Switching function	NO contact NC contact Changeover contact Bistable	6311211541 6311411603	6311201095	6311245539 6316345540		
Technical data	Max. switching voltage: 250 VDC Switching current (max): 0.5 A Performance class (diagram No.): 10 VA Shock resistance:		250 VDC 0.5 A 10 VA	250 VDC 0.5 A 10 VA	250 VDC 1 A 60 VA	250 VDC 0.5 A 10 VA 50 g (11 ms)
Mechanical data	Ambient temperature (min/max): -5°C/+70°C Protection class in accordance with IEC529, EN60529: IP67 Enclosure material: PA, black Connection: 2 x 0.14 mm		-5°C/+70°C IP67 PA, black 2 x 0.14 mm	-5°C/+70°C IP67 PA, black 2 x 0.14 mm	-5°C/+70°C IP67 PA 2 x 0.34 mm ²	-5°C/+70°C IP67 PA 2 x 0.14 mm ²

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

Type	50x19x14mm		68x30x15mm		80x20x15mm	
Nominal switching distance (San)	20 mm		8 mm		18 mm 18 mm	
Type of connection	Connector		Cable 1 m		Cable 1 m Cable 1 m	
Reference magnet (Page)	T-62 N/S		T-62 N/S		TK-21-02 TK-21-02	
Special feature	Temperature					
Switching function	NO contact NC contact Changeover contact Bistable	6310299652	6316313004	6315302309	6315312196	
Technical data	Max. switching voltage: 100 VDC Switching current (max): 0.5 A Performance class (diagram No.): 10 VA Shock resistance: 30 g (11 ms)		250 VDC 1 A 60 VA	250 VDC 0.5 A 30 VA	250 VDC 0.5 A 30 VA	
Mechanical data	Ambient temperature (min/max): -30°C/+120°C Protection class in accordance with IEC529, EN60529: IP67 Enclosure material: Nylon, black Connection: 6.3 mm		-5°C/+70°C IP67 PC, red 3 x 0.5 mm ²	-5°C/+70°C IP67 PA, black 3 x 0.75 mm ²	-5°C/+70°C IP67 PA, red 3 x 0.75 mm ²	

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

80x20x15 mm		80x20x15 mm		80x20x15 mm		80x20x15 mm	
20 mm	20 mm	21 mm	21 mm	21 mm	24 mm	24 mm	25 mm
Cable 3 m	Cable 3 m	Cable 1 m	Cable 1 m	Cable 1 m	Cable 1 m	Cable 1 m	Cable 1 m
T-62 N/S	T-62 N/S	TK-21-02	TK-21-02	TK-21-12	TA-21-02	TK-21-12	T-62 N/S
Temperature							



	6312202316	6314202204	6314212217				
6314402566	6419402397		6316302206	6316312220	6410412143		

250 VDC	250 VDC	250 VDC	250 VDC	250 VDC	250 VDC	250 VDC	250 VDC
3 A	5 A	0.5 A	3 A	3 A	1 A	1 A	1 A
100 VA	250 VA	30 VA	100 VA	100 VA	60 VA	60 VA	60 VA
	10 g (11 ms)						

-40°C/+150°C	-25°C/+70°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67
GDAISi12, red	PA, black	PA, black	PA, black	PA, red	PA, black	PA, red	PA, red
3 x 0.75 mm ²	2 x 0.5 mm ²	2 x 0.75 mm ²	2 x 0.75 mm ²	2 x 0.5 mm ²	3 x 0.75 mm ²	3 x 0.5 mm ²	2 x 0.5 mm ²

You will find detailed data sheets to the products under www.bernstein.eu

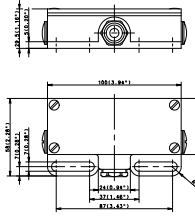
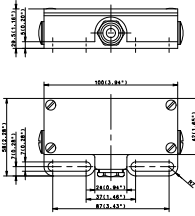
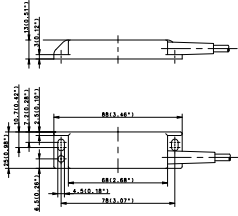


Magnetic Switches (Type 80 x 20 mm, 80 x 30 mm, 85 x 24 mm, 88 x 25 mm, 100 x 58 mm)

Type	80x20x15 mm		80x30x15 mm		80x30x15 mm	
Nominal switching distance (San)	25 mm	30 mm	8 mm	19 mm	20 mm	22 mm
Type of connection	Connector M8	Cable 1 m	Cable 1 m	Cable 1 m	Cable 1 m	Cable 1 m
Reference magnet (Page)	Ø 10 x 50 Neod	TA-21-02	TK-44	TK-44	T-62 N/S	TK-44
Special feature	Temperature					
Switching function	NO contact NC contact Changeover contact Bistable		6314244536		6317344538	
Technical data	6310302636 6316302389		6314144542		6310444537	
Max. switching voltage	60 VDC	250 VDC	250 VDC	250 VDC	250 VDC	250 VDC
Switching current (max)	1 A	1 A	3 A	3 A	5 A	1 A
Performance class (diagram No.)	3 VA	60 VA	100 VA	100 VA	250 VA	80 VA
Shock resistance	10 g (11 ms)					
Mechanical data	-30°C/+80°C -40°C/+150°C		-5°C/+70°C -5°C/+70°C		-5°C/+70°C -5°C/+70°C	
Ambient temperature (min/max)	IP65	IP67	IP67	IP67	IP67	IP67
Protection class in accordance with IEC529, EN60529	GDAISi 12, red	GDAISi12, red	PA, black	PA, black	PA, black	PA
Enclosure material	M8 x 1	4 x 0.75 mm ²	2 x 0.5 mm ²	2 x 0.5 mm ²	2 x 0.5 mm ²	3 x 0.5 mm ²
Connection	Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.					

Type	85x24x26 mm		85x24x26 mm		88x25x13 mm	
Nominal switching distance (San)	15 mm	24 mm	24 mm		22 mm	25 mm
Type of connection	Cable 3 m	Cable 1 m	Flat plug		Cable 1 m	Cable 1 m
Reference magnet (Page)	T-67 N/S	T-69 N/S	T-69 N/S		TK-42	TK-42
Special feature			K4.8			
Switching function	NO contact NC contact Changeover contact Bistable		6310432590		6317342535	
Technical data	6314432609 6310432598		6310432590		6314242533	
Max. switching voltage	250 VDC	250 VDC	250 VDC		250 VDC	250 VDC
Switching current (max)	3 A	5 A	5 A		1 A	3 A
Performance class (diagram No.)	100 VA	250 VA	250 VA		80 VA	100 VA
Shock resistance						
Mechanical data	-25°C/+70°C -5°C/+70°C		-20°C/+70°C		-5°C/+70°C -5°C/+70°C	
Ambient temperature (min/max)	IP67	IP67	IP67		IP67	IP67
Protection class in accordance with IEC529, EN60529	PBT	PA, black	PBT, black		PA, black	PA, black
Enclosure material	2 x 0.5 mm ²	2 x 0.75 mm ²	4.8 mm		3 x 0.5 mm ²	2 x 0.5 mm ²
Connection	Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.					

88x25x13 mm		100x58x29.5		100x58x29.5		
25 mm	25 mm	10 mm	10 mm	15 mm		
Cable 1 m	Cable 3 m	Screw terminal	Screw terminal	Screw terminal		
T-69 N/S	T-69 N/S	TA-31	TA-31	T-62 N/S		



		6314203232				
6310442534	6310442622	6317303312		6319403532		

250 VDC	250 VDC	250 VDC	250 VDC	250 VDC		
5 A	5 A	1 A	3 A	5 A		
250 VA	250 VA	80 VA	100 VA	250 VA		

-5°C/+70°C	-5°C/+70°C	-5°C/+70°C	-25°C/+70°C	-25°C/+70°C		
IP67	IP67	IP67	IP65	IP65		
PA, black	PA, black	Aluminium	Aluminium	Aluminium		
2 x 0.5 mm ²	2 x 0.5 mm ²	max. 1.5 mm ²	max. 1.5 mm ²	max. 1.5 mm ²		

You will find detailed data sheets to the products under www.bernstein.eu



Electronic Magnetic Sensors

Thanks to their special properties, electronic magnetic switches with magneto-resistive or Hall elements are ideal for use in many different applications. They are used to detect position, angle and/or speed and are immune to shock, impact, vibration and wear. High switching frequencies, long switching distances, a broad temperature range and excellent reproducibility are other advantageous features of this technology which in many cases make them the technically superior alternative to electromechanical reed contacts.



The fact that many non-magnetic metals allow magnetic fields to pass unhindered also extends the fields of application for magnetic sensors. This makes it possible to encapsulate sensors in a sturdy pressure-proof metal enclosure. Sensors can, however, also be mounted in tubing or concealed behind non-magnetic metal surfaces.

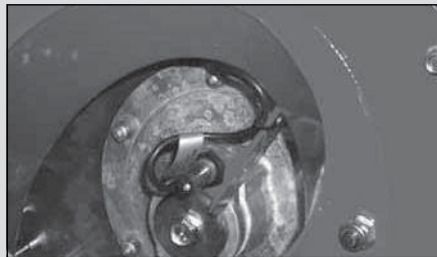
Advantages of electronic magnetic sensors over electromechanical reed contacts

- Reliable and immune to vibration
- Bounce-free switching
- Unlimited service life
- High repeat accuracy
- Short response times
- High sensitivity
- Thermal stability

Select the sensor and the technical principle that best meet your requirements from the comprehensive BERNSTEIN range of magnetic sensors: Hall sensors with minimum circuitry, standard Hall sensors with integrated sensor electronics or magnetoresistive sensors. Round, square or metric bodies in plastic, brass, brass/plastic or stainless enclosures.

Fundamentals of Hall sensor technology

The BERNSTEIN range of magnetic sensors is based on a modular system comprising an encapsulated Hall element with the EMC protective circuitry. These sensors therefore conform to the requirements of EN-60947-5-2 for non-mechanical magnetic proximity switches. Sensors of various designs are available for a wide variety of applications.



- Output circuitry NPN, NO contact or bistable
- Voltage range 4.5 – 24 V DC
- Polarity reversal protected
- Switching frequencies up to 20 kHz
- Size ranging from 6 mm diameter to 50 x 25 x 10 mm
- Unipolar version

Standard range of Hall sensors

In contrast to the more basic BERNSTEIN Hall sensors, the functionality and modularity have been enhanced in these Hall sensors by integrating comprehensive sensor electronics. In this segment BERNSTEIN also offers a complete modular system that can be adapted to suit your specific needs.

- Output circuitry PNP, NC or NO contact or bistable
- Voltage range 10 – 39 V DC
- Output current 400 mA, short-circuit proof
- Polarity reversal protected
- Switching frequencies up to 10 kHz
- Size ranging from M10 diameter to 50 x 25 x 10 mm
- Unipolar version

Single-channel speed sensors with high frequency range

BERNSTEIN offers a high performance series of gearwheel sensors designed as electronic magnetic sensors with Hall elements that detect the rotation of near-engine ferromagnetic gearwheels with sensing distances of up to 2 mm. A specific feature of these single-channel speed sensors is their high switching frequency. Based on the BERNSTEIN modular range of magnetic sensors, switching frequencies of up to 20 kHz can be realised. Switching frequencies up to 10 kHz can be achieved in the standard range. The sensors are available in M12 and M18 versions. The characteristic versatility of Hall sensors is fully utilised in these applications:

Outstanding immunity to shock, impact, vibration, non-wearing and silent, high switching frequencies, broad temperature range, exceptional repeat accuracy.

Technical data

- Output circuitry PNP or NPN
- Voltage range 10 – 36 V DC
- Switching frequencies up to 20 kHz
- Sensing distance 0 – 2 mm on ferromagnetic material

Standard range of magnetoresistive sensors

Magnetoresistive sensors are more sensitive than Hall-effect sensors by a factor of 10. Not only can they be very small but they can also detect especially low field strengths.

In addition to their high measuring accuracy even at high ambient temperatures, these sensors are also characterised by a high degree of reliability and by the fact that they occupy little space. Since they are designed to be independent of polarity, the countermagnet does not need to be mounted with pole orientation. With corresponding encapsulation, BERNSTEIN magnetoresistive sensors have proven effective even in demanding environments such as lift construction or agricultural technology.

- Output circuitry PNP, NC or NO contact
- High sensitivity (up to sensing distance of 60 mm)
- Voltage range 10 – 39 V DC/10 – 30 V DC
- Output current 400 mA/200 mA, short-circuit proof
- Polarity reversal protected
- Polarity independent
- Size 6 mm diameter to M18

Microsensors

Ever more complex and above all more compact measuring and control configurations require components that occupy even less space. In line with this trend, BERNSTEIN has expanded its comprehensive range of sensors for determining position, angle and/or speed in industrial applications in two branches of development: Compared to the previous smallest model (RD = 6 mm), the diameter in this series of magnetoresistive sensors has been further reduced by 30 % yet the smallest model RD = 4 mm or 5 x 5 mm still achieves the parameters of the larger sensors. As part of the second development stage, the basic and standard range of electronic magnetic sensors has been expanded to include the latch functionality (bistable switching characteristic) which utilises the magnetic field only for the corresponding switching operation. As a result, this functionality has been added to a wide range of enclosure variants in the current modular range.

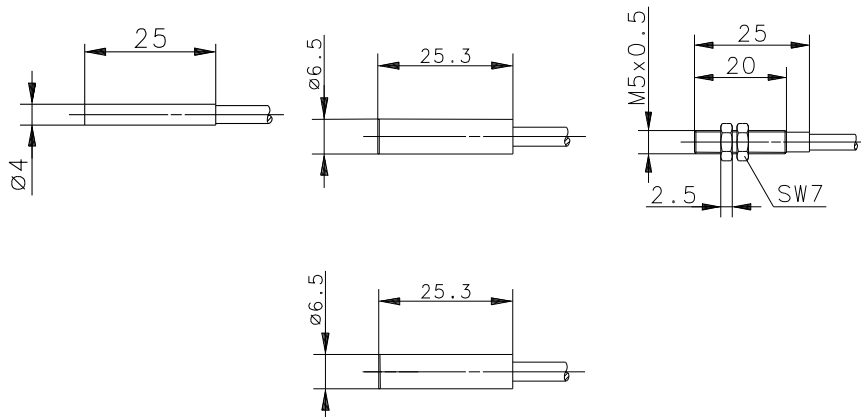
Sensing distances of electronic magnetic sensors

Since the sensing distances of magnetic sensors are influenced by the combination of sensor and magnet, it is appropriate to consider them as a complete system. The overview below shows the expected sensing distances (Sn) when using different magnets from the BERNSTEIN range.

Magnet	Size	Article number	Sn of Hall sensors	Sn of magnetoresistive sensors
T 75	Ø 5 mm	6301175057	5 mm	10 mm
T 06	Ø 6 mm	6301106065	5 mm	15 mm
T 61	Ø 20 mm	6301261035	10 mm	35 mm
T 62	Ø 23 mm	6301262039	17 mm	45 mm
T 67	Ø 20 mm	6301167054	15 mm	40 mm
T 69	Ø 31 mm	6301269031	20 mm	60 mm

Electronic Magnetic Sensors (Type D04, D06, M05, M08, M10, M12)

Type	D04	D06		M05
Operating mode	MR	Hall	MR	MR
Magnetic sensitivity (mT)	3 mT	10 mT	2 mT	3 mT
Sensing distance (Sn)	30 mm	17 mm	45 mm	30 mm
Reference magnet (Page)	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S
Type of connection	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m
Special feature				



PNP	NO contact NC contact Bistable	6373299132	6373270105	6373299133
NPN	NO contact NC contact Bistable		6362670001 6363870032	
Analogue	Current output Voltage output			

Technical data

Rated operating voltage	U_B	4.5-30 VDC	4.5-24 VDC	10-30 VDC	4.5-30 VDC
Rated operating current	I_B	200 mA	25 mA	200 mA	200 mA
Max. switching voltage	F	10 kHz	20 kHz	1500 Hz	10 kHz
Function/operating voltage indicator		-/-	-/-	-/-	-/-
Sensitivity adjustable					
Short circuit-protection		Current limiter	Current limiter	Cyclic	Current limiter
Teachable					

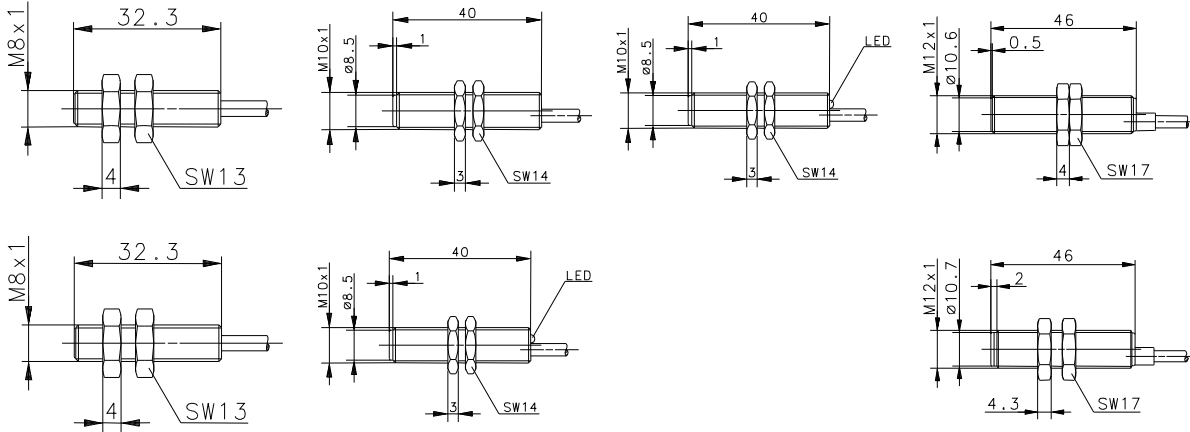
Mechanical data

Ambient temperature (min/max)		-20°C/+70°C	-25°C/+70°C	-25°C/+70°C	-20°C/+70°C
Protection class in accordance with IEC529, EN60529		IP67	IP67	IP67	IP67
Enclosure material		Stainless steel 1.4401	Stainless steel 1.4401	Stainless steel 1.4401	CuZn39Pb3
Connection		3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.



M08		M10		M10		M12	
Hall	MR	Hall	Hall	MR		Hall	Hall
10 mT	2 mT	10 mT	10 mT	1 mT		10 mT	10 mT
17 mm	45 mm	17 mm	17 mm	45 mm		17 mm	17 mm
T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S		T-62 N/S	T-62 N/S
Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m		Cable 2 m	Cable 2 m
			All-metal	All-metal			



6373260107	6372261085 6372161086 6373461124	6373261087 6373161088	
6362660002	6362661003		6362662004 6362662005
6363860033	6363861034		6363862035 6363862036

4.5-24 VDC	10-30 VDC	4.5-24 VDC	10-39 VDC	10-39 VDC	4.5-24 VDC	4.5-24 VDC
25 mA	200 mA	25 mA	400 mA	400 mA	25 mA	25 mA
20 kHz	1500 Hz	20 kHz	10 kHz	10 kHz	20 kHz	20 kHz
-/-	-/-	-/-	LED/-	LED/-	-/-	-/-
Current limiter	Cyclic	Current limiter	Cyclic	Cyclic	Current limiter	Current limiter

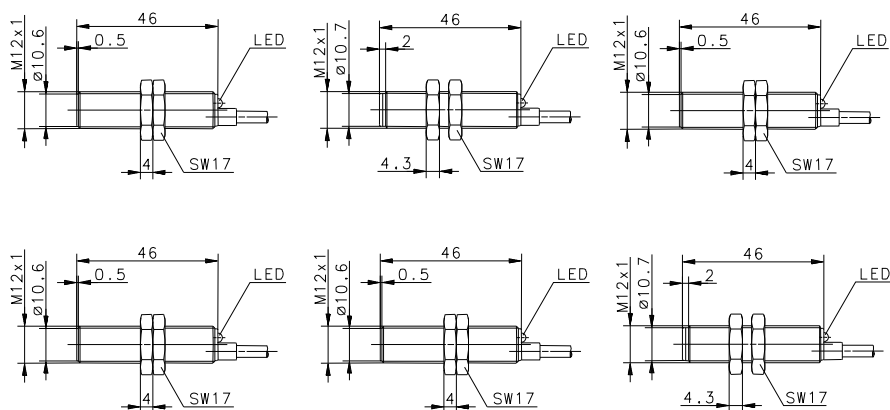
-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67	IP67
CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	PA
3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²

You will find detailed data sheets to the products under www.bernstein.eu



Electronic Magnetic Sensors (Type M12, M18)

Type	M12		M12		M12	
Operating mode	Hall	Hall	Hall	MR	MR	MR
Magnetic sensitivity (mT)	10 mT	10 mT	10 mT	1 mT	1 mT	1 mT
Sensing distance (Sn)	17 mm	17 mm	17 mm	45 mm	45 mm	45 mm
Reference magnet (Page)	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S
Type of connection	Cable 2 m	Cable 10 m	Cable 2 m	Cable 2 m	Cable 5 m	Cable 2 m
Special feature						



PNP	NO contact	6372262090	6472262077	6372262089	6373262094	6373262123	6373262093
	NC contact	6372162092		6372162091	6373162096		6373162095
	Bistable	6373462126		6373462125			
NPN	NO contact						
	NC contact						
	Bistable						
Analogue	Current output						
	Voltage output						

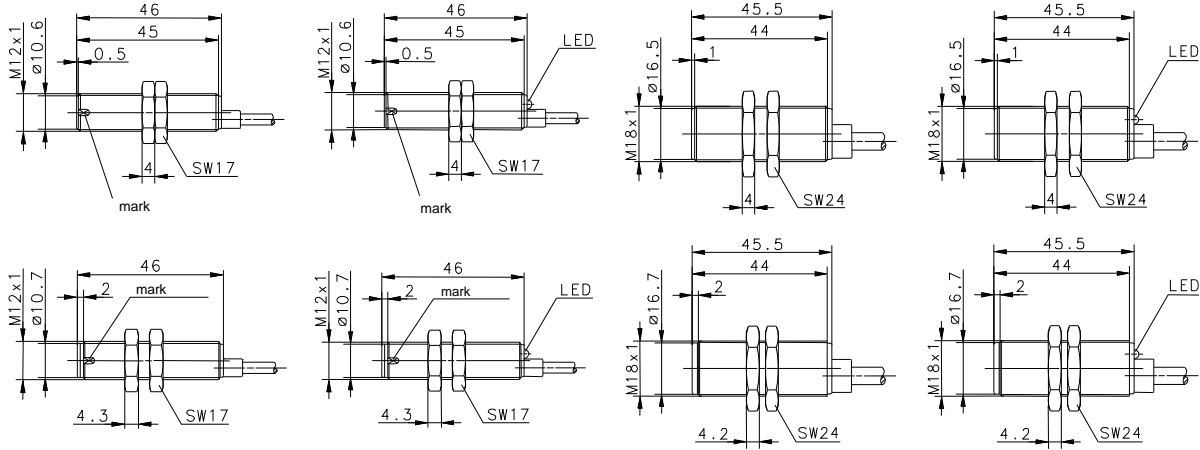
Technical data		M12		M12		M12	
Rated operating voltage	U_b	10-39 VDC	10-39 VDC	10-39 VDC	10-39 VDC	10-39 VDC	10-39 VDC
Rated operating current	I_b	400 mA	400 mA	400 mA	400 mA	400 mA	400 mA
Max. switching voltage	F	10 kHz	10 kHz	10 kHz	10 kHz	1500 Hz	10 kHz
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-	LED/-
Sensitivity adjustable							
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Teachable							

Mechanical data		M12		M12		M12	
Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC529, EN60529		IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material		CuZn39Pb3	CuZn39Pb3	PA	CuZn39Pb3	CuZn39Pb3	PA
Connection		3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.



M12		M12		M18		M18	
Hall	Hall	Hall	Hall	Hall	Hall	Hall	Hall
-	-	-	-	10 mT	10 mT	10 mT	10 mT
0-2 mm	0-2 mm	0-2 mm	0-2 mm	17 mm	17 mm	17 mm	17 mm
-	-	-	-	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S
Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m
Speed	Speed	Speed	Speed				



	6379262120	6379262119		6372263098	6372263097		
				6372163100	6372163099		
				6373463128	6373463127		
6369662028	6369662027			6362663006	6362663007		
				6363863037	6363863038		

10-36 VDC	10-36 VDC	10-39 VDC	10-39 VDC	4.5-24 VDC	4.5-24 VDC	10-39 VDC	10-39 VDC
< 20 mA	< 20 mA	400 mA	400 mA	25 mA	25 mA	400 mA	400 mA
20 kHz	20 kHz	10 kHz	10 kHz	20 kHz	20 kHz	10 kHz	10 kHz
-/-	-/-	LED/-	LED/-	-/-	-/-	LED/-	LED/-
Cyclic	Cyclic	Cyclic	Cyclic	Current limiter	Current limiter	Cyclic	Cyclic

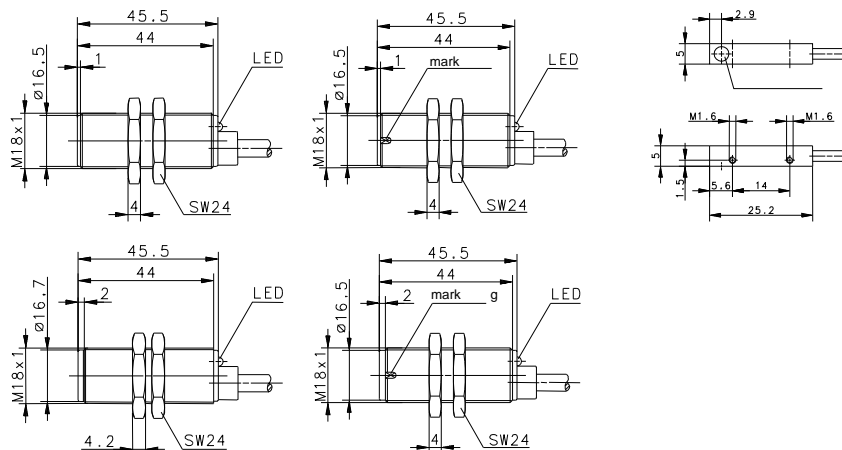
-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67
CuZn39Pb3	PA, red	CuZn39Pb3	PA, red	CuZn39Pb3	PBT	CuZn39Pb3	PBT
3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²

You will find detailed data sheets to the products under www.bernstein.eu



Electronic Magnetic Sensors (Type M18, Q05, Q08, Q12, E27, E29)

Type	M18		M18		Q05
Operating mode	MR	MR	Hall	Hall	MR
Magnetic sensitivity (mT)	1 mT	1 mT	-	-	3 mT
Sensing distance (Sn)	45 mm	45 mm	0 - 2 mm	0 - 2 mm	10 mm
Reference magnet (Page)	T-62 N/S	T-62 N/S	-	-	T-62 N/S
Type of connection	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m
Special feature			Speed	Speed	



PNP	NO contact NC contact Bistable	6373263102 6373263101 6373163104 6373163103	6379263122 6379263121	6373299134
NPN	NO contact NC contact Bistable			
Analogue	Current output Voltage output			

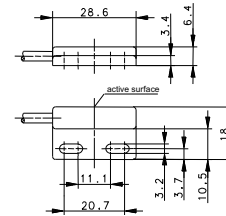
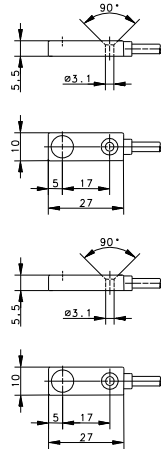
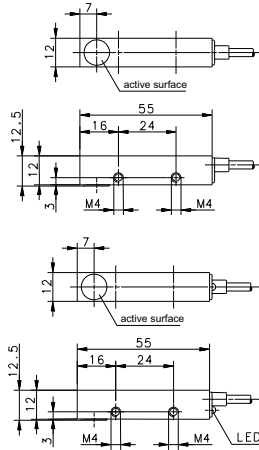
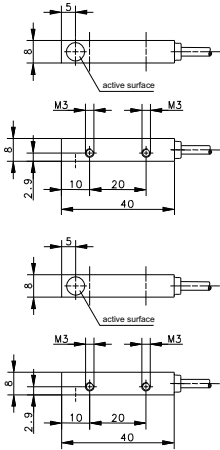
Technical data	6373263102	6373263101	6379263122	6379263121	6373299134
Rated operating voltage U_b	10-39 VDC	10-39 VDC	10-39 VDC	10-39 VDC	4.5-30 VDC
Rated operating current I_b	400 mA	400 mA	400 mA	400 mA	200 mA
Max. switching voltage F	10 kHz	10 kHz	10 kHz	10 kHz	10 kHz
Function/operating voltage indicator	LED/-	LED/-	LED/-	LED/-	-/-
Sensitivity adjustable					
Short circuit-protection	Cyclic	Cyclic	Cyclic	Cyclic	Current limiter
Teachable					

Mechanical data	6373263102	6373263101	6379263122	6379263121	6373299134
Ambient temperature (min/max)	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-20°C/+70°C
Protection class in accordance with IEC529, EN60529	IP67	IP67	IP67	IP67	IP67
Enclosure material	CuZn39Pb3	PBT	CuZn39Pb3	PBT, black	CuZn39Pb3
Connection	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.05 mm ²

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.



Q08		Q12		E27		E29
Hall	MR	Hall	Hall	Hall	Hall	Hall
10 mT	2 mT	10 mT	10 mT	10 mT	2 mT	10 mT
17 mm	45 mm	17 mm	17 mm	17 mm	30 mm	17 mm
T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S
Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m



6373280106	6372255083 6372155084 6373455131		
6362680012	6362655013	6362693010	6362611008
6363880043	6363855044	6363893041 6363893031	6363811039

4.5-24 VDC	10-30 VDC	4.5-24 VDC	10-39 VDC	4.5-24 VDC	4.5-24 VDC	4.5-24 VDC
25 mA	200 mA	25 mA	400 mA	25 mA	25 mA	25 mA
20 kHz	1500 Hz	20 kHz	10 kHz	20 kHz	20 kHz	20 kHz
-/-	-/-	-/-	LED/-	-/-	-/-	-/-
Current limiter	Cyclic	Current limiter	Cyclic	Current limiter	Current limiter	Current limiter

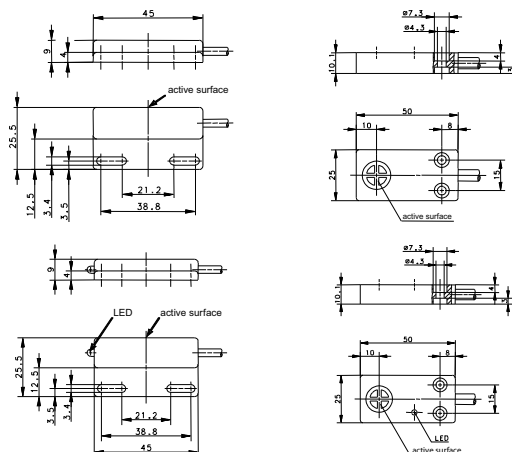
-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67	IP67
CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	PA	PA	PA
3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.14 mm ²

You will find detailed data sheets to the products under www.bernstein.eu



Electronic Magnetic Sensors (Type E45, E50)

Type	E45		E50	
Operating mode	Hall	Hall	Hall	Hall
Magnetic sensitivity (mT)	10 mT	10 mT	10 mT	10 mT
Sensing distance (Sn)	17 mm	17 mm	17 mm	17 mm
Reference magnet (Page)	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S
Type of connection	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m
Special feature				



PNP	NO contact	6372245079	6372290081
	NC contact	6372145080	6372190082
	Bistable	6373445129	6373490130
NPN	NO contact	6362645009	6362690011
	NC contact	6363845040	6363890042
	Bistable		
Analogue	Current output		
	Voltage output		

Technical data		E45		E50	
Rated operating voltage	U_B	4.5-24 VDC	10-39 VDC	4.5-24 VDC	10-39 VDC
Rated operating current	I_B	25 mA	400 mA	25 mA	400 mA
Max. switching voltage	F	20 kHz	10 kHz	20 kHz	10 kHz
Function/operating voltage indicator		-/-	LED/-	-/-	LED/-
Sensitivity adjustable					
Short circuit-protection		Current limiter	Cyclic	Current limiter	Cyclic
Teachable					

Mechanical data		E45		E50	
Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC529, EN60529		IP67	IP67	IP67	IP67
Enclosure material		PA	PA	PBT	PBT
Connection		3 x 0.14 mm ²	3 x 0.14 mm ²	3 x 0.50 mm ²	3 x 0.50 mm ²

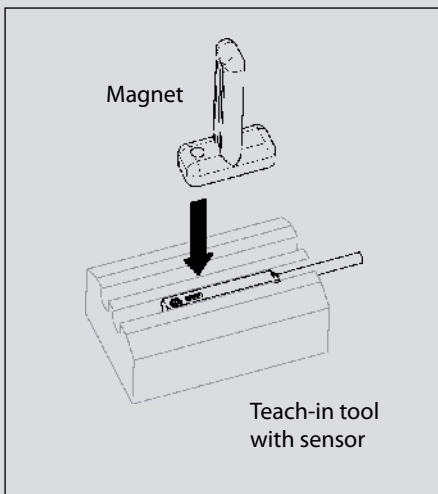
Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.



Programmable Miniature Position Sensors with Fully Integrated Electronics

The product family of teachable magnetic sensors is characterised by two freely programmable, independent switching points. Despite this high degree of functionality, BERNSTEIN has succeeded in integrating the entire electronics in the compact sensor enclosure with the smallest possible dimensions. This design feature renders additional protection, e.g. for the cable electronics, or high-cost safeguards unnecessary.

The compact design is suitable for installation in all standard T- and C-slots (e.g. FESTO or SMC). In installed position, the two freely programmable switching points can be quickly and easily set with the aid of the easy-to-use teach-in tool.



- The installed sensor assumes programming mode when the teach-in tool is placed over it
- The positions of the magnet are assigned to the respective outputs by correspondingly aligning the tool
- The programmable switching points are stored in the sensor
- The switching points can be changed by repeating the teach-in procedure

This configuration largely avoids unintentional changes to the settings, substantially increases the resistance to environmental influences while retaining the protection class rating.

Manually searching for the switching points has been replaced by rapid electronic balancing with the sensor installed in position. Two LEDs at the top of the sensor serve as the function indicator, provide information on the programming status and also signal faults. In addition to featuring effective polarity reversal protection as standard, the sensors also have an internal EEPROM that stores the switching points in the event of power failure.

Advantages

- Completely integrated electronic solution
- Permanent protection rating
- No need for additional electronics
- Fully immersed and therefore protected installation in the slot
- Suitable for standard C- and T-slots
- Available as cable or plug version
- Occupies only one slot
- Two freely programmable switching points
- Straightforward teach-in procedure
- Reduced installation and wiring requirements
- Can be fitted from above
- High switching accuracy

Technical data

- PNP/NO contact
- Magnetic sensitivity $\pm 1.5 \text{ mT}$ to $\pm 13.5 \text{ mT}$
- Sensing distance up to 50 mm (depending on magnet/air gap)
- Repeat accuracy $\leq 0.1 \text{ mT}$
- Hysteresis $1 \text{ mT} \leq H \leq 1.35 \text{ mT}$
- Operating voltage range 10 – 30 V DC
- Output current $I_e \leq 50 \text{ mA}$ (one output switched) $\leq 25 \text{ mA}$ per output (both outputs switched)
- Ambient temperature $-20 \text{ }^\circ\text{C}$ to $+80 \text{ }^\circ\text{C}$
- Protection class IP67

Other slot sensors

Sensors with only one output can also be used for applications that require only one switching point. For this purpose BERNSTEIN offers a range of Hall sensors with set sensitivity or reed contact versions that do not require auxiliary energy.

All sensors come with the following accessories:

- 1x setscrew M2 x 3 (E22), M3 x 6 (E30), DIN 913
- 1x Offset screwdriver (E22)
- 1x Teach-in tool
- 1x Operating and installation instructions

Standards and approvals

MEK E-22/MEA E30
EN 60947-5-2



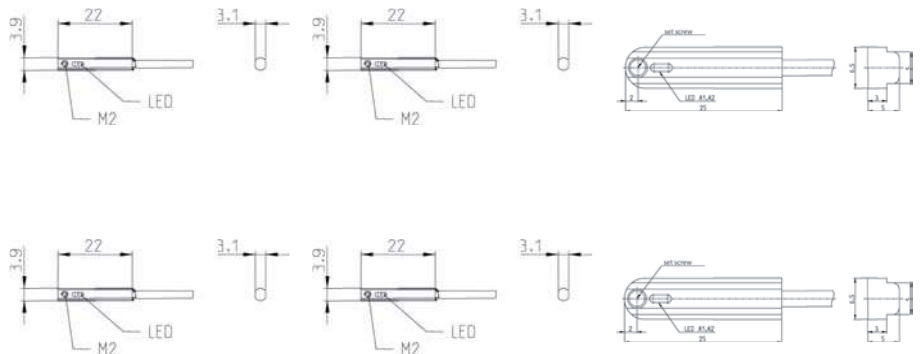
① **MEK-E22 Ex**



II 2 G Ex mb II T6
II 2 D Ex tD A21 IP67
T 85 °C

KEMA 08ATEX0130 X

Type	E22		E22		E30	
Operating mode	Hall	Hall	Hall	Hall	Hall	Hall
Magnetic sensitivity (mT)	1.5 – 13.5 mT	1.5 – 13.5 mT	1.5 – 13.5 mT	1.5 – 13.5 mT	1.5 – 13.5 mT	1.5 – 13.5 mT
Switching function	2 x PNP NO	2 x PNP NO	2 x PNP NO	2 x PNP NO	2 x PNP NO	2 x PNP NO
Reference magnet (Page)						
Type of connection	Cable 2 m	Connector M8	Cable 2 m	Connector M8	Cable 2 m	Connector M8
Special feature	Teachable	Teachable	Teachable – Ex ^⓪	Teachable – Ex ^⓪	Teachable	Teachable



Type	C-slot SMC C-slot Festo T-slot	6370281109 6370281144	6370281110 6370281145	6370281152	6370281153	6370299136	6370299143
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Technical data

Rated operating voltage	U _B	10-30 VDC	10-30 VDC	10-30 VDC	10-30 VDC	10-30 VDC	10-30 VDC
Rated operating current	I _B	≤ 50 mA	≤ 50 mA	≤ 50 mA	≤ 50 mA	≤ 50 mA	≤ 50 mA
Max. switching voltage	F						
Function/operating voltage indicator		2 x LED/-	2 x LED/-	2 x LED/-	2 x LED/-	2 x LED/-	2 x LED/-
Sensitivity adjustable		Yes	Yes	Yes	Yes	Yes	Yes
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Teachable		Yes	Yes	Yes	Yes	Yes	Yes

Mechanical data

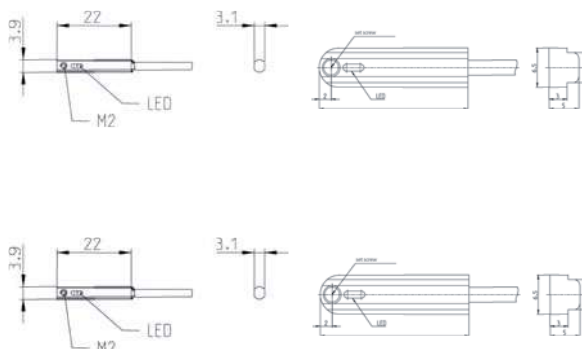
Ambient temperature (min/max)		-20°C/+80°C	-20°C/+80°C	-20°C/+80°C	-20°C/+80°C	-20°C/+80°C	-20°C/+80°C
Protection class in accordance with IEC529, EN60529		IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material		PA, black	PA, black	PA, black	PA, black	Aluminium	Aluminium
Connection		4 x 0.05 mm ²	M8 x 1	4 x 0.05 mm ²	M8 x 1	4 x 0.05 mm ²	M8 x 1

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.



Electronic Slot Sensors

Type	E22		E30	
Operating mode	Hall	Hall	Hall	Hall
Magnetic sensitivity (mT)	3 mT	3 mT	3 mT	3 mT
Switching function	PNP NO	PNP NO	PNP NO	PNP NO
Reference magnet (Page)				
Type of connection	Cable 2 m	Connector M8	Cable 2 m	Connector M8
Special feature				



Type	C-slot SMC C-slot Festo T-slot	6372281146 6372281148	6372281147 6372281149	6372299150	6372299151

Technical data

Rated operating voltage	U_b	10-30 VDC	10-30 VDC	10-30 VDC	10-30 VDC
Rated operating current	I_b	≤ 50 mA	≤ 50 mA	≤ 50 mA	≤ 50 mA
Max. switching voltage	F				
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-
Sensitivity adjustable		Yes	Yes	Yes	Yes
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic
Teachable		-	-	-	-

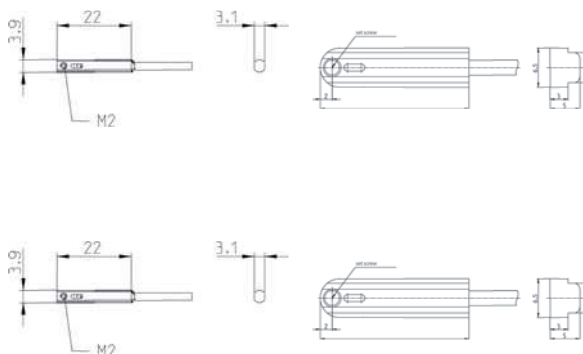
Mechanical data

Ambient temperature (min/max)		-20°C/+80°C	-20°C/+80°C	-20°C/+80°C	-20°C/+80°C
Protection class in accordance with IEC529, EN60529		IP67	IP67	IP67	IP67
Enclosure material		PA, black	PA, black	Aluminium	Aluminium
Connection		3 x 0.05 mm ²	M8 x 1	3 x 0.05 mm ²	M8 x 1

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.



Type	E22		E30	
Operating mode	Reed	Reed	Reed	Reed
Magnetic sensitivity (mT)	3 mT	3 mT	3 mT	3 mT
Switching function	NO	NO	NO	NO
Switching power	10 VA	10 VA	10 VA	10 VA
Type of connection	Cable 2 m	Connector M8	Cable 2 m	Connector M8
Special feature				



Type	C-slot SMC C-slot Festo T-slot	6310281656 6310281658	6310281657 6310281659	6310299660	6310299661

Technical data

Rated operating voltage U_B	120 VDC	120 VDC	120 VDC	120 VDC
Performance class (diagram No.)	10 VA	10 VA	10 VA	10 VA
Shock resistance	30 g (11 ms)	30 g (11 ms)	30 g (11 ms)	30 g (11 ms)
Reproducibility	+/- 1 mm	+/- 1 mm	+/- 1 mm	+/- 1 mm
Mechanical service life (switching operations)	3×10^8	3×10^8	3×10^8	3×10^8

Mechanical data

Ambient temperature (min/max)	-25°C/+80°C	-25°C/+80°C	-25°C/+80°C	-25°C/+80°C
Protection class in accordance with IEC529, EN60529	IP67	IP67	IP67	IP67
Enclosure material	PA, black	PA, black	Aluminium	Aluminium
Connection	$3 \times 0.05 \text{ mm}^2$	M8 x 1	$3 \times 0.05 \text{ mm}^2$	M8 x 1

You will find detailed data sheets to the products under www.bernstein.eu



Safety Magnetic Controllers

Magnetic controllers for safety functions

In accordance with the Machinery Directive (98/37/EC and 2006/42/EU) all manufacturers are obligated to construct machines conforming to health and safety standards. This requirement ensures that machines correspond to the stipulated safety standard, thus avoiding any danger for the operator during operation. When considering machine safety, all machine manufacturers or operators will be confronted with terms such as hazard analysis and hazard assessment. The new Machinery Directive (2006/42/EU) now additionally stipulates the need for risk analysis. It is therefore fitting to take a closer look at these terms: While hazard assessment takes into consideration all hazards that can occur at the machine workplace, hazard analysis performed by the machine manufacturer considers the possible hazards that may emanate from the machine. Against this backdrop, ever increasing significance is being attached to safety technology.

Despite all the safety regulations that are taken into account during the design phase, in accordance with EN 414 (types of hazard) a risk of injury posed by moving parts still exists during operation or maintenance of machines.



The aim is to identify all potential hazards and take appropriate precautions, e.g. by installing suitable safety facilities with the corresponding performance level as defined by EN 13849-1 or EN 61508 or with the corresponding SIL category in accordance with EN 62061.

BERNSTEIN offers safety magnetic controllers certified in accordance with EN ISO 13849-1 and conforming to performance level d for safety applications.



A safety system consists of the safety magnetic controllers and a coded transducer unit. Depending on the type of device, one or two coded transducer units (magnetic switch with corresponding magnet) of type

- MAK-4236-x with TK-42-CD
- MAK-5236-x with TK-52-CD / 2
- MAK-5336-x with TK-43-CD



can be connected to and monitored by the safety magnetic controllers.

The safety magnetic controllers process the NC or NO contact signals coming from the coded magnetic switch separately, thus achieving a redundant evaluation system. The individual NO contact signals are internally processed in serial while the corresponding NC contact signals are processed in parallel. A switching delay of approx. 0.5 seconds must be taken into account during operation. This delay is the time difference between the NC contact signal and the NO contact signal. On exceeding the delay, the safety magnetic controller signals an error and switches to the "safe state". An LED indicates that the safety magnetic controller is in the "safe state".

When the locking device is closed and the transducer actuated correctly, the output relays pick up, allowing the machine that poses no danger in the form of moving parts to start up via the PLC. The system additionally features a galvanically isolated data output for signalling purposes. This signal can be transferred to a control facility such a PLC or processed for use by an acoustic or visual indicator.

When using positive-action motor circuit breakers, the risk of the contacts welding together can be included in the safety circuit. The safety magnetic controller features a corresponding feedback circuit for this purpose. The feedback circuit must be bypassed if it is not used in the application. The system is reset immediately by opening the locking device or the transducer unit.

The use of positive-action relays and the mutual monitoring of individual control circuits allows safety magnetic controllers to be used in applications that must conform to the safety requirements defined by performance level d in accordance with EN ISO 13849-1.

Magnetic controllers for safety functions

TÜV certified

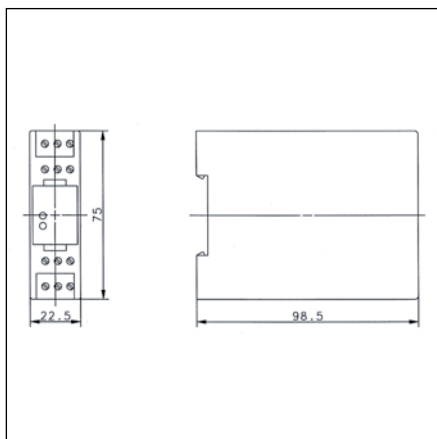
- EN ISO 13849-1 performance level "d"
- EN 61508 and EN 62061 "SIL 3"
- EN 60947-5-2 Single fault security "S"



Type designation	
Article number	
Max. number of connectable transducer units	
Safety output, NO contact	
Feedback circuit	
Data output (NC contact)	
Operating voltage	
AC 230 V	
AC 24 V	
DC 24 V	
Operating current	
Switching capacity, safety output	
Switching voltage	max
Switching current	max
Switching power	max
LED: Hazard status/switching status	
LED: Supply voltage/ON	
Relay: Positive-action/standard	
Ambient conditions	
Temperature range	min/max
Protection class (to IEC 529, EN 60529)	
Enclosure material	
Mounting system (DIN 50022)	
Type of connection: Terminal block	
Wiring diagram (Page/Item)	

	MÜZ-102/D24-FL-DA	MÜZ-202/D24-FL
Article number	6392701306	6392702307
Max. number of connectable transducer units	1	2
Safety output, NO contact	●	●
Feedback circuit	●	-
Data output (NC contact)	●	-
Operating voltage		
AC 230 V	-*	-*
AC 24 V	-	-
DC 24 V	●	●
Operating current	60 mA	
Switching capacity, safety output		
Switching voltage	AC 250 V	AC 250 V
Switching current	8 A	8 A
Switching power	1700 VA	1700 VA
LED: Hazard status/switching status	●/-	●/-
LED: Supply voltage/ON	●	-
Relay: Positive-action/standard	●/-	●/-
Ambient conditions		
Temperature range	0 °C/+55 °C 32 °F/+131 °F	0 °C/+55 °C 32 °F/+131 °F
Protection class (to IEC 529, EN 60529)	IP20	IP20
Enclosure material	PC	PC
Mounting system (DIN 50022)	TS 35	TS 35
Type of connection: Terminal block	max. 2.5 mm ²	max. 2.5 mm ²
Wiring diagram (Page/Item)	260/7	260/8

All dimensions in mm



Coded transducer units

Magnetic switches

3 m PVC cable	
Type designation	
Article number	
6 m PVC cable	
Type designation	
Article number	
9 m PVC cable	
Type designation	
Article number	
Connector (M12/4-pin)	
Type designation	
Article number	
Ambient conditions	
Temperature range	min/max
Protection class (to IEC 529, EN 60529)	
Enclosure material	
Sensing distance	S on min
	S on max
Actuating magnet	
Type designation	
Article number	
Use: safety magnetic controller	
Article number	

All dimensions in mm

Other types available on request.



MAK-4236-3
6490642315

MAK-5236-3
6490652316

MAK-5336-3
6490653317

MAK-4236-6
6490642302

MAK-5236-6
6490652307

MAK-5336-6
6490653311

MAK-4236-9
6490642303

MAK-5236-9
6490652308

MAK-5336-9
6490653312

MAK-4236-STK
6490642305

MAK-5236-STK
6490652309

MAK-5336-STK
6490653313

-5 °C/+70 °C
+23 °F/+158 °F
IP67
PA 6.6
4 mm
14 mm

-5 °C/+70 °C
+23 °F/+158 °F
IP67
PBT
3 mm
14 mm

-5 °C/+70 °C
+23 °F/+158 °F
IP67
PA 6.6
3 mm
14 mm

TK-42-CD
6402042310

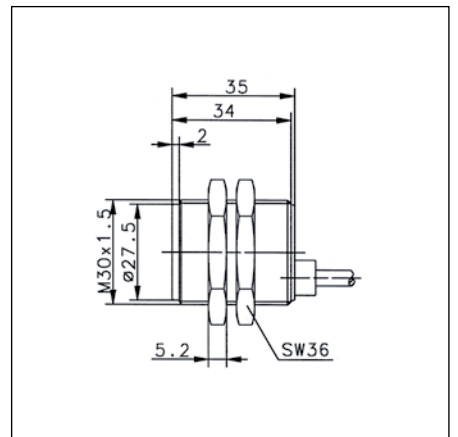
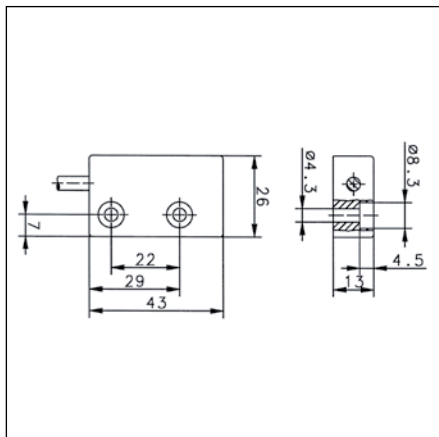
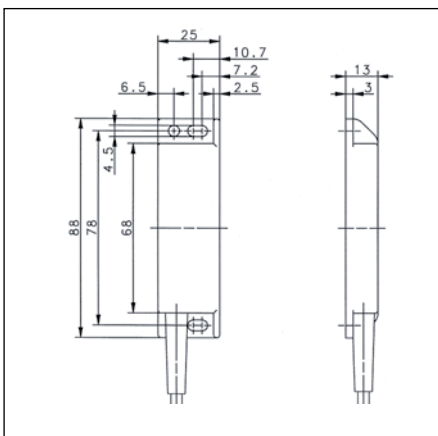
TK-52-CD/2
6402052311

TK-43-CD
6402043312

6392701306
6392702307

6392701306
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6392702307



Ultrasonic Sensors

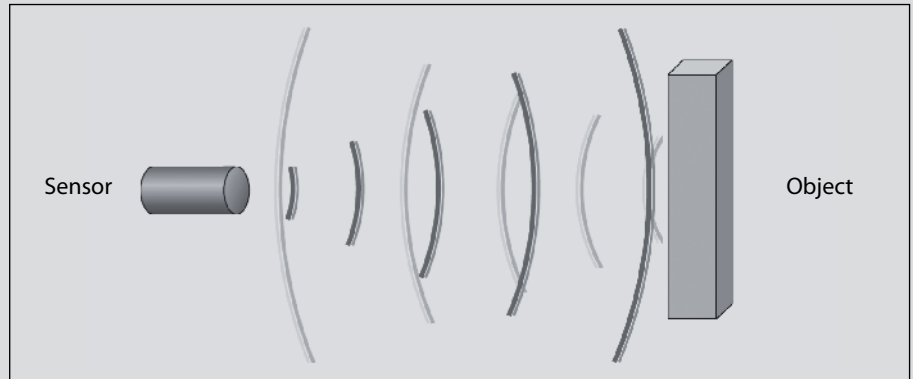
Ultrasonic sensors are used to precisely detect the position of objects of any material and colour, irrespective of external light levels even in harsh industrial environments. The sensors are characterised by high sound intensity that makes it possible to detect even the smallest of objects.

In addition to their high precision, outstanding repeatability and high degree of linearity their strengths also include their suitability for use in universal applications, irrespective of light conditions, as well as colour and material of the objects and substances to be detected.

Ultrasonic sensors produce accurate results even in connection with highly transparent objects such as film or glass surfaces and are completely unaffected by normal levels of soiling on the sensor surface. High performance under the most difficult operating conditions, even in suspended particle or water vapour environments, is a characteristic feature as is their ruggedness under harsh operating conditions.

Thanks to their outstanding properties ultrasonic sensors are used in a diverse range of applications and sectors of industry.

Measuring principle



The sensor emits a sound pulse that is reflected from the object to be detected. The sensor reads in the reflected pulse and the distance to the object is determined by means of a runtime measurement routine.

Advantages

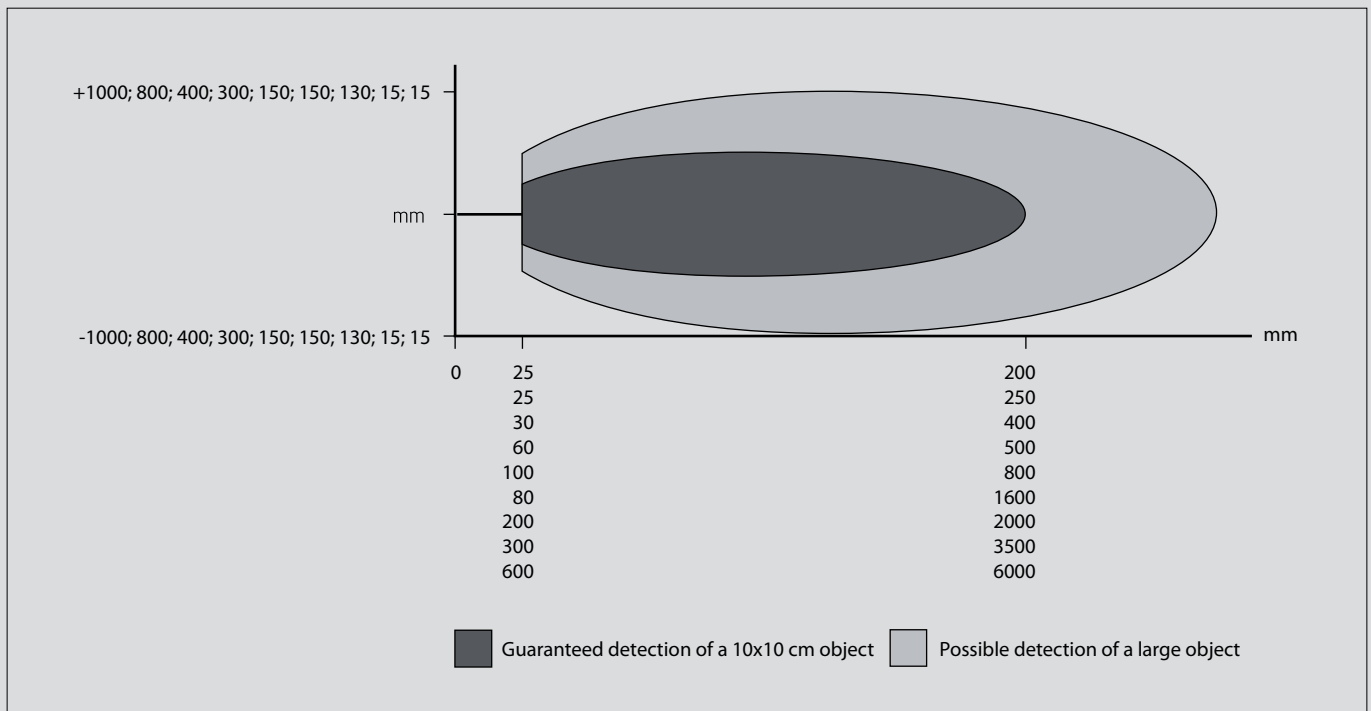
- Protection class IP67
- Large detection range of up to 6000 mm (depending on type)
- High linearity
- High repeat accuracy
- Narrow sound beam of 8°
- Adaptive 0-10 V voltage or 4-20 mA current output (analogue sensors)
- Two adaptive switching outputs, can be used individually or combined in connection with switching sensors (depending on type)

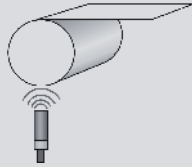
Technical data*

- One analogue 0...10 V/4...20 mA output or two switching outputs.
- Rated operating voltage range 12 V – 30 V DC
- Enclosure: PBT/ GF30
- Ambient temperature -15 °C...70 °C
- Repeat accuracy $\pm 0.2\% \pm 2$ mm
- Hysteresis 1 %

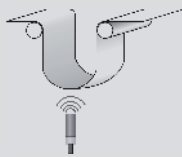
* Please refer to the following catalogue pages and the corresponding datasheets for technical information on the individual products

Detection range:



Application examples:

Wind-on and wind-off control

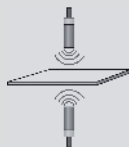
Detection of the diameter of coils in the paper, plastics and textile as well as metal working industries.


Sag control

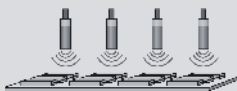
Detection of sag loop for controlling material tension or controlling quantity of material for the downstream production process.


Level measurement

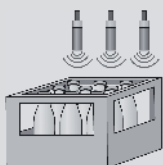
Level measurement of liquids of bulk materials in containers and silos.


Thickness measurement

Thickness measurement of objects.


Completeness check

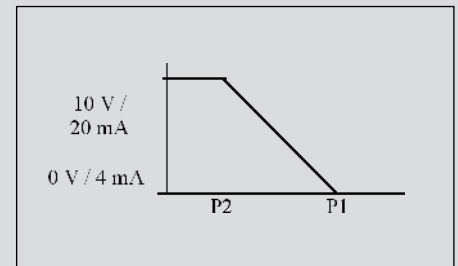
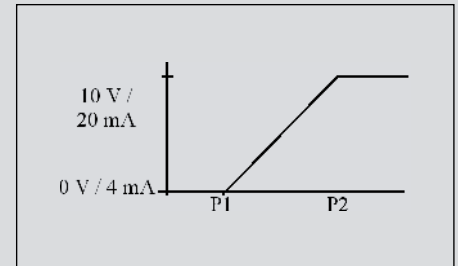
For checking completeness of objects in containers.


Completeness check of bottles in crates

For checking the presence and height of bottles in crates.

Teach-in procedure
Analogue sensors

Any interval within the measuring range can be selected for the analogue output by means of TeleTeach. The slope of the characteristic curve – positive or negative – can, of course, be set to any value.



The points P1 and P2 determine the position of the analogue characteristic curve: P1 defines the point at which the characteristic curve assumes the value 0 V/4 mA, P2 defines the 10 V/20 mA point. In the case of a “positive characteristic curve”, the sensor is programmed in such a way that the sensor-P1 distance is smaller than the sensor-P2 distance. Correspondingly, sensor-P2 distance is smaller than sensor-P1 distance for a “negative characteristic curve”.

Switching sensors

The two switching outputs are taught-in accurate to the millimetre via a teach-in input. Independent of each other, they can be optionally adapted with 1 % hysteresis as complementary windows (NO/NC) or as complementary switching outputs (NO/NC) with hysteresis adjustable to any value. P1 and P2 define the position of the switching points. The switching point has NO characteristic if the corresponding LED is on while teaching in the switching point and conversely, it has NC characteristic when the LED is off. Two LEDs indicate the switching status of the sensor.

Standards and approvals:

EN 60947-5-2

Ultrasonic Sensors (Type M12, M18)

Type	M12	M18		M18	
Detection range	25-200 mm	30-400 mm	30-400 mm	30-400 mm	30-400 mm
Output	1 x NO/NC	2 x NO/NC	Analogue	2 x NO/NC	Analogue
Type of connection	Connector M12	Cable 2 m	Cable 2 m	Connector M12	Connector M12
Special feature					



PNP	DC	NO/NC	6712101001	6711102005	6712102005
NPN	DC	NO/NC	6712201001	6711202005	6712202005
Analogue	DC	0-10 V 4-20 mA		6711402005 6711302005	6712402005 6712302005

Technical data

Rated operating voltage	U_B	12-30 VDC	12-30 VDC	15-30 VDC	12-30 VDC	15-30 VDC
Rated operating current	I_B	100 mA	500 mA	-	500 mA	-
Switching frequency (max)	F	20 Hz	15 Hz	-	15 Hz	-
Resolution		-	-	0.125 mm	-	0.125 mm
Linearity error		-	-	< 0.5 %	-	< 0.5 %
Response times		-	-	60 ms	-	60 ms
Repeatability		±0.3 %	±0.2 % ±1 mm	±0.2 % ±1 mm	±0.2 % ±1 mm	±0.2 % ±1 mm
Sound beam		12°	8°	8°	8°	8°
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/LED	LED/LED	LED/LED	LED/LED	LED/LED

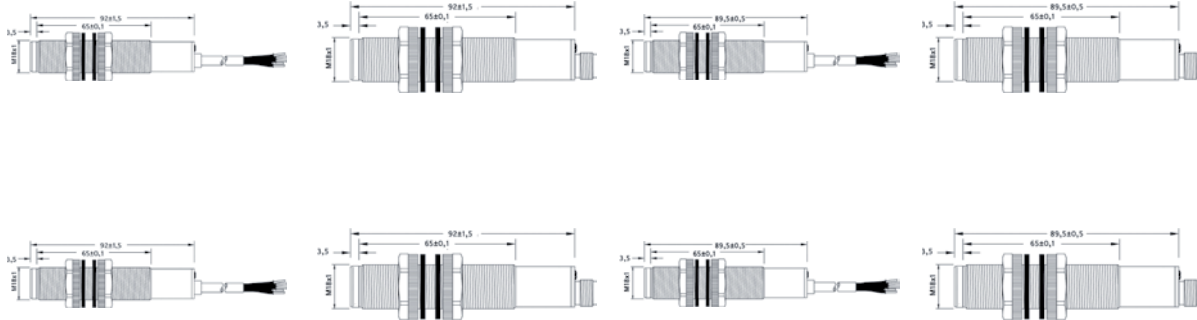
Mechanical data

Ambient temperature (min/max)		-20°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C
Protection class in accordance with IEC529, EN60529		IP67	IP67	IP67	IP67	IP67
Enclosure material		Stainless steel	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30
Connection		M12 x 1	5 x 0.14 mm ²	4 x 0.14 mm ²	M12 x 1	M12 x 1

Please refer to Accessories for cable couplers and sensor tester.



M18		M18		M18		M18	
60-500 mm	60-500 mm	60-500 mm	60-500 mm	80-1600 mm	80-1600 mm	80-1600 mm	80-1600 mm
2 x NO/NC	Analogue	2 x NO/NC	Analogue	2 x NO/NC	Analogue	2 x NO/NC	Analogue
Cable 2 m	Cable 2 m	Connector M12	Connector M12	Cable 2 m	Cable 2 m	Connector M12	Connector M12



6711102004	6712102004	6711102002	6712102002
6711202004	6712202004	6711202002	6712202002
6711402004	6712402004	6711402002	6712402002
6711302004	6712302004	6711302002	6712302002

12-30 VDC	15-30 VDC	12-30 VDC	15-30 VDC	12-30 VDC	15-30 VDC	12-30 VDC	15-30 VDC
500 mA	-	500 mA	-	500 mA	-	500 mA	-
10 Hz	-	10 Hz	-	6 Hz	-	6 Hz	-
-	0.25 mm	-	0.25 mm	-	1 mm	-	1 mm
-	< 0.5 %	-	< 0.5 %	-	< 0.5 %	-	< 0.5 %
-	100 ms	-	100 ms	-	140 ms	-	140 ms
±0.2 % ±1 mm	±0.2 % ±1 mm	±0.2 % ±1 mm	±0.2 % ±1 mm	±0.2 % ±2 mm	±0.2 % ±2 mm	±0.2 % ±2 mm	±0.2 % ±2 mm
8°	8°	8°	8°	8°	8°	8°	8°
Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
LED/LED	LED/LED	LED/LED	LED/LED	LED/LED	LED/LED	LED/LED	LED/LED

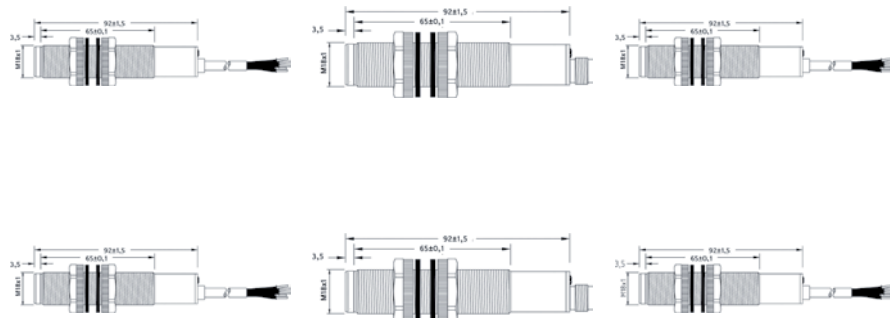
-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C
IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67
PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30
5 x 0.14 mm ²	4 x 0.14 mm ²	M12 x 1	M12 x 1	5 x 0.14 mm ²	4 x 0.14 mm ²	M12 x 1	M12 x 1

You will find detailed data sheets to the products under www.bernstein.eu



Ultrasonic Sensors (Type M18, M30)

Type	M18		M18		M18	
Detection range	100-800 mm	100-800 mm	100-800 mm	100-800 mm	200-2000 mm	200-2000 mm
Output	2 x NO/NC	Analogue	2 x NO/NC	Analogue	2 x NO/NC	Analogue
Type of connection	Cable 2 m	Cable 2 m	Connector M12	Connector M12	Cable 2 m	Cable 2 m
Special feature						



PNP	DC	NO/NC	6711102003	6712102003	6711102001
NPN	DC	NO/NC	6711202003	6712202003	6711202001
Analogue	DC	0-10 V 4-20 mA	6711402003 6711302003	6712402003 6712302003	6711402001 6711302001

Technical data

Rated operating voltage	U_B	12-30 VDC	15-30 VDC	12-30 VDC	15-30 VDC	12-30 VDC	15-30 VDC
Rated operating current	I_B	500 mA	-	500 mA	-	500 mA	-
Switching frequency (max)	F	10 Hz	-	10 Hz	-	5 Hz	-
Resolution		-	0.25 mm	-	0.25 mm	-	1 mm
Linearity error		-	< 0.5 %	-	< 0.5 %	-	< 0.5 %
Response times		-	100 ms	-	100 ms	-	200 ms
Repeatability		$\pm 0.2 \% \pm 1 \text{ mm}$	$\pm 0.2 \% \pm 1 \text{ mm}$	$\pm 0.2 \% \pm 1 \text{ mm}$	$\pm 0.2 \% \pm 1 \text{ mm}$	$\pm 0.2 \% \pm 2 \text{ mm}$	$\pm 0.2 \% \pm 2 \text{ mm}$
Sound beam		8°	8°	8°	8°	8°	8°
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/LED	LED/LED	LED/LED	LED/LED	LED/LED	LED/LED

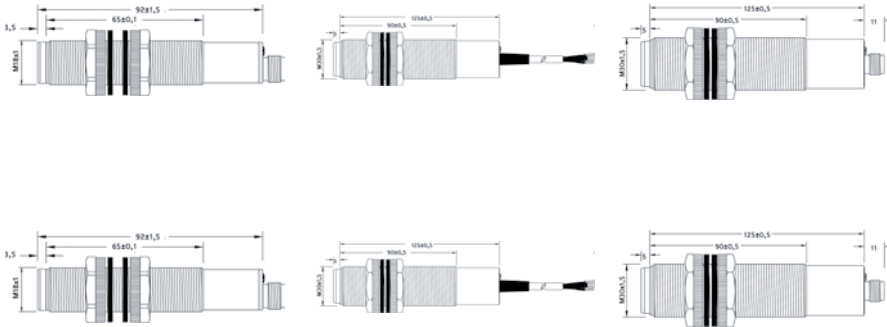
Mechanical data

Ambient temperature (min/max)	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C
Protection class in accordance with IEC529, EN60529	IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30
Connection	5 x 0.14 mm ²	4 x 0.14 mm ²	M12 x 1	M12 x 1	5 x 0.14 mm ²	4 x 0.14 mm ²

Please refer to Accessories for cable couplers and sensor tester.



M18		M30		M30			
200-2000 mm	200-2000 mm	300-3500 mm	300-3500 mm	300-3500 mm	300-3500 mm		
2 x NO/NC	Analogue	2 x NO/NC	Analogue	2 x NO/NC	Analogue		
Connector M12	Connector M12	Cable 2 m	Cable 2 m	Connector M12	Connector M12		



6712102001	6711103001	6712103001		
6712202001	6711203001	6712203001		
6712402001	6711403001	6712401001		
6712302001	6711303001	6712303001		

12-30 VDC	15-30 VDC	12-30 VDC	15-30 VDC	12-30 VDC	15-30 VDC		
500 mA	-	500 mA	-	500 mA	-		
5 Hz	-	2.5 Hz	-	2.5 Hz	-		
-	1 mm	-	1 mm	-	1 mm		
-	< 0.5 %	-	< 0.5 %	-	< 0.5 %		
-	200 ms	-	400 ms	-	400 ms		
±0.2 % ±2 mm	±0.2 % ±2 mm	±0.2 % ±2 mm	±0.2 % ±2 mm	±0.2 % ±2 mm	±0.2 % ±2 mm		
8°	8°	8°	8°	8°	8°		
Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic		
LED/LED	LED/LED	LED/LED	LED/LED	LED/LED	LED/LED		

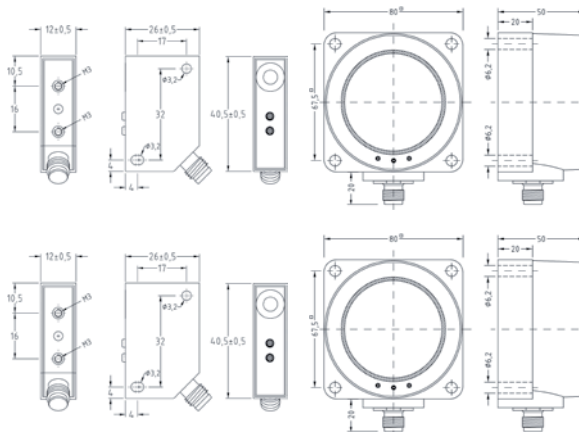
-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C		
IP67	IP67	IP67	IP67	IP67	IP67		
PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30		
M12 x 1	M12 x 1	5 x 0.14 mm ²	4 x 0.14 mm ²	M12 x 1	M12 x 1		

You will find detailed data sheets to the products under www.bernstein.eu



Ultrasonic Sensors (Type 40 x 26 mm, 80 x 80 mm)

Type	40.5x26x12mm		80x80x50mm	
Detection range	25-250 mm	25-250 mm	600-6000 mm	600-6000 mm
Output	1 x NO/NC	Analogue	2 x NO/NC	Analogue
Type of connection	Connector M8	Connector M8	Connector M12	Connector M12
Special feature				



PNP	DC	NO/NC	6713111001	6712112001
NPN	DC	NO/NC	6713211001	6712212001
Analogue	DC	0-10 V 4-20 mA	6713411001	6712412001 6712312001

Technical data

Rated operating voltage	U _B	10-30 VDC	12-30 VDC	12-30 VDC	15-30 VDC
Rated operating current	I _B	100 mA	-	500 mA	-
Switching frequency (max)	F	20 Hz	-	1 Hz	-
Resolution		-	0.125 mm	-	1.5 mm
Linearity error		-	< 0.3 %	-	< 0.5 %
Response times		-	40 ms	-	700 ms
Repeatability		±0.2 % ±0.2 mm	±0.2 % ±0.2 mm	±0.2 % ±2 mm	±0.2 % ±2 mm
Sound beam		8°	8°	8°	8°
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/LED	LED/LED	LED/LED	LED/LED

Mechanical data

Ambient temperature (min/max)		-10°C/+70°C	-10°C/+70°C	-15°C/+70°C	-15°C/+70°C
Protection class in accordance with IEC529, EN60529		IP67	IP67	IP65	IP65
Enclosure material		PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30
Connection		M8 x 1 ^①	M8 x 1 ^①	M12 x 1	M12 x 1

Please refer to Accessories for cable couplers and sensor tester.

① Cable coupler included in delivery specification



Float Switches

Design and Function

BERNSTEIN float switches are designed as contactless magnetic switches. They are used to control level in containers/tanks with non-flowing and/or flowing liquids such as water, oils, caustic solutions etc.

Float switches consist of a connection head, immersion tube with one to four magnetic sensor elements and a float. Versions with straight or elbow immersion tube are available.

Rising or falling liquid levels carry the float equipped with a ring magnet into the detection zone of a magnetic sensor element, where the magnetic field of the float is evaluated and a switching pulse generated.

The range of BERNSTEIN float switches extends from miniature float switches through to heavy-duty, pressure-proof versions.

The combination options between various enclosure materials, floats and connection heads make it possible to create the optimum configuration for virtually any application.

Based on a comprehensive modular system of adjustable float switches, the product range offers an enormous problem solution potential. It allows the user to adjust the required switching points to individual applications, thus creating a customised product ideally adapted to his specific operating conditions.

BERNSTEIN additionally offers many other specific solutions that cannot all be illustrated in one catalogue. For more demanding applications it is therefore recommended to contact BERNSTEIN using the fax Enquire/Order form at the end of this section.



BERNSTEIN miniature float switches

To ensure smooth running operating processes, in many devices and industrial systems it is necessary to monitor product level in the most confined spaces.

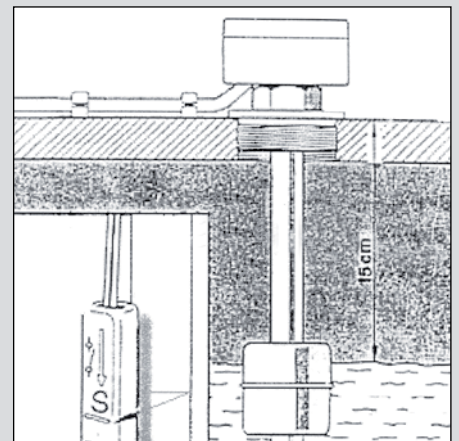
These miniature float switches have been specially developed for small tanks/reservoirs as used in the automotive industry, drinks vending machines, air conditioning systems etc.

The NC/NO contact switching function in many miniature switches can be selected by simply turning the float by 180°.

This type of miniature float switch is also available with individual lengths of immersion tube.

BERNSTEIN adjustable float switches

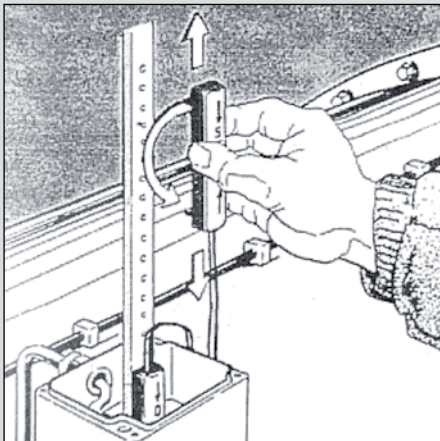
Up to four encapsulated magnetic sensor elements can be placed in any position at 10 mm intervals in the immersion tube of BERNSTEIN adjustable float switches.



Thanks to their extremely user-friendly design, each of these universally used devices can replace several conventional switches.

Instead of keeping a large assortment of different switches in stock, the user requires only one single device.

The NC or NO contact switching function can be easily adapted to given operating conditions.



All versions are available as standard in four lengths (250, 500, 750 and 1000 mm). Other lengths are possible on request.



BERNSTEIN standard float switches

For over 25 years it has been hard to imagine fluid level regulation, control and monitoring systems without BERNSTEIN standard float switches. In addition to being used to simply provide a signal when a liquid level drops below or exceeds a defined value, they also ideally serve as signal generators in automatically operating filling systems.

With a wide range of different floats, enclosure materials and connection heads to choose from, the optimum float switch can be configured for virtually any application. Lengths of up to 2 m are possible. Versions are available with an elbow immersion tube in the connection head or even with a specially developed switching device.

Float Switches

Terminology and Basic Theory

Connection cable

Temperature resistant up to +70 °C, special versions up to +150 °C also available. Switches with cables come in the standard length of 1 m, other lengths are also possible on request.

Radian (y)

The radian is the length measured from the contact surface of the connection head to the neutral phase of the vertical immersion tube.

Chemical resistance

See "Chemical Resistance" table (Page 133).

Pressure

Up to 25 bar depending on type of float.

Disruptive breakdown voltage

Each float switch undergoes a high voltage test in accordance with DIN VDE 0160.

Maximum making current

From 0.5 A – 5 A depending on type of sensor used.

Immersion depth (h1)

Designates how far the float is immersed in the medium. This parameter is dependent on the density of the liquid as well as the size and weight of the float. The values listed in the catalogue refer to a density of 1.

End length (e)

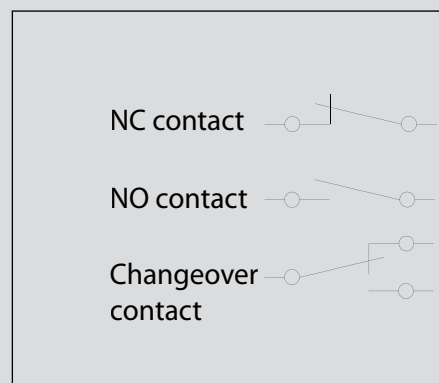
From 36 mm to 50 mm depending on the type of float.

Electrical service life

To maintain a long service life of the float switches, it is important to ensure the maximum supply voltages and switching currents are not exceeded.

Spark quenching

On request, all BERNSTEIN float switches can be equipped with protection circuitry which prevents wear caused by switching sparks when switching inductive or capacitive loads (please refer to protective circuitry for reed contacts).



Contact function

Performance diagram

The performance diagram shows the switching capacity as a function of the switching current (please refer to Page 71).

Miniature float switches

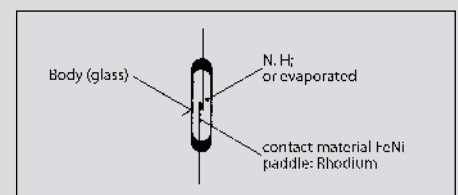
Favourable design and compact dimensions allow these float switches to be used in smallest containers.

Mechanical wear

Thanks to the contactless operating principle, mechanical wear is not an issue.

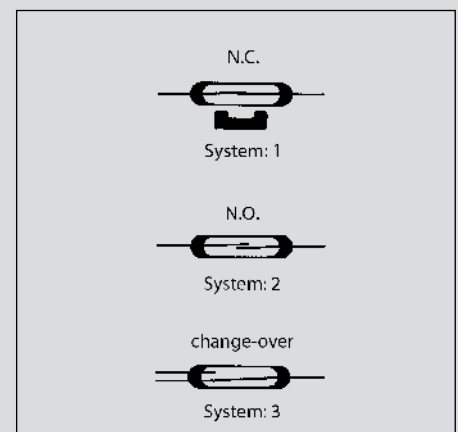
Reed contact

A reed contact is a magnetically or electro-magnetically operated switch. The pair of ferromagnetic contact studs are housed in a hermetically sealed glass tube filled with inert gas. Under the influence of a magnetic field, the contact paddles assume opposing polarity (north and south pole) and close when a sufficient force is applied. This procedure can be repeated millions of times even at extremely short time intervals.



Design of a reed contact

BERNSTEIN float switches are equipped with barium ferrite magnets that are located in the float. Opening and closing of the contact studs is determined by the magnet in the float correspondingly approaching or moving away. The delivery range includes normally-closed contacts, normally-open contacts and changeover contacts.



Versions of reed contacts

Switching distances (o/m/u)

The switching distances are defined with

- **o** = Top
- **m** = Middle
- **u** = Bottom

(please refer to Float Switch Enquiry and Order form on Page 134).

Switch length (x)

This is the length from the connection head up to the lower end of the tube.

x (max.) = 2000 mm

Maximum switching power

3 VA – 250 VA depending on type of reed contact (please refer to Page 130).

Immersion tube

Available in PVC, MS63, stainless 1.4571.

Maximum switching voltage

100 V – 250 V depending on type of reed contact (please refer to Page 130).

Switching point

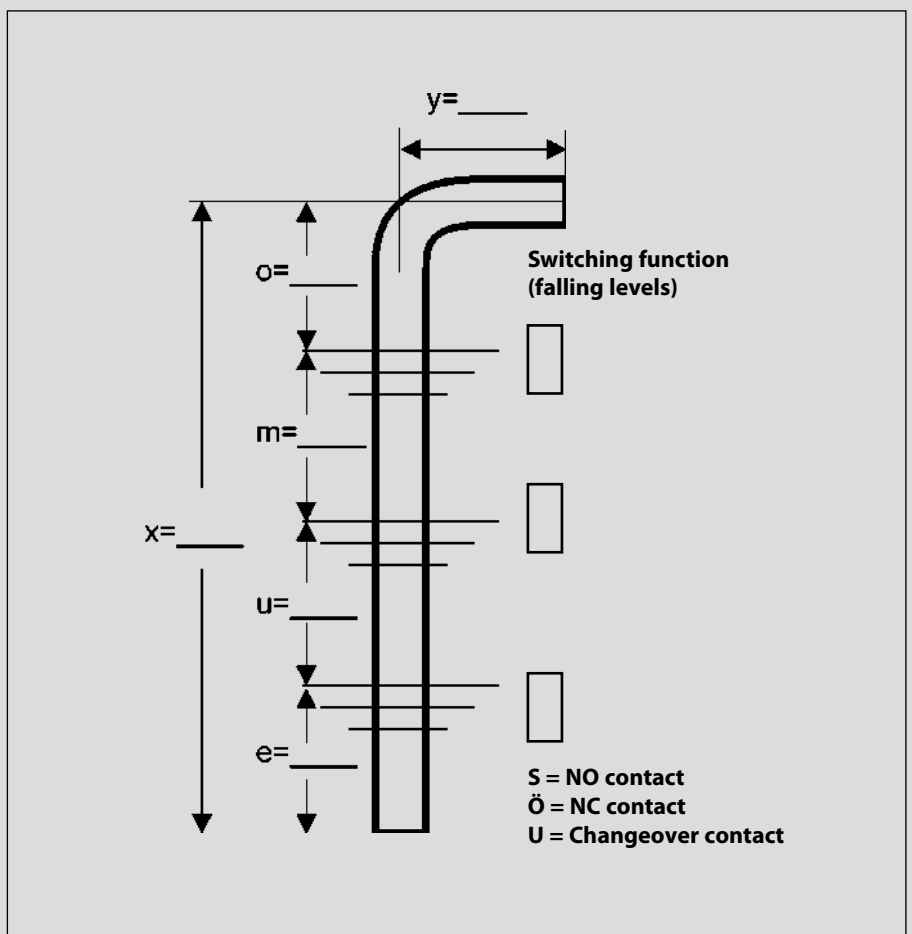
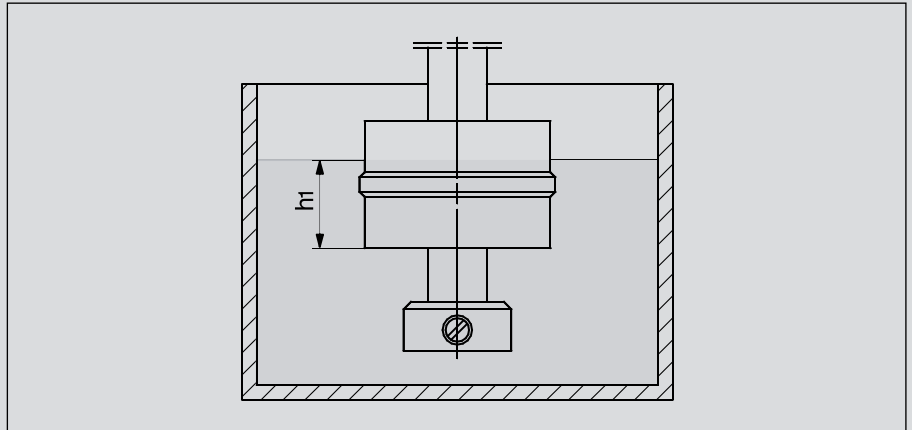
The float magnet initiates a switching signal by magnetising the contact studs of the reed contact. Three switching points per switch are possible (more on request).

Switching path

This corresponds to the path, on which the contact remains active while the float is moving in the same direction.

Protection classes

Corresponding to their ID code, the switches are dustproof and water-proof in accordance with IP65 or IP67 (EN 60529, IEC 529).



Float Switches

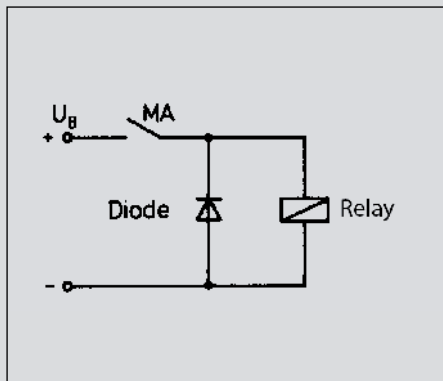
Guidelines for reed contact protection

The values for current, voltage and power specified in the catalogue apply only to purely resistive loads. Very often, however, these loads are exposed to inductive or capacitive components. In these cases it is advisable to protect the reed contacts against voltage and current peaks. Whilst it is not possible to recommend a safe contact protection concept that applies to all load ranges (each individual case will require its own evaluation), we would like to present general guidelines on how reed contacts may be connected to different loads in order to avoid premature failure.

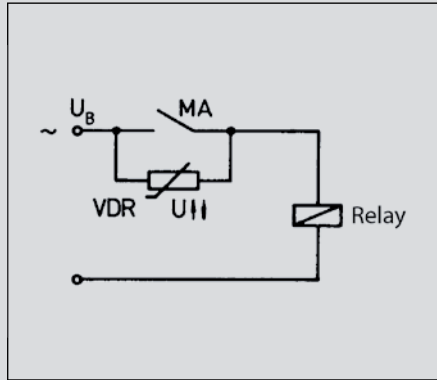
1. Inductive loads

In DC applications, contact protection is relatively easy to realise with the aid of a free-wheeling diode connected in parallel to the load. The diode polarity must be selected so that it blocks when normal operating voltage is applied but will short-circuit the voltage induced after the switch is opened (voltage peaks can significantly exceed the operating voltage).

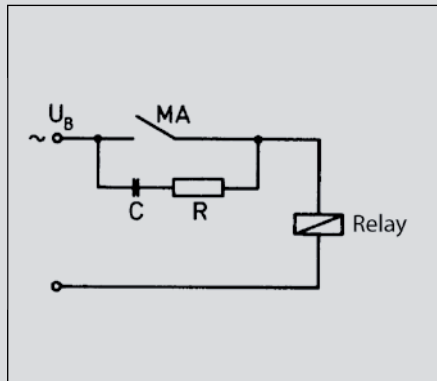
This can amount to a multiple of the operating voltage and initially cause a switching spark between the opening contact studs.



Suppression of voltage peaks with a free-wheeling diode



1) Voltage peaks induced by switching off inductive loads are suppressed by connecting a voltage-dependent resistor (VDR) in parallel to the reed contact.



2) In AC voltage applications effective protection is achieved with a combination of a resistor and a capacitor (RC element).

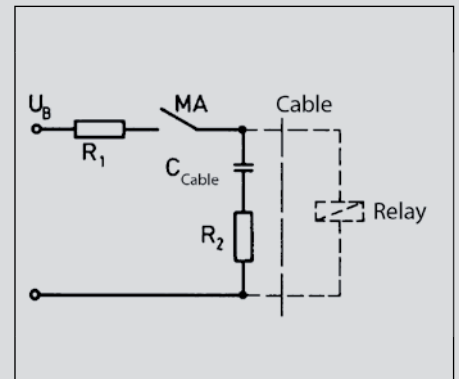
Generally, the RC element is connected in parallel to the contact and therefore in series to the load (vice versa is also possible).

2. Capacitive loads

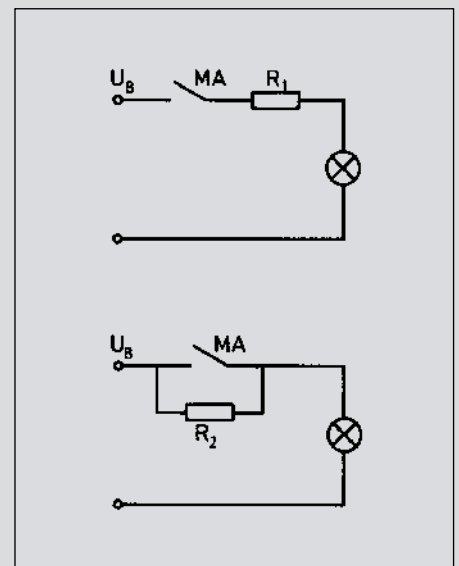
In contrast to inductive loads, increase making currents can occur in connection with capacitive loads and lamp loads that can damage and even weld contacts closed. When capacitors are switched (e.g. cable capacitance) a very high peak current occurs with its intensity depending on the capacitance and length of the cable leading to the switch.

A resistor connected in series to the contact will reduce this current. The size of the resistor is determined by the characteristics of the corresponding electric circuit. It should, however, be as large as possible to reduce the current to a permissible value, thus ensuring reliable contact protection.

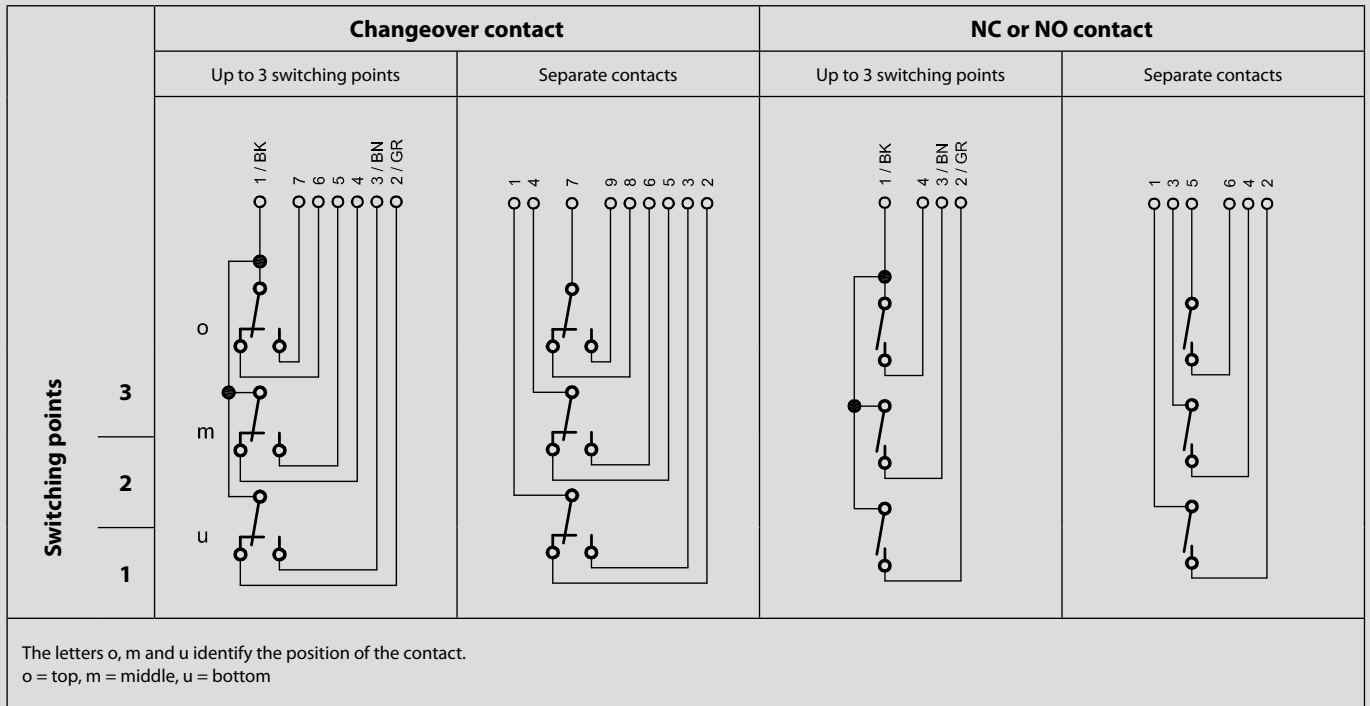
Contact protection with resistors for limiting current:



1) Capacitive load




2) Lam load

Wiring diagram


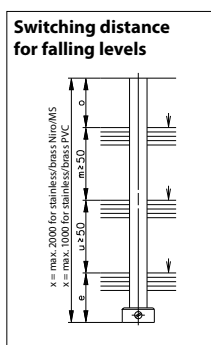
Standard float switches

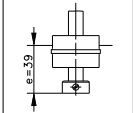
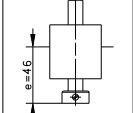
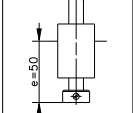
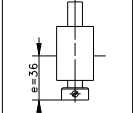
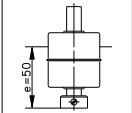
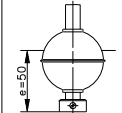
Ordering example:
See Page 118

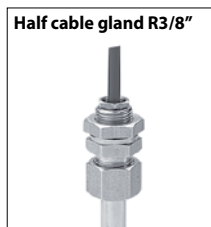
Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Float switch – float combination	
Type	M	A		-

Min./max. dimensions

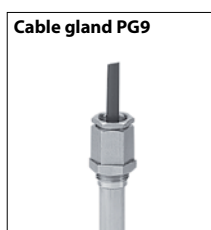
Float switch – float combination



Float material	POM ø 40 x 27	PVC ø 42 x 44	PP ø 30 x 44	NBR ø 30 x 44	1.4571 ø 45 x 47	1.4571 ø 52
Connection head material						
Float switch material						



1.4571	1.4571	A	V	T	R	N	E
MS 59	MS63	M	L	C	S	P	F
PVC	PVC	K	D	I	U	—	—




1.4571	1.4571	A	V	T	R	N	E
MS 58	MS63	M	L	C	S	P	F
PVC	PVC	K	D	I	U	—	—



PC	1.4571	A	V	T	R	N	E
PC	MS63	M	L	C	S	P	F
PC	PVC	K	D	I	U	—	—

Standard float switches

Ordering example:
See Page 118

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Float switch – float combination	
Type	M	A		-

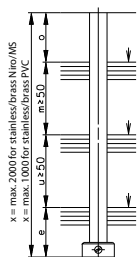
Min./max. dimensions



Float switch – float combination



Switching distance for falling levels

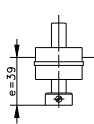


Float material

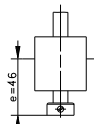
Connection head material

Float switch material

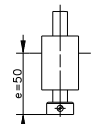
POM
ø 40 x 27



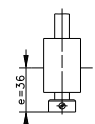
PVC
ø 42 x 44



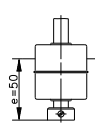
PP
ø 30 x 44



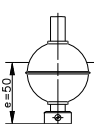
NBR
ø 30 x 44



1.4571
ø 45 x 47



1.4571
ø 52



Oval flange with connector



PC	1.4571	A	V	T	R	N	E
PC	MS63	M	L	C	S	P	F
PC	PVC	K	D	I	U	—	—

Flange enclosure ø 78



G-AI Si 12	1.4571	A	V	T	R	N	E
G-AI Si 12	MS63	M	L	C	S	P	F
G-AI Si 12	PVC	K	D	I	U	—	—


Flange enclosure ø 120



G-AI Si 12	1.4571	A	V	T	R	N	E
G-AI Si 12	MS63	M	L	C	S	P	F
G-AI Si 12	PVC	K	D	I	U	—	—

Standard float switches

Ordering example:
See Page 118

Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Float switch – float combination	
Type	M	A		-

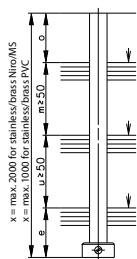
Min./max. dimensions



Float switch – float combination



Switching distance for falling levels

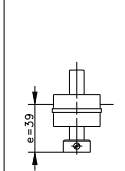


Float material

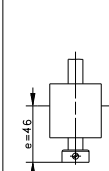
Connection head material

Float switch material

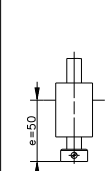
POM
ø 40 x 27



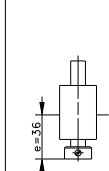
PVC
ø 42 x 44



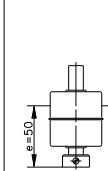
PP
ø 30 x 44



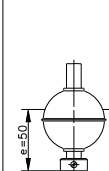
NBR
ø 30 x 44



1.4571
ø 45 x 47



1.4571
ø 52



Flange enclosure DN50
ø 165



1.4571/
G-Al Si 12

1.4571

A

V

T

R

N

E

PVC/
G-Al Si 12

PVC

K

D

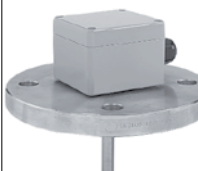
I

U

—

—

Flange enclosure DN65
ø 185



1.4571/
G-Al Si 12

1.4571

A

V

T

R

N

E

PVC/
G-Al Si 12

PVC

K

D

I

U

—

—

Tank cable gland R1,5"



G-Al Si 12

1.4571

A

V

T

R

N

E

PVC/
Polyester

PVC

K

D


I


U

—

—

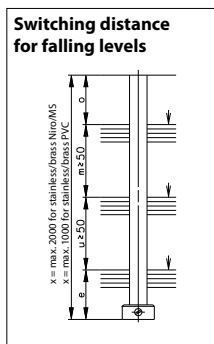
Standard float switches

Ordering example: 
MAK-721 KR2S

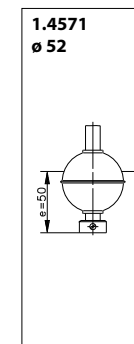
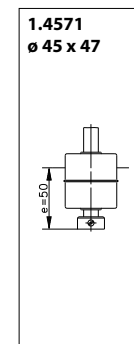
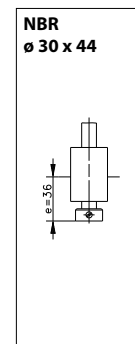
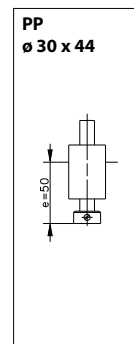
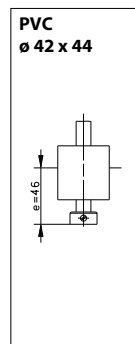
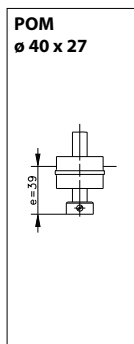
Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Float switch – float combination	
Type	M	A		-


Min./max. dimensions

Float switch – float combination



Float material	
Connection head material	Float switch material



1.4571/ G-Al Si 12	1.4571	A	V	T	R	N	E
PVC/ Polyester	PVC		D	I	U	—	—

With specification $o = \text{---}$; $u = \text{---}$ (see Order form on Page 134)

Miniature float switches

Ordering example:
See Page 118

Position	1	2	3
Version	Miniature float switches	Float	
Type	MS		-

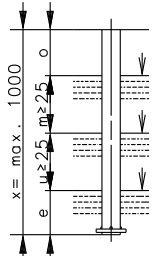
Min./max. dimensions

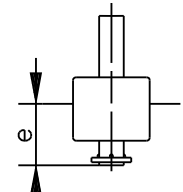
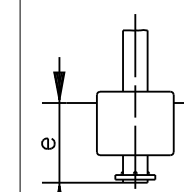
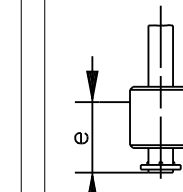
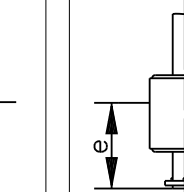
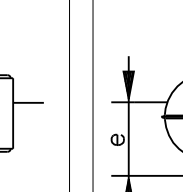


Float



Switching distance
for falling levels



PP ϕ 25 x 21  e = 20 (NC contact) e = 17 (NO contact)	PVC ϕ 25 x 21  e = 26 (NC contact) e = 23 (NO contact)	NBR ϕ 20 x 20  e = 23 (NC contact) e = 23 (NO contact)	NBR ϕ 23 x 25  e = 28 (NC contact) e = 22 (NO contact)	1.4571 ϕ 30  e = 24 (NC contact) e = 23 (NO contact)
---	--	--	---	--

Connection thread
R1/8"



K1	K2	K3	K4	N1
K1	K2	K3	K4	N1
K1	—	K3	K4	—
—	K2	K3	K4	—

Connection thread
R3/8"







K1	K2	K3	K4	N1
K1	K2	K3	K4	N1
K1	—	K3	K4	—
—	K2	K3	K4	—

Connection thread
R3/8" with connector



K1	K2	K3	K4	N1
K1	K2	K3	K4	N1
K1	—	K3	K4	—
—	K2	K3	K4	—

4	5	6	7	8	9	10
Enclosure material		Connection head		Switching function		Special features (see Page 119)
	-		-			

Enclosure material

Connection head

Switching function


Ni (stainless) = 1.4571

MS (brass) = MS63

PP = Polypropylene

PVC = Polyvinyl chloride

Version

S = NO contact (250 V- 0.5 A- 10 VA)
max. = 10 VA

O = NC contact (100 V; 0.3 A; 3 VA)

U = Changeover contact
(100 V; 0.3 A; 3 VA)

X = max. overall length (mm)

Max. number of switching points

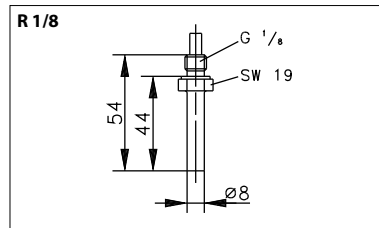
Cable length (m)

Ni

MS

PP

PVC



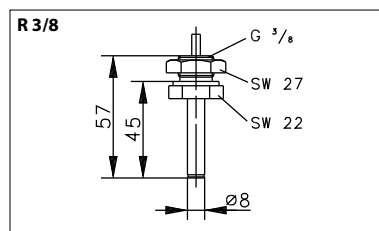
S	O	U	1000	3	1
S	O	U	1000	3	1
S	O	U	40,5	1	1
S	O	U	500	3	1

Ni

MS

PP

PVC



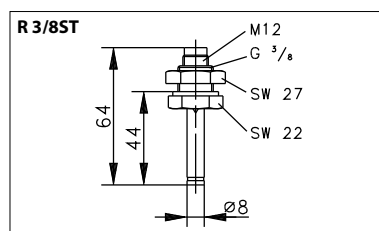
S	O	U	1000	3	1
S	O	U	1000	3	1
S	O	U	40,5	1	1
S	O	U	500	3	1

Ni

MS

PP

PVC



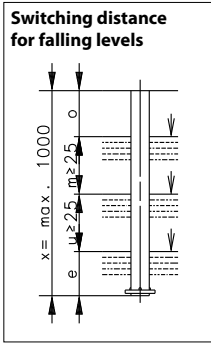
S	O	U	1000	3	—
S	O	U	1000	3	—
PP			40,5	1	—
PVC			500	3	—

Miniature float switches

Ordering example:
See Page 118

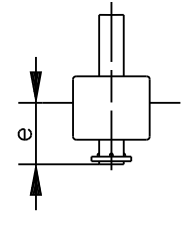
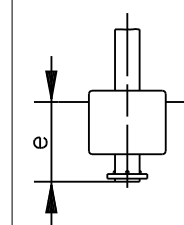
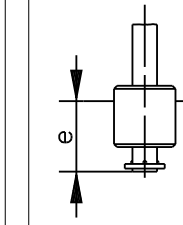
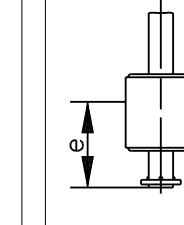
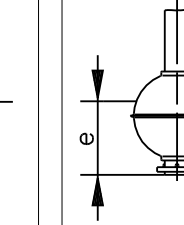
Position	1	2	3
Version	Miniature float switches	Float	
Type	MS		-

Min./max. dimensions



Float



<p>PP ø 25 x 21</p>  <p>e = 20 (NC contact) e = 17 (NO contact)</p>	<p>PVC ø 25 x 21</p>  <p>e = 26 (NC contact) e = 23 (NO contact)</p>	<p>NBR ø 20 x 20</p>  <p>e = 23 (NC contact) e = 23 (NO contact)</p>	<p>NBR ø 23 x 25</p>  <p>e = 28 (NC contact) e = 22 (NO contact)</p>	<p>1.4571 ø 30</p>  <p>e = 24 (NC contact) e = 23 (NO contact)</p>
--	---	---	--	---

Connection thread PG7







K1	K2	K3	K4	N1
K1	K2	K3	K4	N1
K1	—	K3	K4	—
—	K2	K3	K4	—

MSKS-PA-FL36-0S



—	—	—	—	—
---	---	---	---	---

4	5	6	7	8	9	10
Enclosure material		Connection head		Switching function		Special features (see Page 119)
	-		-			

Enclosure material

Connection head

Switching function

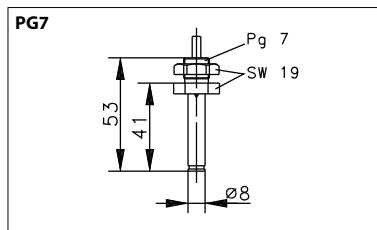

Ni (stainless) = 1.4571
 MS (brass) = MS63
 PP = Polypropylene
 PVC = Polyvinyl chloride

Version

S = NO contact (250 V- 0.5 A- 10 VA)
 max. = 10 VA
O = NC contact (100 V; 0.3 A; 3 VA)
U = Changeover contact
 (100 V; 0.3 A; 3 VA)

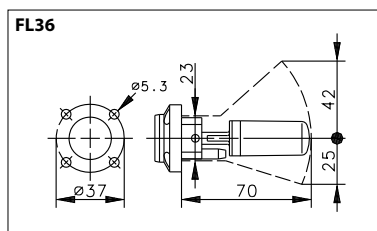
X = max. overall length (mm)
Max. number of switching points
Cable length (m)

Ni
 MS
 PP
 PVC





S	O	U	1000	3	1
S	O	U	1000	3	1
S	O	U	40,5	1	1
S	O	U	500	3	1

PA12
 (Enclosure & float)

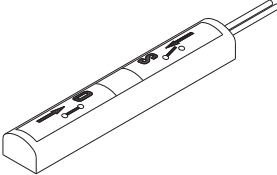
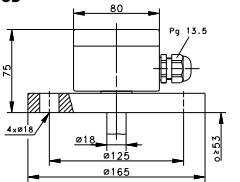
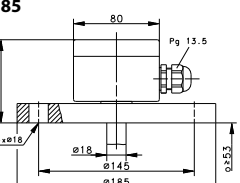
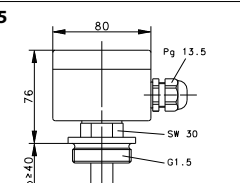




S O —
 (with 1 m cable)

For lateral mounting

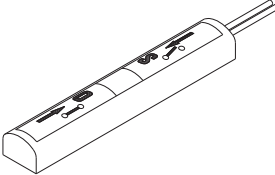
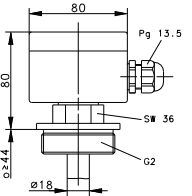
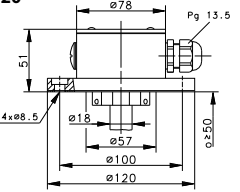
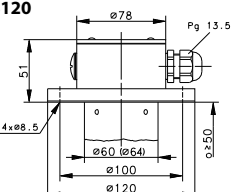
5	6	7	8
Adjustable	Connection head		Length
VST		/	

Important! Please order switching devices without switching modules separately!

Connection head	Length	Switching module	Max. number of switching modules/switching devices		
↓	↓	↓			
Version	Other lengths (mm) on request	 NC/NO contact Bistable Changeover contact	NC/NO contact Lengths 250 mm 500 mm 750 mm 1000 mm	Changeover contact Lengths 250 mm 500 mm 750 mm 1000 mm	
FL165 	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
FL185 	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
R1,5 	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3
	250 / 500 / 750 / 1000	4910007069	4916007075	2 / 3 / 4 / 4	2 / 3 / 3 / 3

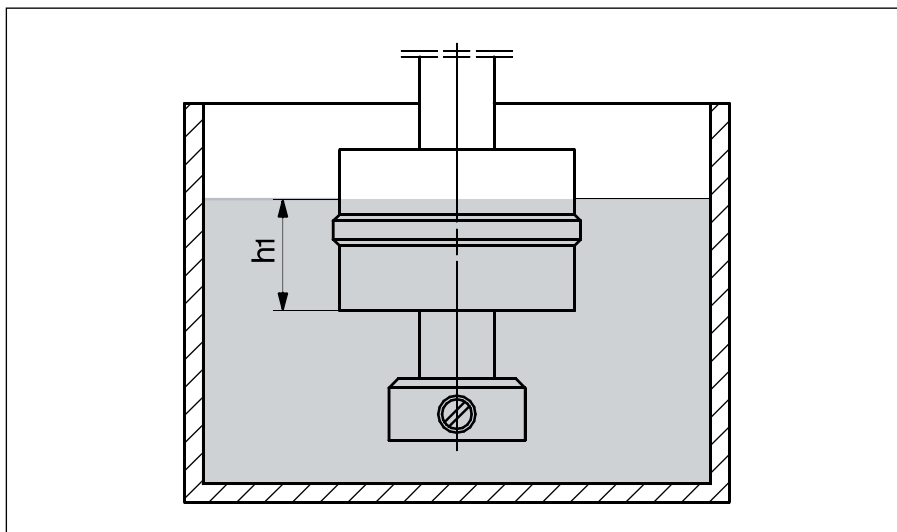
5	6	7	8
Adjustable	Connection head		Length
VST		/	

Important! Please order switching devices without switching modules separately!

Connection head	Length	Switching module	Max. number of switching modules/switching devices		
↓	↓	↓			
Version	Other lengths (mm) on request	 NC/NO contact Bistable Changeover contact	NC/NO contact Lengths 250 mm 500 mm 750 mm 1000 mm	Changeover contact Lengths 250 mm 500 mm 750 mm 1000 mm	
R2 	250 / 500 / 750 / 1000 250 / 500 / 750 / 1000 250 / 500 / 750 / 1000	4910007069 4910007069 4910007069	4916007075 4916007075 4916007075	2 / 3 / 4 / 4 2 / 3 / 4 / 4 2 / 3 / 4 / 4	2 / 3 / 3 / 3 2 / 3 / 3 / 3 2 / 3 / 3 / 3
FL120 	250 / 500 / 750 / 1000 250 / 500 / 750 / 1000 250 / 500 / 750 / 1000	4910007069 4910007069 4910007069	4916007075 4916007075 4916007075	2 / 3 / 4 / 4 2 / 3 / 4 / 4 2 / 3 / 4 / 4	2 / 3 / 3 / 3 2 / 3 / 3 / 3 2 / 3 / 3 / 3
FLS120 	250 / 500 / 750 / 1000 250 / 500 / 750 / 1000 250 / 500 / 750 / 1000	4910007069 4910007069 4910007069	4916007075 4916007075 4916007075	2 / 3 / 4 / 4 2 / 3 / 4 / 4 2 / 3 / 4 / 4	2 / 3 / 3 / 3 2 / 3 / 3 / 3 2 / 3 / 3 / 3

Range of Floats

Floats Standard Float Switches



ID letter	A/M/K
Dimensions (mm)	Ø 40 x 27
Material	POM

Immersion depth h1 (mm)	Density y (g/cm ³)
18	1
20	0.9
22,5	0.8
26	0.7

Art. No.: 4945206009



ID letter	T/C/I
Dimensions (mm)	Ø 30 x 44
Material	PP

Immersion depth h1 (mm)	Density y (g/cm ³)
27,5	1
30,5	0.9
34,5	0.8
39,5	0.7

Art. No.: 4945203019



ID letter	R/S/U
Dimensions (mm)	Ø 30 x 44
Material	NBR

Immersion depth h1 (mm)	Density y (g/cm ³)
19,5	1
22	0.9
24,5	0.8
28	0.7

Art. No.: 4945203031



ID letter	V/L/D
Dimensions (mm)	Ø 42 x 44
Material	PVC

Immersion depth h1 (mm)	Density y (g/cm ³)
25	1
27,5	0.9
30,5	0.8
35	0.7

Art. No.: 4945215029



ID letter	N/P
Dimensions (mm)	Ø 44 x 45
Material	1.4571

Immersion depth h1 (mm)	Density y (g/cm ³)
32	1
35	0.9
39	0.8
45	0.7

Art. No.: 4942104002



ID letter	E/F
Dimensions (mm)	Ø 52
Material	1.4571

Immersion depth h1 (mm)	Density y (g/cm ³)
32	1
34	0.9
37	0.8
43	0.7

Art. No.: 4942105003



ID letter	B/O
Dimensions (mm)	Ø 62
Material	1.4571

Immersion depth h1 (mm)	Density y (g/cm ³)
33	1
35	0.9
38	0.8
42	0.7

Art. No.: 4942102001



ID letter	G/H
Dimensions (mm)	Ø 84
Material	1.4571

Immersion depth h1 (mm)	Density y (g/cm ³)
33	1
35	0.9
38	0.8
42	0.7


Art. No.: 4942101004



Floats

Adjustable Float Switches

ID letter	V/L/D
Dimensions (mm)	Ø 52 x 55
Material	PVC
Immersion depth h1 (mm)	Density y (g/cm³)
29	1
32	0.9
36	0.8
42	0.7
Art. No.: 4945216032	




ID letter	N/P
Dimensions (mm)	Ø 52 x 55
Material	1.4571
Immersion depth h1 (mm)	Density y (g/cm³)
33	1
36	0.9
40,5	0.8
46	0.7
Art. No.: 4942299023	




Floats

Miniature Float Switches


ID letter	K1
Dimensions (mm)	Ø 25 x 21
Material	PP
Immersion depth h1 (mm)	Density y (g/cm³)
12	1
13	0.9
14,5	0.8
16,5	0.7
Art. No.: 4945207021	



ID letter	K2
Dimensions (mm)	Ø 25 x 21
Material	PVC
Immersion depth h1 (mm)	Density y (g/cm³)
15	1
16	0.9
18,5	0.8
-	0.7
Art. No.: 4945207022	




ID letter	K4
Dimensions (mm)	Ø 23 x 25
Material	NBR
Immersion depth h1 (mm)	Density y (g/cm³)
16	1
17,5	0.9
19,5	0.8
22	0.7
Art. No.: 4945211024	



ID letter	K3
Dimensions (mm)	Ø 20 x 20
Material	NBR
Immersion depth h1 (mm)	Density y (g/cm³)
15	1
17	0.9
-	0.8
-	0.7
Art. No.: 4945210020	



ID letter	N1
Dimensions (mm)	Ø 30
Material	1.4571
Immersion depth h1 (mm)	Density y (g/cm³)
18	1
19	0.9
21	0.8
24	0.7
Art. No.: 4942109018	



Standard Float switches



Electrical data

Switching function
Contact ID letter
Switching voltage (max)
Switching current (max)
Switching power (max)

Changeover/NC/NO contacts

K
250 V AC/DC
0.5 A
30 VA

Changeover/NC/NO contacts

L (min. Switching power 3 VA)
250 V AC/DC
1 A
60 VA

Mechanical data

Container connection options

Flange enclosure RD 120 mm	Flange enclosure RD 120 mm
Flange enclosure RD 77 mm	Flange enclosure RD 77 mm
Flange enclosure RD 165 mm	Flange enclosure RD 165 mm
Flange enclosure RD 185 mm	Flange enclosure RD 185 mm
Cable gland PG9	Cable gland PG9
Cable gland R3/8"	Cable gland R3/8"
Cable gland R1/5" with connector DIN 43650	Cable gland R1/5" with connector DIN 43650
Oval flange 75 x 50 mm with connector DIN 43650	Oval flange 75 x 50 mm with connector DIN 43650

Float switch material

Stainless steel 1.4571	Stainless steel 1.4571
Brass MS63	Brass MS63
PVC	PVC

Float variants

A/M/K Cylinder float	RD 40 x 27 mm (POM)	A/M/K Cylinder float	RD 40 x 27 mm (POM)
T/C/I Cylinder float	RD 30 x 44 mm (PP)	T/C/I Cylinder float	RD 30 x 44 mm (PP)
V/D Cylinder float	RD 42 x 44 mm (NBR)	V/D Cylinder float	RD 42 x 44 mm (NBR)
R/S Cylinder float	RD 30 x 44 mm (NBR)	R/S Cylinder float	RD 30 x 44 mm (NBR)
N/P Cylinder float	RD 44 x 45 mm (stainless steel)	N/P Cylinder float	RD 44 x 45 mm (stainless steel)
E/F Ball float	RD 52 mm (stainless steel)	E/F Ball float	RD 52 mm (stainless steel)
B/O Ball float	RD 62 mm (stainless steel)	B/O Ball float	RD 62 mm (stainless steel)
G/H Ball float	RD 84 mm (stainless steel)	G/H Ball float	RD 84 mm (stainless steel)

Ambient conditions

Protection class (DIN 40050)
Temperature range
Pressure

IP65 (up to IP68 on request)	IP65 (up to IP68 on request)
-5 °C to +70 °C (from -30 °C to +150 °C on request)	-5 °C to +70 °C (from -30 °C to +150 °C on request)
5 bar (up to 25 bar on request)	5 bar (up to 25 bar on request)

Miniature Float Switches



Electrical data

Switching function	Changeover/NC contacts	Changeover/NC/NO contacts
Contact ID letter	B	X
Switching voltage (max)	250 V AC/DC	100 V AC/DC
Switching current (max)	0.5 A	0.3 A
Switching power (max)	10 VA	3 VA

Mechanical data

Container connection options	Cable gland PG7	Cable gland PG7
	Cable gland R1/8"	Cable gland R1/8"
	Cable gland R3/8"	Cable gland R3/8"
	Cable gland R3/8" with connector	Cable gland R3/8" with connector

Float switch material	Stainless steel 1.4571	Stainless steel 1.4571
	PP	PP
	PVC	PVC
	Brass MS63	Brass MS63

Float variants	K1	Cylinder float	RD 25 x 20 mm (PP)	K1	Cylinder float	RD 25 x 20 mm (PP)
	K2	Cylinder float	RD 25 x 20 mm (PVC)	K2	Cylinder float	RD 25 x 20 mm (PVC)
	K3	Cylinder float	RD 20 x 20 mm (NBR)	K3	Cylinder float	RD 20 x 20 mm (NBR)
	K4	Cylinder float	RD 23 x 25 mm (NBR)	K4	Cylinder float	RD 23 x 25 mm (NBR)
	N1	Ball float	RD 30 mm (stainless steel)	N1	Ball float	RD 30 mm (stainless steel)

Ambient conditions

Protection class (DIN 40050)	IP65 (up to IP68 on request)	IP65 (up to IP68 on request)
Temperature range	-5 °C to +70 °C (from -30 °C to +150 °C on request)	-5 °C to +70 °C (from -30 °C to +150 °C on request)
Pressure	5 bar (up to 15 bar on request)	5 bar (up to 15 bar on request)

Adjustable Float Switches



Electrical data

Contact ID letter	P	L
Switching module, type designation	REEDK. KPL. F. MA	REEDK. KPL. F. MA
Article number	4910007069	4910007075
Switching function	NC/NO contact (bi)	Changeover contact (bi)
Switching voltage (max)	250 V AC/DC	250 V AC/DC
Switching current (max)	5 A	1 A
Switching power (max)	250 VA	60 VA

Mechanical data

Container connection options	Flange DN 50 (PVC/stainless steel)	Flange DN 50 (PVC/stainless steel)
	Flange DN 65 (PVC/stainless steel)	Flange DN 65 (PVC/stainless steel)
	Cable gland R1.5" (PVC/stainless steel)	Cable gland R1.5" (PVC/stainless steel)
	Cable gland R2" (PVC/stainless steel)	Cable gland R2" (PVC/stainless steel)
	Flange enclosure RD 120 mm (also available with gush water tube)	Flange enclosure RD 120 mm (also available with gush water tube)

Float switch material	Stainless steel 1.4571	Stainless steel 1.4571
	Brass MS63	Brass MS63
	PVC	PVC

Float variants	N/P Cylinder float RD 52 x 55 mm (stainless steel)	N/P Cylinder float RD 52 x 55 mm (stainless steel)
	V/D/L Cylinder float RD 52 x 55 mm (PVC)	V/D/L Cylinder float RD 52 x 55 mm (PVC)

Ambient conditions

Protection class (DIN 40050)	IP65 (up to IP68 on request)	IP65 (up to IP68 on request)
Temperature range	-5 °C to +70 °C (from -30 °C to +150 °C on request)	-5 °C to +70 °C (from -30 °C to +150 °C on request)
Pressure	5 bar (up to 15 bar on request)	5 bar (up to 15 bar on request)

Chemical Resistance

Float switch materials at +20 °C

Chemical substance	Conc. in %	POM	PP	NBR	PVC	Brass MS63 1.4571	
Acetone	100	+	+	U	U	+	+
Aluminium sulphate	10	/	+	+	+	U	+
Aluminium chloride	10	/	+	+	+	U	+
Formic acid	85	+	+	U	+	U	+
Ammonia	10	+	+	U	O	U	+
Aniline	100	/	+	U	U	O	+
Ethyl acetate	100	O	O	U	U	+	+
Ethyl ether	100	+	+	U	/	+	+
Ethylene chloride	100	/	U	U	U	/	+
Benzine	100	+	U	+	+	+	+
Benzene	100	+	U	O	U	+	+
Boric acid	10	/	+	+	+	+	+
Butyl acetate	100	+	O	U	U	/	+
Calcium chloride	10	+	+	+	+	U	+
Chlorobenzene	100	+	+	U	U	/	+
Chlorine water	-	/	+	U	O	U	+
Chloroform	100	/	U	U	U	+	+
Chromic acid	10	O	+	U	+	U	+
Ferrous chloride	10	O	+	+	+	U	U
Acetic acid	10	+	+	U	+	U	+
Acetic acid	80	O	+	U	+	U	+
Formaldehyde	20	+	+	+	+	O	+
Glycerine	90	+	+	+	+	+	+
Urea	10	/	+	+	+	/	+
Iodine	-	/	+	+	U	/	+
Potassium bichromate	5	/	+	O	+	U	+
Potassium nitrate	10	/	+	+	+	/	+
Potassium permanganate	1	+	+	O	+	/	+
Copper sulphate	10	/	/	+	+	U	+
Magnesium chloride	10	/	+	+	+	U	+
Methylene chloride	100	U	U	U	O	/	+
Lactic acid	10	+	+	O	+	O	+
Mineral oil	100	+	+	+	+	+	+
Sodium bisulphite	10	/	+	U	O	U	+
Sodium carbonate	10	+	+	+	+	O	+
Sodium chloride	10	+	+	+	+	O	+
Sodium sulphate	10	/	+	+	+	+	+
Oxalic acid	40	/	O	U	+	O	O
Phenol, aqueous	10	U	+	U	+	/	+
Phosphoric acid	10	+	+	O	+	U	+
Mercury	100	/	+	+	+	U	+
Mercuric chloride	5	/	+	+	O	U	+
Nitric acid	65	U	U	U	+	U	+
Nitric acid	10	U	O	U	+	U	+
Hydrochloric acid	10	U	+	U	+	U	U
Hydrochloric acid	2	U	+	U	+	U	U
Carbon disulphide	100	+	U	U	U	+	+
Sulphuric acid	10	+	+	+	+	U	+
Sulphuric acid	98	U	O	U	O	U	+
Hydrogen sulphide	2	/	+	+	+	O	+
Soap solution	1	+	+	+	+	+	+
Carbon tetrachloride	100	+	U	U	O	+	+
Trichloroethylene	100	O	O	U	U	O	+
Wine	-	/	+	+	+	O	+
Zinc chloride	10	/	+	+	+	U	+

+ = Resistant

The material remains fully resistant to the medium or is minimally affected. The effect of pressure and temperature changes on the materials must be taken into account.

O = Conditionally resistant

The material is affected by the medium; sealing materials swell. Application may be possible if concentration, pressure, temperature, service life or other influencing factors are restricted.

U = Non-resistant

The material may not be used in the specified medium or at the given temperature unless under very clearly defined preconditions.

/ = No data available

Enquiry and Order Form Float Switches

Enquiry

Date: _____

Order

Receiver

BERNSTEIN AG
Tieloser Weg 6
D-32457 Porta Westfalica

Telephone: +49-(0)571/793-0
Fax: +49-(0)571/793-555
info@de.bernstein.eu

Sender

Company: _____

Customer No.: _____

Contact: _____

Department: _____

Street: _____

Town: _____

Telephone: _____

Fax: _____

E-mail: _____

Operational environment

Medium: _____ Temperature: from _____ °C to _____ °C

Pressure: min. _____ bar max. _____ bar

One-off Batch order Sample

Batch size: _____ pcs.

Annual quantity: _____ pcs.

Electrical data

Voltage: _____ V AC DC Current: _____ A

Power: min. _____ VA max. _____ VA

Technical data

Cable length*: _____ m Separate contacts

Mounting: From top From bottom From side

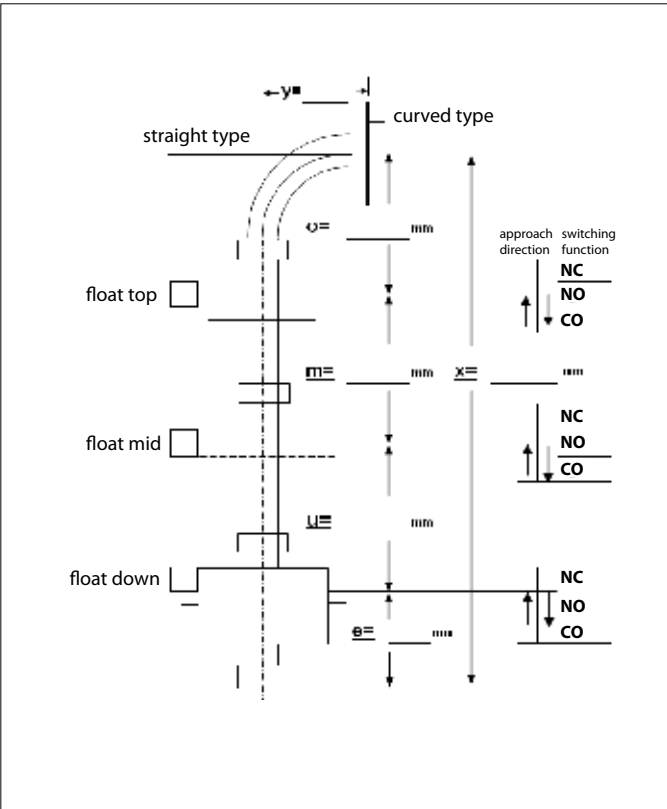
*Standard 1 m

Type

1	2	3	4	5	6	7	8	9	10	11	12	13		

Special features

Remarks



Magnets

1. Hard ferrite magnets

Barium and strontium hard ferrites are economically priced, reliable components that are also widely used in automation, control and measurement applications. When operated in high temperature ranges, the specified switching distance will decrease by a factor of 0.2 % per 1 °C.

Chemical properties:

Ferrite magnets are oxide ceramics. They are made of approx. 80 % iron oxide and 20 % barium oxide or strontium oxide. The magnets are resistant to a large number of chemicals, including solvents, caustic solutions and weak acids. If strong organic and inorganic acids, e.g. hydrochloric, sulphuric and hydrofluoric acid, are used, their resistance will basically be determined by the temperature, concentration and reaction time of the medium. In general, the resistance should first be determined by means of long-term tests.

Mechanical properties:

Due to their ceramic characteristic, ferrites are brittle and sensitive to shock and bending loads.

2. Rare-earth magnets

Permanent magnets made from samarium cobalt and neodymium iron boron are high performance and high quality components that are widely used in drive and control engineering. When operated in high temperature ranges, the specified switching distance will decrease by a factor of 0.02 % per 1 °C.

Chemical properties:

All rare-earth magnets are metallic materials and show the corresponding characteristics associated with these materials, e.g. the polished shine immediately after being machined. The magnets are surface-treated (e.g. nickel coating) to protect them from environmental influences.

Mechanical properties:

Minor chips may occur if rare-earth magnets are subjected to impact stress. They respond very sensitively to vibrations and may become demagnetised.



3. Plastic-bound magnets

Plastic-bound permanent magnets have an attractive price-performance ratio and thanks to the way they are formed they can be produced with complex geometries.

Injection-moulded magnets are typical composite materials. The magnetic powder is embedded in thermoplastic materials (polyamides). One of the main advantages of plastic-bound magnets is that they can be formed into a diverse range of shapes.

Chemical properties:

Surface corrosion can rarely be found on plastic bound magnets. For this reason, they can be used in most fields of application without additional coating.

Mechanical properties:

Plastic-bound magnets can be subjected to buckling and bending without breaking or chipping.

Use in potentially explosive atmospheres

Magnets must not be used in potentially explosive atmospheres as they can cause sparks. Grinding dust and chips from rare-earth magnets are self-igniting and burn off at high temperatures. They should therefore only be machined using ample water and never in dry conditions since even dried grinding dust can ignite.

Strong magnetic fields

Strong magnetic fields can interfere with or even damage electronic or mechanical equipment. This includes cardiac pace-makers. Appropriate safety distances are specified in the corresponding manuals or may be requested from the manufacturers.

Radioactive radiation

Permanent magnets must not be exposed to long-term radioactive radiation otherwise they may lose their magnetism.

Effects on persons

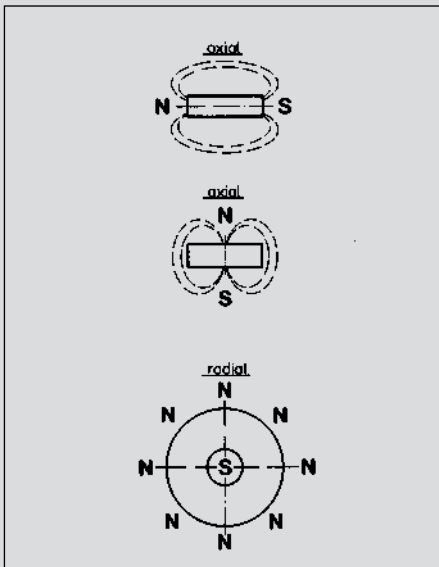
There are no known side-effects caused by touching magnet materials.

Magnet shapes

Rectangular, circular and cylindrical magnets are the most common shapes of permanent magnets manufactured in a press-shaping process. In addition to these standard geometries, permanent magnets may be manufactured in many other shapes. The shape should preferably be defined during the pressing process since subsequent shaping can only be performed using complex diamond tools. Holes and openings can only be made in the pressing direction.

Directions of magnetisation

The term preferred direction refers to the alignment of the magnetic crystals in a certain direction. The magnet achieves its highest magnetic values in this preferred direction and must therefore be magnetised in this direction.



The preferred direction is achieved by subjecting the magnetic powder to a strong external magnetic field (coil) during the pressing process. As magnets have no preferred direction, the magnetisation direction and type can be freely selected.

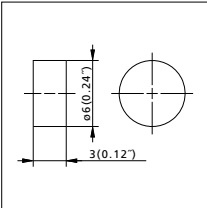
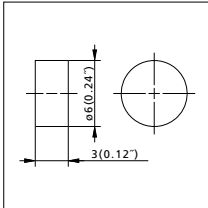
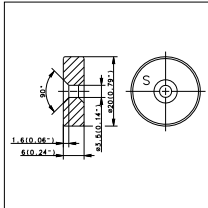
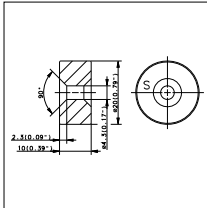
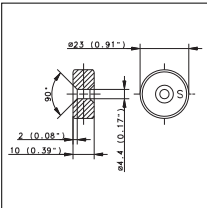
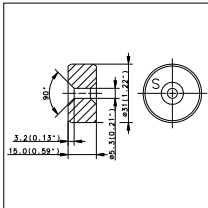
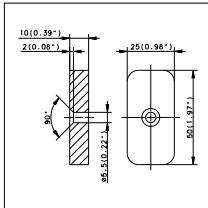
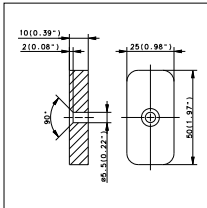
Mounting a magnetic switch system on ferromagnetic materials

The nominal distance may be reduced when magnetic limit switches and their actuating magnets are mounted on magnetisable material (Fe, etc.). To ensure trouble-free operation, a minimum gap of 15 mm between the magnetic switch and any material that can be magnetised should be maintained as a reference value. The same applies to the actuating magnets.





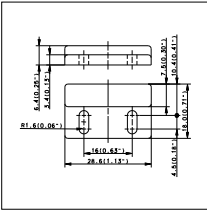
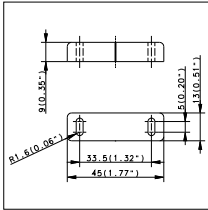
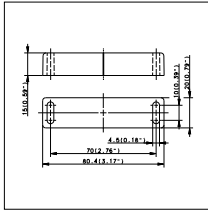
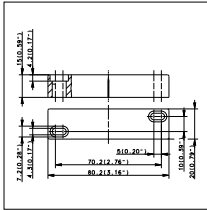



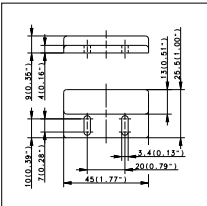
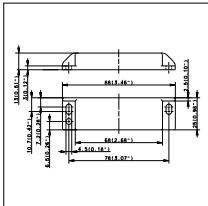
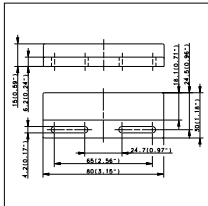
Applications

- Counting
- Position indication in lifts
- End position switches in pneumatic and hydraulic installations
- Position indication on butterfly valves, slide valves and valves in general
- Conveyors in high-bay shelving
- Position detection in textile, packaging and meat cutting machines
- Machine runtime and downtime monitoring
- Control of machine tools
- Level monitoring of liquids (see Float Switches)




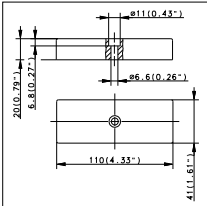
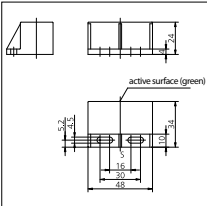
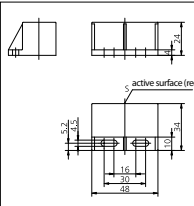



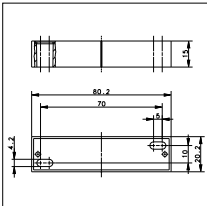
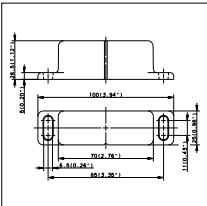
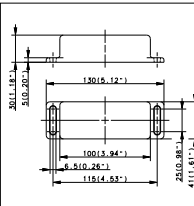
Actuating Magnets without Encapsulation

Actuating magnets without encapsulation	T-75	T-06N/S	T-61N/S	T-67N/S
Magnet material	Rare-earth	Neodymium iron boron (NdFeB)	Barium ferrite	Barium ferrite
Temperature range (magnetic switch operation)	-40 °C ... +150 °C -40 °F ... +302 °F	-40 °C ... +150 °C -40 °F ... +302 °F	-40 °C ... +150 °C -40 °F ... +302 °F	-40 °C ... +150 °C -40 °F ... +302 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K	0.2 %/K
Enclosure material	-	-	-	-
Article number	6301175057	6301106065	6301261035	6301167054
Dimensioned drawing				
		Marking slots on north pole side		
Actuating magnets without encapsulation	T-62N/S	T-69N/S	T-68N	T-68S
Magnet material	Barium ferrite	Barium ferrite	Barium ferrite	Barium ferrite
Temperature range (magnetic switch operation)	-40 °C ... +150 °C -40 °F ... +302 °F	-40 °C ... +150 °C -40 °F ... +302 °F	-40 °C ... +150 °C -40 °F ... +302 °F	-40 °C ... +150 °C -40 °F ... +302 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K	0.2 %/K
Enclosure material	-	-	-	-
Article number	6301262039	6301269031	6301268028	6301368033
Dimensioned drawing				
			90° countersink on north pole side	90° countersink on south pole side




Actuating Magnets in Plastic Enclosure

Actuating magnets in plastic enclosure	TK-11-11	TK-11-01	TK-21-02	TK-21-12
				
Magnet material	AlNiCo-500	AlNiCo-500	AlNiCo-500	AlNiCo-500
Temperature range (magnetic switch operation)	-20 °C ... +80 °C -4 °F ... +176 °F	-20 °C ... +80 °C -4 °F ... +176 °F	-20 °C ... +80 °C -4 °F ... +176 °F	-20 °C ... +80 °C -4 °F ... +176 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K	0.2 %/K
Enclosure material	PA 6.6	PA 6.6	PA 6.6	PA 6.6
Article number	6302111047	6303111001	6303121002	6302121030
Dimensioned drawing				
Actuating magnets in plastic enclosure	TK-45	TK-42	TK-44	
				
Magnet material	AlNiCo-500	AlNiCo-500	AlNiCo-500	
Temperature range (magnetic switch operation)	-20 °C ... +80 °C -4 °F ... +176 °F	-20 °C ... +80 °C -4 °F ... +176 °F	-20 °C ... +80 °C -4 °F ... +176 °F	
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K	
Enclosure material	PA 6.6	PA 6.6	PA 6.6	
Article number	6302145048	6302142049	6302144050	
Dimensioned drawing				

Actuating Magnets

Actuating magnets in plastic enclosure	TK-50	TK-57N	TK-57S
			
Magnet material	Barium ferrite	Barium ferrite	Barium ferrite
Temperature range (magnetic switch operation)	-20 °C ... +80 °C -4 °F ... +176 °F	-20 °C ... +80 °C -4 °F ... +176 °F	-20 °C ... +80 °C -4 °F ... +176 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K
Enclosure material	PA 6.6	PBT	PBT
Article number	6302100053	6302257060	6302357061
Dimensioned drawing			
Actuating magnets in metal enclosure	TA-21-02	TA-31	TA-33
			
Magnet material	AlNiCo-500	AlNiCo-500	Barium ferrite
Temperature range (magnetic switch operation)	-40 °C ... +150 °C -40 °F ... +302 °F	-20 °C ... +80 °C -4 °F ... +176 °F	-20 °C ... +80 °C -4 °F ... +176 °F
Temperature coefficient	0.2 %/K	0.2 %/K	0.2 %/K
Enclosure material	Al	Al	Al
Article number	6305121064	6303131005	6303133034
Dimensioned drawing			

Connectors

Cable connector M8 x 1	M8	M8	M8
Contact assignments 1 = Brown 2 = Black 3 = Blue			
Cable material	PVC	PVC	PVC
Coupler material	TPU	PUR	PUR
Coupling ring material	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Temperature range	-25/+90 °C	-25/+90 °C	-25/+90 °C
Switching function	PNP/LED	Universal	Universal
Cable structure	3 x 0.25 mm ²	3 x 0.25 mm ²	3 x 0.25 mm ²
Protection class	IP67	IP68	IP68
Article number			
2.5 m	4139100213	4139100795	4139100798
5 m	4139100216	4139100796	4139100799
10 m		4139100797	4139100800

Cable connector M12 x 1	M12 3-wire	M12 3-wire	M12 4-wire	M12 4-wire
Contact assignments 1 = Brown 2 = White 3 = Blue 4 = Black				
Cable material	PVC	PVC	PVC	PUR
Coupler material	PUR	PUR	PA	PUR
Coupling ring material	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Temperature range	-25/+90 °C	-25/+90 °C	-25/+90 °C	-25/+90 °C
Switching function	Universal	Universal	Universal	PNP/LED
Cable structure	3 x 0.34 mm ²	3 x 0.34 mm ²	4 x 0.25 mm ²	4 x 0.25 mm ²
Protection class	IP68	IP68	IP68	IP67
Article number				
2.5 m	4139100801	4139100804	4139100903	4139100244
5 m	4139100802	4139100468	4139100467	4139100245
10 m	4139100803	4139100805		4139100254

Cable connector M12 x 1	M12 Ultralock	M12 Ultralock	M12	M12
Contact assignments 1 = Brown 2 = White 3 = Blue 4 = Black				
Cable material	PVC	PVC	-	-
Coupler material	PUR	PUR	PA	PA
Coupling ring material	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Temperature range	-25/+90 °C	-25/+90 °C	-25/+90 °C	-25/+90 °C
Switching function	Universal	Universal	Universal	Universal
Cable structure	3 x 0.34 mm ²	3 x 0.34 mm ²	-	-
Protection class	IP68	IP68	IP67	IP67
Article number	4139100899	4139100906	4139100102	4139100101
2.5 m				
5 m				
10 m				

Cable connector M12 x 1	M12 3-wire	M12 5-wire
Contact assignments 1 = Brown 2 = White 3 = Blue 4 = Black		
Cable material	PVC	PUR
Coupler material	TPU	PUR
Coupling ring material	CuZn39Pb3	CuZn39Pb3
Temperature range	-25/+90 °C	-25/+90 °C
Switching function	PNP/LED	Universal
Cable structure	3 x 0.4 mm ²	5 x 0.34 mm ²
Protection class	IP68	IP68
Article number	4139100553	4139100956
2.5 m	4139100554	
5 m		
10 m		

Reflectors

Triple reflectors are best suited for the purpose of reflecting light in light barrier systems. Reflective films are only used as a second choice alternative. Triple reflectors are designed as small, pyramid-shaped triple mirrors, joined to provide a reflection surface. Three pyramid-shaped mirror surfaces joined at 90° reflect the incident light three times on one mirror surface. They reflect the light beam by 180° back in the source direction. Vibration, slight movement and displacement up to 30° with respect to the optical axis of the triple reflector do not interrupt the light beam.

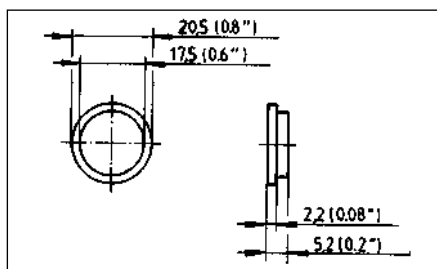
A reflective film can also be tilted or displaced. In this case, in contrast to the triple reflector, the degree of reflection diminishes considerably as such films use small mirrors together with micro glass pearls to reflect light. An advantage of reflective film, however, is its flexibility in installation. Although its reflection quality can be improved by means of a triple structure in the film, it still does not match the degree of reflection achieved by a triple reflector. In general, a plane mirror must not be displaced. The angle of incidence of the light beam directed at such mirrors must precisely correspond to the angle of reflection about the optical axis to ensure effective reflection in the light barrier receiver (optoelectric sensor).

The specified ranges of the reflection light barriers refer to the RTS-083 KK and RTS-060 KK reflector. Essentially, the size of the reflector should be selected according to the sensing range and the size of the object to be detected. The object should ideally be larger than the reflector so that it completely covers the reflector.

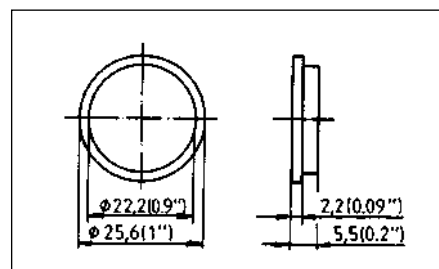
Example: OR20RS

Reflector	Range
RTS-D17 KK	3.2 m
RTS-D22 KK	3.5 m
RTS-D32 KK	4.0 m
RTS-D83 KK	8.0 m
RTS-60 KK	8.0 m
RFS-100 KK	6.0 m
RTS-120 KK	3.5 m
RTS-500 KK	7.0 m

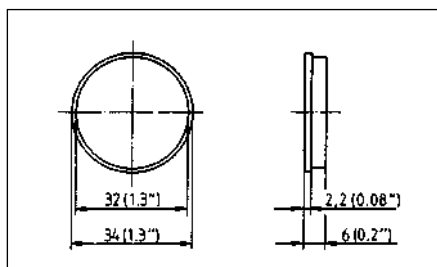
Ranges of other reflection light barriers available on request.



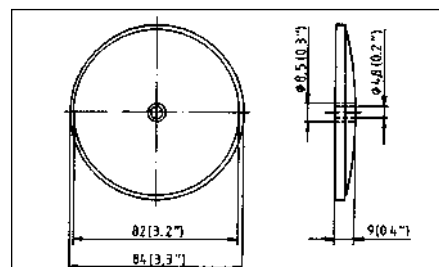
Type designation	RTS-D17 KK
Article number	6572108008
Diameter	17,5 mm



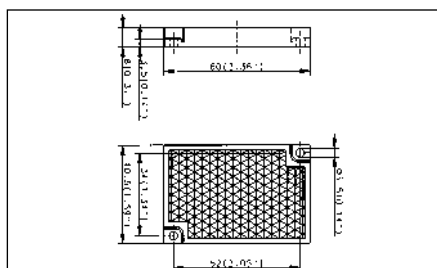
Type designation	RTS-D22 KK
Article number	6572109009
Diameter	22 mm



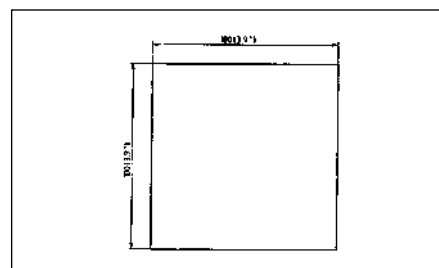
Type designation	RTS-D32 KK
Article number	6572110010
Diameter	32 mm



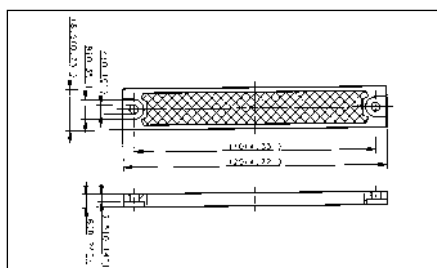
Type designation	RTS-D83 KK
Article number	6572107003
Diameter	83 mm



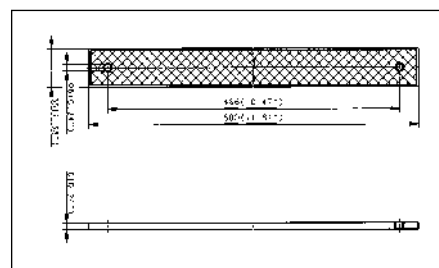
Type designation	RTS-60 KK
Article number	6572100007
Structure	60 x 41 mm



Type designation	RFS-100 KK
Article number	6572300001
Structure	100 x 100 mm Self-adhesive film



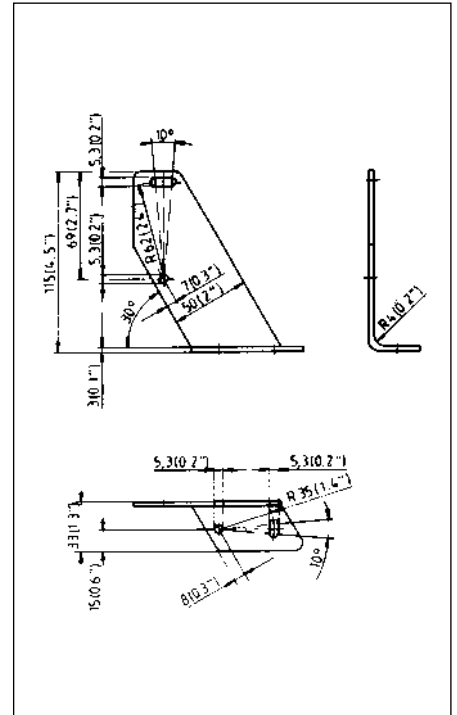
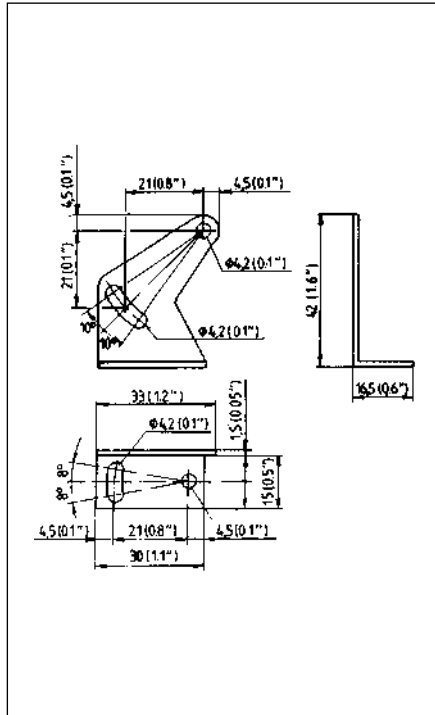
Type designation	RTS-120 KK
Article number	6572100006
Structure	120 x 18 mm



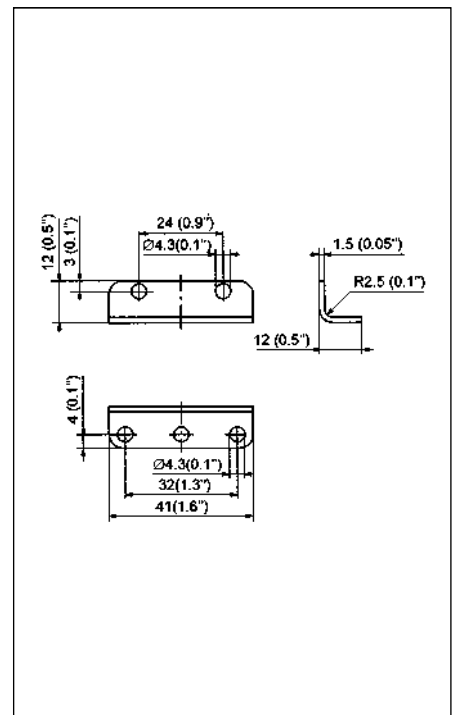
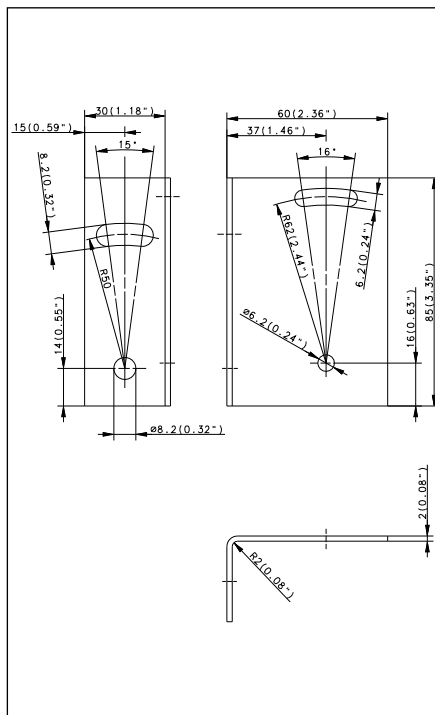
Type designation	RTS-500 KK
Article number	6572100002
Structure	500 x 35 mm Plastic

Mounting Material

Other mounting brackets available on request.

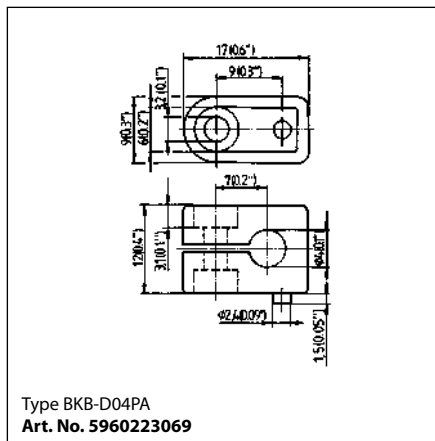


Type designation	BWN-L05ST KPL	BWN-L20NI KPL
Article number	6571300003	6571200002

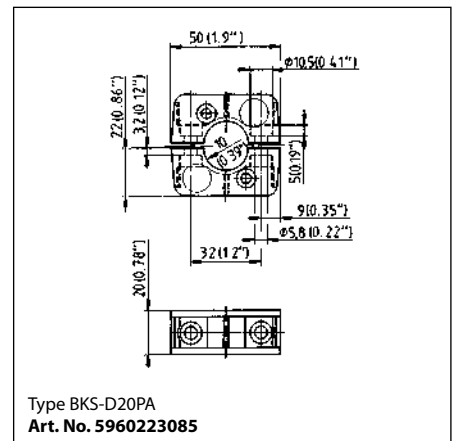


Type designation	BWN-L20NI KPL	BWN-L12AL KPL
Article number	6571200007	6571500006

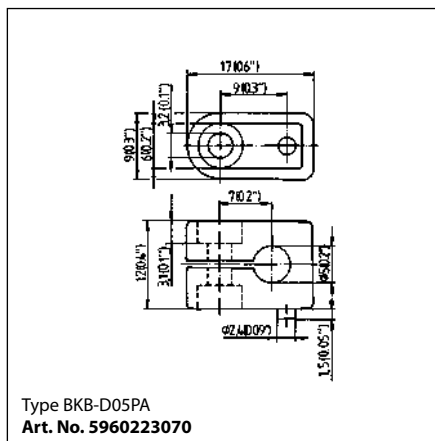
Mounting Brackets



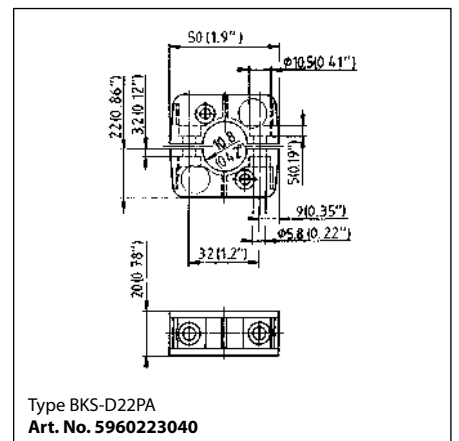
Type BKB-D04PA
Art. No. 5960223069



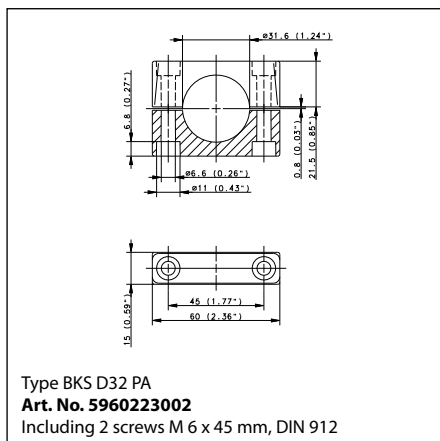
Type BKS-D20PA
Art. No. 5960223085



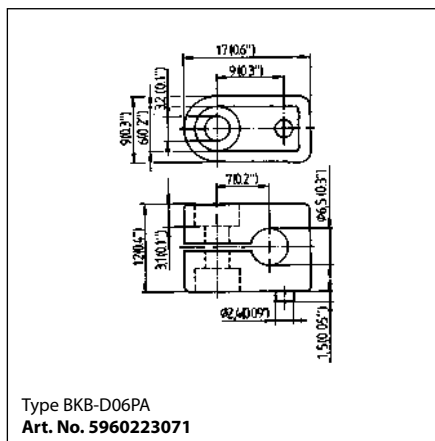
Type BKB-D05PA
Art. No. 5960223070



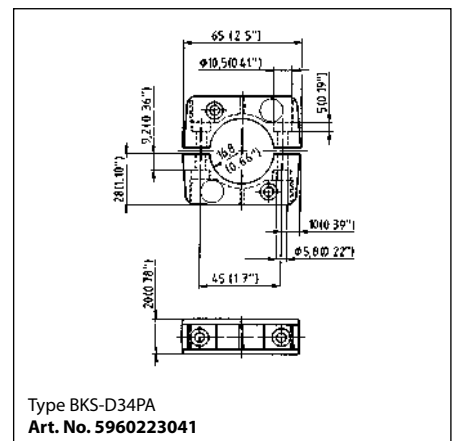
Type BKS-D22PA
Art. No. 5960223040



Type BKS D32 PA
Art. No. 5960223002
Including 2 screws M 6 x 45 mm, DIN 912



Type BKB-D06PA
Art. No. 5960223071



Type BKS-D34PA
Art. No. 5960223041

Sensor Tester



Technical data

Type designation	Sensor Tester
Article number	6510000048
Function	Sensor tester for DC 2-wire and 3-wire proximity switches Test function: Checking and indicating the switching status of a sensor with visual and acoustic signal
Power supply	9 V block battery (6LR61)
Output voltage	15 VDC, 20 mA stabilised
Enclosure	Modified enclosure of Series OR20
Temperature range	min/max -25 °C/+70 °C
Input signals	NPN/PNP 3-wire, DC 2-wire, NAMUR

The sensor tester is used for checking 2-wire and 3-wire DC proximity switches. Coloured LEDs and an acoustic signal are used to indicate the switching statuses.

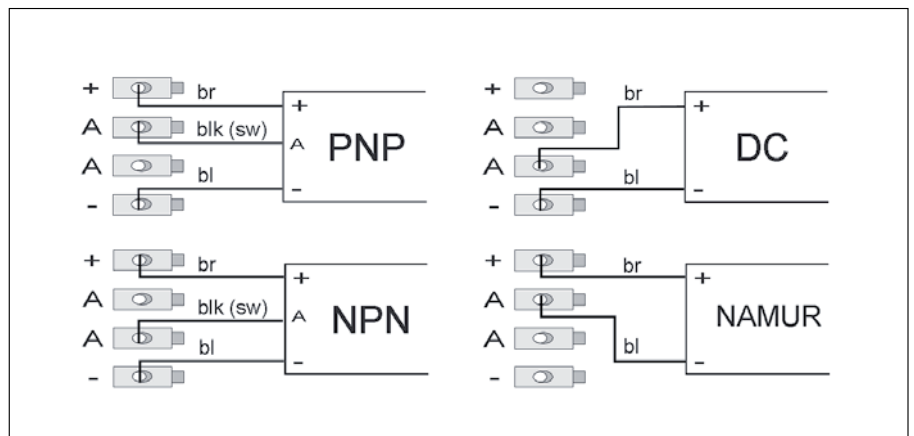
Green LED: Operating voltage

Red LED: Low battery

Yellow LED: Sensor switching status

When not in use, the sensor tester switches off automatically after approx. 30 s.

Connection assignments



Inductive Sensors

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	+
K	I	N	-	T	1	2	N	S	/	0	0	4	-	K	L	2			
Product group			Type of enclosure				Output		Sensing distance				Options						

Product group		
1	K	Non-contact proximity switch
2	I	Inductive
3	B	Flush mount
	N	Non-flush mount
	R	Ring sensor
4	-	Dash (fixed)
Type of enclosure		
5	M	Metric thread (metal enclosure)
	T	Metric thread (plastic enclosure)
	D	Round enclosure (metal)
	R	Round enclosure (plastic)
	Q	Cuboid enclosure (metal)
	P	PG thread (metal)
	E	Rectangular enclosure (plastic)
	S	Slot proximity switch (plastic)
	N	Standard mounting (to DIN 50025/50037)
	C	Compact enclosure
6 – 7		Two-digit number for:
		Round types = Ø as specified
		Threaded types = standard designation
		Rectangular types = consecutive type numbers

Design examples		
	D08	Ø 8 mm (metal)
	R22	Ø 22 mm (plastic)
	M12	Threaded barrel M12 x 1
Rectangular and other types		
	E16	16 x 5 x 5 mm
	E27	27 x 10 x 5.5 mm
	E28	28 x 16 x 11 mm
	E40	40 x 26 x 12 mm
	E50	50 x 25 x 10 mm
	E68	68 x 30 x 15 mm
	G00	Tube thread, general
	N44	41.5 x 41.5 x 120 mm
	Q05	5 x 5 x 25 mm
	Q08	8 x 8 x 40 mm, Side active
	Q12	12 x 12 x 55 mm

Output		
8	P	PNP
	N	NPN
	A	AC 2-wire
	E	NAMUR
	Z	DC 2-wire
	R	Relay
	G	Push-pull
	D	Dual output stage (NPN/PNP selectable)
9	S	NO contact
	Ö	NC contact
	P	Programmable
	A	Analogue
	U	Antivalent (selectable)
10	/	Slash (fixed)
Sensing distance		
11 – 13	z. B. 1.5	1.5 mm
	z. B. 002	2.0 mm
	z. B. 040	40 mm
14	-	Dash (fixed)
Options		
15 – 17		See type code "OPTIONS"

Inductive Sensors (sort by type designation)

Type	Art. No.	Page	Type	Art. No.	Page	Type	Art. No.	Page
KIB-D03PÖ/0,6-KL2PU	6502799007	14	KIB-M12PS/002-KLSM8V	6502943008	19	KIN-E50PÖ/008-KL2	6502790002	35
KIB-D03PS/0,6-KL2PU	6502999019	14	KIB-M12PS/002-KS12V	6502943006	19	KIN-E50PS/008-KL2	6502990003	35
KIB-D04NS/0,8-KL2PU	6502399004	14	KIB-M12PS/004-KL2E	6502903025	20	KIN-E50PS/008-KLSM8	6502990006	35
KIB-D04PÖ/0,8-KL2PU	6502799002	14	KIB-M12PS/004-KL2VE	6502903023	20	KIN-E60PÖ/008-KLSM8	6602799048	35
KIB-D04PS/0,8-KL2PU	6502999004	14	KIB-M12PS/004-KLS12E	6502943015	20	KIN-E68NÖ/007-KL6	6502156058	36
KIB-D06NS/1,5-KL2	6502399009	14	KIB-M18AÖ/005-L2	6503405001	22	KIN-E68PS/007-KL2	6502956076	36
KIB-D06PÖ/1,5-KL2	6502799011	14	KIB-M18AS/005-L2	6503505004	22	KIN-M08EA/002-2	6501601005	18
KIB-D06PS/1,5-K2VPU	6502999034	15	KIB-M18EA/005-2	6501626762	24	KIN-M08PS/002-KL2	6502916003	17
KIB-D06PS/1,5-KL2	6502999010	14	KIB-M18NÖ/005-KL2	6932105001	22	KIN-M08PS/002-KLSM8	6502942006	17
KIB-D06PS/1,5-KL5V	6602999460	15	KIB-M18NS/005-KLS12	6932305004	23	KIN-M08PS/002-KS12	6502942008	17
KIB-D06PS/1,5-KLSM8	6502999012	14	KIB-M18NS/005-KLS12U	6502305013	24	KIN-M12AÖ/004-L2	6503404001	20
KIB-E16PS/1,5-K2PU	6502985002	33	KIB-M18PÖ/005-KL2	6932705001	22	KIN-M12AS/004-L2	6503504001	20
KIB-E27NS/1,5-KL2PU	6502393001	33	KIB-M18PÖ/005-KLSD	6502705001	23	KIN-M12EA/004-2	6501625761	22
KIB-E27PS/1,5-KL2PU	6502993001	33	KIB-M18PÖ/005-KS12V	6502705007	23	KIN-M12NÖ/004-KL2	6932104001	20
KIB-E28PÖ/002-KL2	6502773002	33	KIB-M18PS/005-KL2	6932905001	22	KIN-M12NS/004-KL2	6932304001	20
KIB-E28PÖ/002-KLSM8	6502773001	33	KIB-M18PS/005-KL2PUT	6502905023	24	KIN-M12NS/004-KL2V	6502304007	21
KIB-E28PS/002-KL2	6502973001	33	KIB-M18PS/005-KL6V	6502905013	23	KIN-M12NS/004-KLS12	6932344001	21
KIB-E28PS/002-KLSM8	6502973002	33	KIB-M18PS/005-KLS12	6932905004	23	KIN-M12NS/004-KLS12U	6502344010	21
KIB-E40AÖ/002-L2	6503484003	34	KIB-M18PS/005-KLS12T	6502940006	24	KIN-M12NS/008-KLS12E	6602344458	22
KIB-E40AS/002-L2	6503584004	34	KIB-M18PS/005-KLS12U	6502905026	24	KIN-M12PÖ/004-KL2	6932704001	20
KIB-E40PÖ/002-KL2	6502784006	34	KIB-M18PS/005-KLSD	6602905662	23	KIN-M12PÖ/004-KLS12	6502744003	21
KIB-E40PS/002-KL2	6502984023	34	KIB-M18PS/005-KLSDV	6502940001	23	KIN-M12PS/004-KL2	6932904001	20
KIB-E40PS/002-KLSM8	6502984025	34	KIB-M18PS/005-KS12V	6502905012	23	KIN-M12PS/004-KL2F	6502904010	21
KIB-E50NS/005-KL2	6502390001	35	KIB-M18PS/008-KL2E	6502905022	25	KIN-M12PS/004-KL2V	6502904014	21
KIB-E50PS/005-KL2	6502990001	35	KIB-M18PS/008-KL2VE	6502905010	25	KIN-M12PS/004-KLS12	6932944001	21
KIB-E50PS/005-KLSM8	6502990005	35	KIB-M18PS/008-KLS12E	6502940005	25	KIN-M12PS/004-KLS12U	6502944015	21
KIB-M04PÖ/0,6-KL2PU	6502799008	15	KIB-M18PS/008-KS12V	6502906009	25	KIN-M12PS/004-KS12V	6502944006	21
KIB-M04PS/0,6-KL2PU	6502999020	15	KIB-M18PU/005-KSDV	6502840002	23	KIN-M12PS/008-KL2E	6502904021	22
KIB-M05EA/001-2	6501699008	15	KIB-M18PU/008-KSDVE	6602840128	25	KIN-M12PS/008-KLS12E	6502944013	22
KIB-M05NS/001-KL2PU	6502399003	15	KIB-M30AÖ/010-L2	6503407240	28	KIN-M12ZS/004-L2	6501304001	21
KIB-M05PÖ/001-KL2PU	6502799001	15	KIB-M30AÖ/010-LSD	6503435959	29	KIN-M18AÖ/008-L2	6503406001	25
KIB-M05PÖ/001-KLSM8	6502799019	15	KIB-M30AS/010-L2	6503507378	28	KIN-M18AS/008-L2	6503506002	25
KIB-M05PS/001-KL2PU	6502999003	15	KIB-M30AS/010-LSD	6503535960	29	KIN-M18EA/008-2	6501627763	27
KIB-M05PS/001-KLSM8	6502999018	15	KIB-M30EA/010-2	6501699012	30	KIN-M18NS/008-KL2	6932306001	25
KIB-M08EA/1,5-2	6501601003	17	KIB-M30PÖ/010-KL2V	6502707001	28	KIN-M18NS/008-KL2V	6502306004	26
KIB-M08NS/1,5-KL2	6932301001	16	KIB-M30PS/010-KL2	6932907001	28	KIN-M18NS/008-KLS12	6932306004	26
KIB-M08NS/1,5-KL2T	6502301006	17	KIB-M30PS/010-KL2PUT	6502907013	29	KIN-M18NS/008-KLS12U	6502306011	27
KIB-M08NS/1,5-KLSM8	6932342001	16	KIB-M30PS/010-KL2V	6502907003	28	KIN-M18PA/008-2	6502006001	27
KIB-M08PÖ/1,5-KL2	6502701001	16	KIB-M30PS/010-KLS12	6932907002	28	KIN-M18PA/008-S12	6602006111	27
KIB-M08PÖ/1,5-KLSM8	6502742001	16	KIB-M30PS/010-KLS12T	6502939006	29	KIN-M18PÖ/008-KL2	6932706001	25
KIB-M08PS/1,5-KL2	6932901001	16	KIB-M30PS/010-KLS12U	6502907014	29	KIN-M18PÖ/008-KL2V	6502706002	26
KIB-M08PS/1,5-KL2T	6502901008	17	KIB-M30PS/010-KLSD	6502939001	29	KIN-M18PÖ/008-KLS12	6932706002	26
KIB-M08PS/1,5-KL6	6502901004	16	KIB-N40PS/015-KLS12	6502988001	36	KIN-M18PÖ/008-KLSD	6502741001	27
KIB-M08PS/1,5-KLSM8	6932942001	16	KIB-Q08NS/1,5-K2	6502380001	32	KIN-M18PS/008-KL2	6932906001	25
KIB-M08PS/1,5-KLSM8T	6502942013	17	KIB-Q08PÖ/1,5-K2	6502780001	32	KIN-M18PS/008-KL2V	6502906006	26
KIB-M08PS/1,5-KS12	6502942007	16	KIB-Q08PÖ/1,5-KLSM8	6502780002	32	KIN-M18PS/008-KLS12	6932906004	26
KIB-M12AÖ/002-L2	6503403001	18	KIB-Q08PS/1,5-K2	6502980004	32	KIN-M18PS/008-KLS12U	6502906021	27
KIB-M12AS/002-L2	6503503001	18	KIB-Q08PS/1,5-K2T	6602980087	32	KIN-M18PS/008-KLSD	6502941001	27
KIB-M12EA/002-2	6501624760	19	KIB-Q08PS/1,5-KLSM8	6502980002	32	KIN-M18PS/016-KL2E	6502906018	28
KIB-M12NÖ/002-KL2V	6502103003	18	KIB-Q12NS/004-KLSM8E	6502399021	33	KIN-M18PS/016-KLS12E	6502941004	28
KIB-M12NS/002-KL2	6932303001	18	KIB-Q12PS/004-KL2E	6502999028	33	KIN-M18PU/008-KSD	6602841421	27
KIB-M12NS/002-KL2V	6502303007	18	KIB-Q12PS/004-KLSM8E	6502999030	33	KIN-M18ZS/008-L2	6501306001	26
KIB-M12NS/002-KLS12	6932343001	18	KIB-T18AS/005-L2	6503520697	23	KIN-M30AS/015-L2,5	6503508246	30
KIB-M12NS/002-KLS12U	6502343009	19	KIB-T18PS/005-KL2	6502920990	23	KIN-M30NS/015-KL2	6502308001	30
KIB-M12PÖ/002-KL2V	6502703005	18	KIB-T30PÖ/010-KL2	6502722708	29	KIN-M30NS/015-KLS12	6602308459	30
KIB-M12PÖ/002-KLS12	6602743112	18	KIB-T30PP/010-KLSD	6502822862	29	KIN-M30PA/015-2	6502008001	31
KIB-M12PÖ/002-KS12V	6502743005	19	KIN-E40AÖ/004-L2	6503484004	35	KIN-M30PS/015-KL2	6932908001	30
KIB-M12PS/002-KL2	6932903001	18	KIN-E40AS/004-L2	6503584005	35	KIN-M30PS/015-KL2	6502908002	30
KIB-M12PS/002-KL2F	6502903012	19	KIN-E40PÖ/004-KL2	6502784007	34	KIN-M30PS/015-KLS12	6932908002	30
KIB-M12PS/002-KL2T	6502903026	19	KIN-E40PÖ/004-KLSM8	6502784008	35	KIN-M30PS/015-KLS12U	6502908008	31
KIB-M12PS/002-KL2V	6502903016	18	KIN-E40PS/004-KL2	6502984024	34	KIN-M30PS/015-KLSD	6502935001	31
KIB-M12PS/002-KLS12	6932943001	18	KIN-E40PS/004-KLSM8	6502984026	35	KIN-M30PS/040-KL2E	6502908009	31
KIB-M12PS/002-KLS12U	6502943017	19	KIN-E50NS/008-KL2	6502390002	35	KIN-M30PU/015-KL2	6502808001	30

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6501306001	KIN-M18ZS/008-L2	26	6502903023	KIB-M12PS/004-KL2VE	20	6502990006	KIN-E50PS/008-KLSM8	35
6501601003	KIB-M08EA/1,5-2	17	6502903025	KIB-M12PS/004-KL2E	20	6502993001	KIB-E27PS/1,5-KL2PU	33
6501601005	KIN-M08EA/002-2	18	6502903026	KIB-M12PS/002-KL2T	19	6502999003	KIB-M05PS/001-KL2PU	15
6501624760	KIB-M12EA/002-2	19	6502904010	KIN-M12PS/004-KL2F	21	6502999004	KIB-D04PS/0,8-KL2PU	14
6501625761	KIN-M12EA/004-2	22	6502904014	KIN-M12PS/004-KL2V	21	6502999010	KIB-D06PS/1,5-KL2	14
6501626762	KIB-M18EA/005-2	24	6502904021	KIB-M12PS/008-KL2E	22	6502999012	KIB-D06PS/1,5-KLSM8	14
6501627763	KIN-M18EA/008-2	27	6502905010	KIB-M18PS/008-KL2VE	25	6502999018	KIB-M05PS/001-KLSM8	15
6501699008	KIB-M05EA/001-2	15	6502905012	KIB-M18PS/005-KS12V	23	6502999019	KIB-D03PS/0,6-KL2PU	14
6501699012	KIB-M30EA/010-2	30	6502905013	KIB-M18PS/005-KL6V	23	6502999020	KIB-M04PS/0,6-KL2PU	15
6502006001	KIN-M18PA/008-2	27	6502905022	KIB-M18PS/008-KL2E	25	6502999028	KIB-Q12PS/004-KL2E	33
6502008001	KIN-M30PA/015-2	31	6502905023	KIB-M18PS/005-KL2PUT	24	6502999030	KIB-Q12PS/004-KLSM8E	33
6502103003	KIB-M12NÖ/002-KL2V	18	6502905026	KIB-M18PS/005-KLS12U	24	6502999034	KIB-D06PS/1,5-K2VPU	15
6502156058	KIN-E68NÖ/007-KL6	36	6502906006	KIN-M18PS/008-KL2V	26	6502999036	KIR-N40PS/000-KL6	36
6502301006	KIB-M08NS/1,5-KL2T	17	6502906009	KIB-M18PS/008-KS12V	25	6503403001	KIB-M12AÖ/002-L2	18
6502303007	KIB-M12NS/002-KL2V	18	6502906018	KIN-M18PS/016-KL2E	28	6503404001	KIN-M12AÖ/004-L2	20
6502304007	KIN-M12NS/004-KL2V	21	6502906021	KIN-M18PS/008-KLS12U	27	6503405001	KIB-M18AÖ/005-L2	22
6502305013	KIB-M18NS/005-KLS12U	24	6502907003	KIB-M30PS/010-KL2V	28	6503406001	KIN-M18AÖ/008-L2	25
6502306004	KIN-M18NS/008-KL2V	26	6502907013	KIB-M30PS/010-KL2PUT	29	6503407240	KIB-M30AÖ/010-L2	28
6502306011	KIN-M18NS/008-KLS12U	27	6502907014	KIB-M30PS/010-KLS12U	29	6503421704	KIN-T18AÖ/008-L2	26
6502308001	KIN-M30NS/015-KL2	30	6502908002	KIN-M30PS/015-KL2	30	6503423955	KIN-T30AÖ/015-L2	31
6502343009	KIB-M12NS/002-KLS12U	19	6502908008	KIN-M30PS/015-KLS12U	31	6503435959	KIB-M30AÖ/010-LSD	29
6502344010	KIN-M12NS/004-KLS12U	21	6502908009	KIN-M30PS/040-KL2E	31	6503484003	KIB-E40AÖ/002-L2	34
6502380001	KIB-Q08NS/1,5-K2	32	6502915001	KIN-R34PP/020-KLSD	32	6503484004	KIB-E40AÖ/004-L2	35
6502390001	KIB-E50NS/005-KL2	35	6502916003	KIN-M08PS/002-KL2	17	6503503001	KIB-M12AS/002-L2	18
6502390002	KIN-E50NS/008-KL2	35	6502919001	KIN-T12PS/004-KL2	21	6503504001	KIN-M12AS/004-L2	20
6502393001	KIB-E27NS/1,5-KL2PU	33	6502920990	KIB-T18PS/005-KL2	23	6503505004	KIB-M18AS/005-L2	22
6502399003	KIB-M05NS/001-KL2PU	15	6502921975	KIN-T18PS/008-KL2	26	6503506002	KIN-M18AS/008-L2	25
6502399004	KIB-D04NS/0,8-KL2PU	14	6502923981	KIN-T30PS/015-KL2	31	6503507378	KIN-M30AS/010-L2	28
6502399009	KIB-D06NS/1,5-KL2	14	6502935001	KIN-M30PS/015-KLSD	31	6503508246	KIN-M30AS/015-L2,5	30
6502399021	KIB-Q12NS/004-KLSM8E	33	6502939001	KIB-M30PS/010-KLSD	29	6503520697	KIB-T18AS/005-L2	23
6502701001	KIB-M08PÖ/1,5-KL2	16	6502939006	KIB-M30PS/010-KLS12T	29	6503521705	KIN-T18AS/008-L2	26
6502703005	KIB-M12PÖ/002-KL2V	18	6502940001	KIB-M18PS/005-KLSDV	23	6503523956	KIN-T30AS/015-L2,5	31
6502705001	KIB-M18PÖ/005-KLSD	23	6502940005	KIB-M18PS/008-KLS12E	25	6503535960	KIB-M30AS/010-LSD	29
6502705007	KIB-M18PÖ/005-KS12V	23	6502940006	KIB-M18PS/005-KLS12T	24	6503584004	KIB-E40AS/002-L2	34
6502706002	KIN-M18PÖ/008-KL2V	26	6502941001	KIN-M18PS/008-KLSD	27	6503584005	KIN-E40AS/004-L2	35
6502707001	KIB-M30PÖ/010-KL2V	28	6502941004	KIN-M18PS/016-KLS12E	28	6602006111	KIN-M18PA/008-S12	27
6502722708	KIB-T30PÖ/010-KL2	29	6502942006	KIN-M08PS/002-KLSM8	17	6602308459	KIN-M30NS/015-KLS12	30
6502741001	KIN-M18PÖ/008-KLSD	27	6502942007	KIB-M08PS/1,5-KS12	16	6602344458	KIN-M12NS/008-KLS12E	22
6502742001	KIB-M08PÖ/1,5-KLSM8	16	6502942008	KIN-M08PS/002-KS12	17	6602743112	KIB-M12PÖ/002-KLS12	18
6502743005	KIB-M12PÖ/002-KS12V	19	6502942013	KIB-M08PS/1,5-KLSM8T	17	6602799048	KIB-E60PÖ/008-KLSM8	35
6502744003	KIN-M12PÖ/004-KLS12	21	6502943006	KIB-M12PS/002-KS12V	19	6602840128	KIB-M18PU/008-KSDVE	25
6502773001	KIB-E28PÖ/002-KLSM8	33	6502943008	KIB-M12PS/002-KLSM8V	19	6602841421	KIN-M18PU/008-KSD	27
6502773002	KIB-E28PÖ/002-KL2	33	6502943015	KIB-M12PS/004-KLS12E	20	6602905662	KIB-M18PS/005-KLSD	23
6502780001	KIB-Q08PÖ/1,5-K2	32	6502943017	KIB-M12PS/002-KLS12U	19	6602980087	KIB-Q08PS/1,5-K2T	32
6502780002	KIB-Q08PÖ/1,5-KLSM8	32	6502944006	KIN-M12PS/004-KS12V	21	6602999460	KIB-D06PS/1,5-KL5V	15
6502784006	KIB-E40PÖ/002-KL2	34	6502944013	KIN-M12PS/008-KLS12E	22	6932104001	KIN-M12NÖ/004-KL2	20
6502784007	KIN-E40PÖ/004-KL2	34	6502944015	KIN-M12PS/004-KLS12U	21	6932105001	KIB-M18NÖ/005-KL2	22
6502784008	KIN-E40PÖ/004-KLSM8	35	6502956076	KIN-E68PS/007-KL2	36	6932301001	KIB-M08NS/1,5-KL2	16
6502790002	KIN-E50PÖ/008-KL2	35	6502973001	KIB-E28PS/002-KL2	33	6932303001	KIB-M12NS/002-KL2	18
6502799001	KIB-M05PÖ/001-KL2PU	15	6502973002	KIB-E28PS/002-KLSM8	33	6932304001	KIN-M12NS/004-KL2	20
6502799002	KIB-D04PÖ/0,8-KL2PU	14	6502980002	KIB-Q08PS/1,5-KLSM8	32	6932305004	KIB-M18NS/005-KLS12	23
6502799007	KIB-D03PÖ/0,6-KL2PU	14	6502980004	KIB-Q08PS/1,5-K2	32	6932306001	KIN-M18NS/008-KL2	25
6502799008	KIB-M04PÖ/0,6-KL2PU	15	6502982001	KIN-N40PP/015-KLSD	36	6932306004	KIN-M18NS/008-KLS12	26
6502799011	KIB-D06PÖ/1,5-KL2	14	6502982003	KIN-N40PS/020-KLS12	36	6932342001	KIB-M08NS/1,5-KLSM8	16
6502799019	KIB-M05PÖ/001-KLSM8	15	6502984023	KIB-E40PS/002-KL2	34	6932343001	KIB-M12NS/002-KLS12	18
6502808001	KIN-M30PU/015-KL2	30	6502984024	KIN-E40PS/004-KL2	34	6932344001	KIN-M12NS/004-KLS12	21
6502822862	KIB-T30PP/010-KLSD	29	6502984025	KIB-E40PS/002-KLSM8	34	6932704001	KIN-M12PÖ/004-KL2	20
6502836860	KIN-T30PP/015-KLSD	31	6502984026	KIN-E40PS/004-KLSM8	35	6932705001	KIB-M18PÖ/005-KL2	22
6502840002	KIB-M18PU/005-KSDV	23	6502985002	KIB-E16PS/1,5-K2PU	33	6932706001	KIN-M18PÖ/008-KL2	25
6502901004	KIB-M08PS/1,5-KL6	16	6502988001	KIB-N40PS/015-KLS12	36	6932706002	KIN-M18PÖ/008-KLS12	26
6502901008	KIB-M08PS/1,5-KL2T	17	6502990001	KIB-E50PS/005-KL2	35	6932901001	KIB-M08PS/1,5-KL2	16
6502903012	KIB-M12PS/002-KL2F	19	6502990003	KIN-E50PS/008-KL2	35	6932903001	KIB-M12PS/002-KL2	18

Capacitive Sensors

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	+
K	C	N	-	T	1	2	N	S	/	0	0	4	-	K	L	P	2		
Product group			Type of enclosure				Output		Sensing distance				Options						

Product group		
1	K	Non-contact proximity switch
2	C	Capacitive
3	B	Flush mount
	N	Non-flush mount
4	-	Dash (fixed)
Type of enclosure		
5	M	Metric thread (metal enclosure)
	T	Metric thread (plastic enclosure)
	D	Round enclosure (metal)
	R	Round enclosure (plastic)
	Q	Cuboid enclosure (metal)
	P	PG thread (metal)
	E	Rectangular enclosure (plastic)
	N	Standard mounting (to DIN 50025/50037)
6-7		Two-digit number for:
		Round types = Ø as specified
		Threaded types = standard designation
		Rectangular types = consecutive type numbers

Design examples		
	12	12 Thread M12 x 1
	18	34 Ø 34 mm (metal/plastic)
	30	20 Ø 20 mm (plastic)
	32	(Euro standard enclosure)
	34	Ø 34 mm (metal/plastic)
	20	Ø 20 mm (plastic)
	22	Ø 22 mm (plastic)
	50	50 x 25 x 10 mm
	68	68 x 30 x 15 mm
	44	41.5 x 41.5 x 120 mm (Euro standard enclosure)
Output		
8	p	PNP
	N	NPN
	A	AC 2-wire
	E	NAMUR
	Z	DC 2-wire
	R	Relay
	G	Push-pull
	D	Dual output stage (NPN/PNP selectable)

Output		
9	S	NO contact
	Ö	NC contact
	P	Programmable
	A	Analogue
	U	Antivalent (selectable)
10	/	Slash (fixed)
Sensing distance		
11-13	e.g. 1.5	1.5 mm
	e.g. 002	2.0 mm
	e.g. 040	40 mm
14	-	Dash (fixed)
Options		
15-19		See type code "OPTIONS" (0850174076)

Optoelectronic Sensors

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
O	M	1	2	R	T	-	D	H	T	P	-	0	2	0	0	-	C	L	
Product group		Enclosure size		Operating principle			Type of voltage	Output				Sensing range					Type of connection	Options	

Product group		
1	O	Optoelectronic sensor
2	M	Metric brass enclosure
	N	Metric stainless steel enclosure
	T	Metric thermoplastic enclosure
	R	Rectangular type
	Z	Cylindrical type
Enclosure size details		
3 – 4	e.g. 12	M12
	e.g. 18	M18
	e.g. 20	Type 20
Operating principle		
5 – 6	ES	Through-beam sensor assy (set)
	EE	Receiver, through-beam sensor
	SE	Transmitter, through-beam sensor
	LC	Fibre optic switching amplifier (light barrier with fibre optic cable connection)
	RH	Diffuse-reflection sensor with background suppression
	RS	Retro-reflective sensor
	RT	Diffuse –reflection sensor
	FF	Convergent beam sensor, fixed focus
	PS	Retro-reflective sensor, polarised
7	-	Dash (fixed)
Type of voltage		
8	A	AC
	D	DC
	M	Multi-voltage
	P	Programmable (AC or DC)

Output function		
9	A	Antivalent (light and dark activated)
	D	Dark activated
	H	Light activated
	O	No output (transmitter for through-beam sensors)
	P	Programmable (light and dark activated)
	X	Customer-specific output
Type of output		
10	A	Analogue output
	N	NAMUR
	O	No output
	Q	Triac
	R	Relay
	S	Other
	T	Transistor
	Y	Thyristor
11	N	NPN transistor output
	P	PNP transistor output
	G	Push-pull output stage
	S	Transmitter, through-beam sensor
	U	PNP/NPN selectable
	X	Customer-specific output
	2	2-wire output
	3	Dash (fixed)
	4	4-Leiter-Ausgang
12	-	Trennstrich (festgelegt)

Sensing range		
13 – 16	The range and sensing distance are always a 4-digit specification - Millimetre values with no decimal point - Metre values with decimal point	
	e.g. 06.0	6 m
	e.g. 15.0	15 m
	e.g. 0500	500 mm
17	-	Dash (fixed)
Type of connection		
18	A	Connection space
	B	Self-configured cable connector
	C	Cable type (standard C = 2 m or length in m)
	S	Plug connector
Options		
19	C	Control input
	D	LED for switching status and operating reserve
	E	Adjustable sensitivity
	I	Electrically programmable
	F	Operating reserve output and LED
	G	LED for switching status, operating voltage indicator and light path monitoring
	H	LED for indicating operating voltage and switching status
	L	LED for switching status
	T	Adjustable time stage
	V	LED for indicating operating voltage
	W	Radial optical system
	X	Customer-specific option
	Z	Inbuilt time stage

Optoelectronic Sensors (sort by type designation)

Type	Art. No.	Page	Type	Art. No.	Page	Type	Art. No.	Page
OM12EE-DDTP-06.0-CL	6551728001	51	OR15RT-DHTP-0040-SL	6557950006	63	OT18RT-DPTN-0300-SLE	6557218005	54
OM12RT-DDTP-0060-CL	6557728001	50	OR20EE-DPTP-20.0-ALET	6551886003	66	OT18RT-DPTN-0500-CLE	6557219006	55
OM12RT-DHTP-0060-CL	6557928002	50	OR20EE-MARS-20.0-ALET	6551686004	66	OT18RT-DPTN-0500-SLE	6557218006	55
OM12RT-DHTP-0060-S	6557927001	50	OR20EE-MARS-20.0-ALET	6551686003	66	OT18RT-DPTP-0080-CLW	6557819010	52
OM12RT-DHTP-0200-CL	6557928004	50	OR20PS-DPTP-06.0-ALET	6555886001	65	OT18RT-DPTP-0080-SLW	6557818010	52
OM12RT-DHTP-0200-CLE	6557928003	50	OR20PS-MARS-06.0-ALET	6555686002	65	OT18RT-DPTP-0100-CL	6557819008	52
OM12RT-DHTP-0200-SL	6557927004	51	OR20RH-MARS-0400-ALET	6558686002	64	OT18RT-DPTP-0100-CL	6557819004	53
OM18EE-DPTP-08.0-CL	6551817001	58	OR20RS-DPTP-08.0-ALET	6554886001	65	OT18RT-DPTP-0100-SL	6557818008	52
OM18EE-DPTP-08.0-SL	6551816001	58	OR20RS-MARS-08.0-ALET	6554686002	66	OT18RT-DPTP-0100-SL	6557818002	53
OM18ES-DPTP-08.0-SL	6551816101	58	OR20RT-DPTP-01.5-ALET	6557886003	65	OT18RT-DPTP-0300-CELW	6557819009	54
OM18FF-DPTP-0040-CL	6558817001	51	OR20RT-DPTP-0600-ALET	6557886001	64	OT18RT-DPTP-0300-CLE	6557819005	54
OM18FF-DPTP-0040-SL	6558816001	51	OR20RT-MARS-01.5-ALET	6557686004	65	OT18RT-DPTP-0300-SELW	6557818009	55
OM18PS-DPTN-02.5-SLE	6555216001	56	OR20RT-MARS-0600-ALET	6557686001	65	OT18RT-DPTP-0300-SLE	6557818003	54
OM18PS-DPTP-02.5-CLE	6555817001	56	OR20SE-DOOS-20.0-AV	6551086003	66	OT18RT-DPTP-0400-CEL	6557819007	55
OM18PS-DPTP-02.5-SLE	6555816001	56	OR20SE-MOOS-20.0-AV	6551086002	66	OT18RT-DPTP-0400-SEL	6557818007	55
OM18PS-DPTP-0800-CLE	6555817002	56	OR20SE-MOOS-20.0-AV	6551086001	66	OT18RT-DPTP-0500-CLE	6557819006	55
OM18RH-DHTP-0120-SDE	6558916001	53	OR50EE-DATP-20.0-CEG	6551866001	64	OT18RT-DPTP-0500-SLE	6557818006	55
OM18RH-DHTP-0120-SDEW	6558916002	53	OR50EE-DATP-20.0-SEG	6551865001	64	OT18SE-DOOS-08.0-CCV	6551019001	58
OM18RS-DPTP-03.0-SL	6554816001	58	OR50PS-DATP-08.0-CDE	6555866001	64	OT18SE-DOOS-08.0-SCV	6551018001	59
OM18RT-DPAP-0200-SE	6557016002	53	OR50PS-DATP-08.0-SDE	6555865001	64	OT18SE-DOOS-15.0-CCVW	6551019004	59
OM18RT-DPTN-0100-SL	6557216001	53	OR50RH-DATP-0200-CDE	6558866001	63	OT18SE-DOOS-15.0-SCVW	6551018003	59
OM18RT-DPTN-0300-SLE	6557216003	54	OR50RH-DATP-0200-SDE	6558865001	63	OT18SE-DOOS-18.0-CCV	6551019003	59
OM18RT-DPTN-0500-CLE	6557217003	55	OR50RT-DATP-01.0-CDE	6557866001	63	OT18SE-DOOS-18.0-SCV	6551018002	59
OM18RT-DPTN-0500-SLE	6557216004	55	OR50RT-DATP-01.0-SDE	6557865001	63	OT30RT-DDAP-0500-CE	6557005006	59
OM18RT-DPTP-0100-CL	6557817002	53	OR50RT-DATP-02.0-CDE	6557866002	63	OT30RT-DHTP-0200-6LE	6557905008	59
OM18RT-DPTP-0100-SL	6557816001	53	OR50RT-DATP-02.0-SDE	6557865002	63	OZ20RT-DPAP-0200-SE	6557000002	67
OM18RT-DPTP-0300-CLE	6557817003	54	OR50SE-DOOS-20.0-CCV	6551066001	64	OZ20RT-DPAP-0200-SE	6557000001	67
OM18RT-DPTP-0300-SLE	6557816002	54	OR50SE-DOOS-20.0-SCV	6551065001	64	OZ20RT-DPTP-0500-CLE	6557800005	67
OM18RT-DPTP-0500-CLE	6557817004	55	OT12EE-DDTP-06.0-S	6551729001	51	OZ20RT-DPTP-0500-SLE	6557800006	67
OM18RT-DPTP-0500-SLE	6557816006	55	OT12PE-DHTP-0000-C	6550930001	66			
ON18EE-DPTP-08.0-SL	6551821001	58	OT12RT-DHTP-0060-CL	6557930002	50			
ON18PS-DPTP-02.5-SLE	6555821001	56	OT12RT-DHTP-0060-S	6557929002	50			
ON18RT-DPTN-0500-CLE	6557222003	55	OT12RT-DHTP-0200-CL	6557930001	51			
ON18RT-DPTP-0300-SLE	6557821002	54	OT12RT-DHTP-0200-S	6557929001	51			
ON18SE-DOOS-08.0-SCV	6551021001	58	OT12SE-DOOS-06.0-CL	6551028001	51			
OR05EE-DATP-12.0-3DE	6551875003	62	OT12SE-DOOS-06.0-S	6551029001	51			
OR05EE-DATP-12.0-SDE	6551875004	62	OT18EE-DPRP-15.0-CLW	6551819004	59			
OR05PS-DATP-04.0-3DE	6555875001	62	OT18EE-DPTP-08.0-CL	6551819001	58			
OR05PS-DHTP-04.0-3LFE	6555975002	62	OT18EE-DPTP-08.0-SL	6551818001	59			
OR05PS-DHTP-04.0-SLFE	6555975001	62	OT18EE-DPTP-15.0-SLW	6551818003	59			
OR05RT-DATP-01.2-3DE	6557875003	61	OT18EE-DPTP-18.0-CL	6551819003	59			
OR05RT-DHTP-01.2-3LFE	6557975004	61	OT18EE-DPTP-18.0-SL	6551818002	59			
OR05RT-DHTP-01.2-SLFE	6557975003	62	OT18ES-DPTP-08.0-SL	6551818101	59			
OR05SE-DOOS-12.0-3C	6551075003	62	OT18FF-DPTP-0040-CL	6558819001	52			
OR05SE-DOOS-12.0-SC	6551075004	62	OT18FF-DPTP-0040-SL	6558818002	52			
OR12EE-DDTN-06.0-SL	6551155001	60	OT18PS-DPTN-02.5-CLE	6555219001	57			
OR12EE-DDTP-01.0-SL	6551755002	60	OT18PS-DPTN-0800-SLE	6555218002	56			
OR12EE-DDTP-01.0-SLE	6551755004	60	OT18PS-DPTP-02.5-CELW	6555819006	57			
OR12EE-DDTP-06.0-SL	6551755001	60	OT18PS-DPTP-02.5-CLE	6555819003	57			
OR12EE-DDTP-06.0-SLE	6551755003	60	OT18PS-DPTP-02.5-SELW	6555818004	57			
OR12EE-DHTN-06.0-SL	6551355001	60	OT18PS-DPTP-02.5-SLE	6555818001	57			
OR12EE-DHTP-01.0-SL	6551955002	60	OT18PS-DPTP-03.0-CEL	6555819005	57			
OR12EE-DHTP-06.0-SL	6551955001	60	OT18PS-DPTP-03.0-SEL	6555818003	57			
OR12EE-DHTP-10.0-SL	6551955005	60	OT18PS-DPTP-0800-CLE	6555819004	56			
OR12FF-DHTP-0050-SL	6558955001	61	OT18PS-DPTP-0800-SLE	6555818002	56			
OR12RS-DDTP-04.0-SL	6554755001	61	OT18RS-DPTN-03.0-CL	6554219002	57			
OR12RS-DHTP-04.0-SL	6554955001	61	OT18RS-DPTN-03.0-SL	6554218001	57			
OR12RT-DDTP-01.2-SLE	6557755002	61	OT18RS-DPTP-03.0-CL	6554819003	57			
OR12RT-DDTP-0200-SLE	6557755001	61	OT18RS-DPTP-03.0-SL	6554818001	57			
OR12RT-DHTP-01.2-SLE	6557955002	61	OT18RT-DATN-0200-CEL	6557219002	53			
OR12RT-DHTP-0200-SLE	6557955001	61	OT18RT-DATP-0200-CEL	6557819001	53			
OR12SE-DOOS-01.0-SVC	6551055003	60	OT18RT-DPTN-0100-CL	6557219004	53			
OR12SE-DOOS-06.0-SVC	6551055002	60	OT18RT-DPTN-0300-CLE	6557219005	54			

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6551018001	OT18SE-DOOS-08.0-SCV	59	6555818001	OT18PS-DPTP-02.5-SLE	57	6557875003	OR05RT-DATP-01.2-3DE	61
6551018002	OT18SE-DOOS-18.0-SCV	59	6555818002	OT18PS-DPTP-0800-SLE	56	6557886001	OR20RT-DPTP-0600-ALET	64
6551018003	OT18SE-DOOS-15.0-SCVW	59	6555818003	OT18PS-DPTP-03.0-SEL	57	6557886003	OR20RT-DPTP-01.5-ALET	65
6551019001	OT18SE-DOOS-08.0-CCV	58	6555818004	OT18PS-DPTP-02.5-SELW	57	6557905008	OT30RT-DHTP-0200-6LE	59
6551019003	OT18SE-DOOS-18.0-CCV	59	6555819003	OT18PS-DPTP-02.5-CLE	57	6557927001	OM12RT-DHTP-0060-S	50
6551019004	OT18SE-DOOS-15.0-CCVW	59	6555819004	OT18PS-DPTP-0800-CLE	56	6557927004	OM12RT-DHTP-0200-SL	51
6551021001	ON18SE-DOOS-08.0-SCV	58	6555819005	OT18PS-DPTP-03.0-CEL	57	6557928002	OM12RT-DHTP-0060-CL	50
6551028001	OT12SE-DOOS-06.0-CL	51	6555819006	OT18PS-DPTP-02.5-CELW	57	6557928003	OM12RT-DHTP-0200-CLE	50
6551029001	OT12SE-DOOS-06.0-S	51	6555821001	ON18PS-DPTP-02.5-SLE	56	6557928004	OM12RT-DHTP-0200-CL	50
6551055002	OR12SE-DOOS-06.0-SVC	60	6555865001	OR50PS-DATP-08.0-SDE	64	6557929001	OT12RT-DHTP-0200-S	51
6551055003	OR12SE-DOOS-01.0-SVC	60	6555866001	OR50PS-DATP-08.0-CDE	64	6557929002	OT12RT-DHTP-0060-S	50
6551065001	OR50SE-DOOS-20.0-SCV	64	6555875001	OR05PS-DATP-04.0-3DE	62	6557930001	OT12RT-DHTP-0200-CL	51
6551066001	OR50SE-DOOS-20.0-CCV	64	6555886001	OR20PS-DPTP-06.0-ALET	65	6557930002	OT12RT-DHTP-0060-CL	50
6551075003	OR05SE-DOOS-12.0-3C	62	6555975001	OR05PS-DHTP-04.0-SLFE	62	6557950006	OR15RT-DHTP-0040-SL	63
6551075004	OR05SE-DOOS-12.0-SC	62	6555975002	OR05PS-DHTP-04.0-3LFE	62	6557955001	OR12RT-DHTP-0200-SLE	61
6551086001	OR20SE-MOOS-20.0-AV	66	6557000001	OZ20RT-DPAP-0200-SE	67	6557955002	OR12RT-DHTP-01.2-SLE	61
6551086002	OR20SE-MOOS-20.0-AV	66	6557000002	OZ20RT-DPAP-0200-SE	67	6557975003	OR05RT-DHTP-01.2-SLFE	62
6551086003	OR20SE-MOOS-20.0-AV	66	6557005006	OT30RT-DDAP-0500-CE	59	6557975004	OR05RT-DHTP-01.2-3LFE	61
6551155001	OR12EE-DDTN-06.0-SL	60	6557016002	OM18RT-DPAP-0200-SE	53	6558686002	OR20RH-MAR5-0400-ALET	64
6551355001	OR12EE-DHTN-06.0-SL	60	6557216001	OM18RT-DPTN-0100-SL	53	6558816001	OM18FF-DPTP-0040-SL	51
6551686003	OR20EE-MAR5-20.0-ALET	66	6557216003	OM18RT-DPTN-0300-SLE	54	6558817001	OM18FF-DPTP-0040-CL	51
6551686004	OR20EE-MAR5-20.0-ALET	66	6557216004	OM18RT-DPTN-0500-SLE	55	6558818002	OT18FF-DPTP-0040-SL	52
6551728001	OM12EE-DDTP-06.0-CL	51	6557217003	OM18RT-DPTN-0500-CLE	55	6558819001	OT18FF-DPTP-0040-CL	52
6551729001	OT12EE-DDTP-06.0-S	51	6557218005	OT18RT-DPTN-0300-SLE	54	6558865001	OR50RH-DATP-0200-SDE	63
6551755001	OR12EE-DDTP-06.0-SL	60	6557218006	OT18RT-DPTN-0500-SLE	55	6558866001	OR50RH-DATP-0200-CDE	63
6551755002	OR12EE-DDTP-01.0-SL	60	6557219002	OT18RT-DATN-0200-CEL	53	6558916001	OM18RH-DHTP-0120-SDE	53
6551755003	OR12EE-DDTP-06.0-SLE	60	6557219004	OT18RT-DPTN-0100-CL	53	6558916002	OM18RH-DHTP-0120-SDEW	53
6551755004	OR12EE-DDTP-01.0-SLE	60	6557219005	OT18RT-DPTN-0300-CLE	54	6558955001	OR12FF-DHTP-0050-SL	61
6551816001	OM18EE-DPTP-08.0-SL	58	6557219006	OT18RT-DPTN-0500-CLE	55			
6551816101	OM18ES-DPTP-08.0-SL	58	6557222003	ON18RT-DPTN-0500-CLE	55			
6551817001	OM18EE-DPTP-08.0-CL	58	6557686001	OR20RT-MAR5-0600-ALET	65			
6551818001	OT18EE-DPTP-08.0-SL	59	6557686004	OR20RT-MAR5-01.5-ALET	65			
6551818002	OT18EE-DPTP-18.0-SL	59	6557728001	OM12RT-DDTP-0060-CL	50			
6551818003	OT18EE-DPTP-15.0-SLW	59	6557755001	OR12RT-DDTP-0200-SLE	61			
6551818101	OT18ES-DPTP-08.0-SL	59	6557755002	OR12RT-DDTP-01.2-SLE	61			
6551819001	OT18EE-DPTP-08.0-CL	58	6557800005	OZ20RT-DPTP-0500-CLE	67			
6551819003	OT18EE-DPTP-18.0-CL	59	6557800006	OZ20RT-DPTP-0500-SLE	67			
6551819004	OT18EE-DPRP-15.0-CLW	59	6557816001	OM18RT-DPTP-0100-SL	53			
6551821001	ON18EE-DPTP-08.0-SL	58	6557816002	OM18RT-DPTP-0300-SLE	54			
6551865001	OR50EE-DATP-20.0-SEG	64	6557816006	OM18RT-DPTP-0500-SLE	55			
6551866001	OR50EE-DATP-20.0-CEG	64	6557817002	OM18RT-DPTP-0100-CL	53			
6551875003	OR05EE-DATP-12.0-3DE	62	6557817003	OM18RT-DPTP-0300-CLE	54			
6551875004	OR05EE-DATP-12.0-SDE	62	6557817004	OM18RT-DPTP-0500-CLE	55			
6551886003	OR20EE-DPTP-20.0-ALET	66	6557818002	OT18RT-DPTP-0100-SL	53			
6551955001	OR12EE-DHTP-06.0-SL	60	6557818003	OT18RT-DPTP-0300-SLE	54			
6551955002	OR12EE-DHTP-01.0-SL	60	6557818006	OT18RT-DPTP-0500-SLE	55			
6551955005	OR12EE-DHTP-10.0-SL	60	6557818007	OT18RT-DPTP-0400-SEL	55			
6554218001	OT18RS-DPTN-03.0-SL	57	6557818008	OT18RT-DPTP-0100-SL	52			
6554219002	OT18RS-DPTN-03.0-CL	57	6557818009	OT18RT-DPTP-0300-SELW	55			
6554686002	OR20RS-MAR5-08.0-ALET	66	6557818010	OT18RT-DPTP-0080-SLW	52			
6554755001	OR12RS-DDTP-04.0-SL	61	6557819001	OT18RT-DATP-0200-CEL	53			
6554816001	OM18RS-DPTP-03.0-SL	58	6557819004	OT18RT-DPTP-0100-CL	53			
6554818001	OT18RS-DPTP-03.0-SL	57	6557819005	OT18RT-DPTP-0300-CLE	54			
6554819003	OT18RS-DPTP-03.0-CL	57	6557819006	OT18RT-DPTP-0500-CLE	55			
6554886001	OR20RS-DPTP-08.0-ALET	65	6557819007	OT18RT-DPTP-0400-CEL	55			
6554955001	OR12RS-DHTP-04.0-SL	61	6557819008	OT18RT-DPTP-0100-CL	52			
6555216001	OM18PS-DPTN-02.5-SLE	56	6557819009	OT18RT-DPTP-0300-CELW	54			
6555218002	OT18PS-DPTN-0800-SLE	56	6557819010	OT18RT-DPTP-0080-CLW	52			
6555219001	OT18PS-DPTN-02.5-CLE	57	6557821002	ON18RT-DPTP-0300-SLE	54			
6555686002	OR20PS-MAR5-06.0-ALET	65	6557865001	OR50RT-DATP-01.0-SDE	63			
6555816001	OM18PS-DPTP-02.5-SLE	56	6557865002	OR50RT-DATP-02.0-SDE	63			
6555817001	OM18PS-DPTP-02.5-CLE	56	6557866001	OR50RT-DATP-01.0-CDE	63			
6555817002	OM18PS-DPTP-0800-CLE	56	6557866002	OR50RT-DATP-02.0-CDE	63			

Magnetic Switches

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
M	A	K	-	0	1	1	2	-	D	-	1	-	S	O	K			
Product group			Type			Contact specifications				Cable length			Special features					

Product group		
1	M	Magnetic switch
2	Type of output	
	A	Reed contact
	R	Relay
3	Enclosure material	
	A	Aluminium
	N	Stainless steel
	M	Brass, nickel-plated
	K	Plastic, general
	O	Other materials
4	-	Dash (fixed)
Type		
5 - 6	01 - 99	Cylindrical and rectangular types (see next page for details)
Contact specifications		
7	Number of contacts	
	e.g. 1	1 Reed contact
	e.g. 2	2 Reed contacts
	...	etc.

8	Contact function	
	1	NC contact
	2	NO contact
	3	Changeover contact
	4	Bistable (ON/OFF)
	5	Bistable (changeover contact)
	6	NC, NO contact; separate contacts
	7	Coded, BG
	8	Currently not used
	9	Currently not used
	0	Other outputs
9	-	Dash (fixed)
10	Contact type/power of reed contacts	
	A	250 VDC ; 0.5 A; 20 VA
	B	250 VDC ; 0.5 A; 10 VA
	C	250 VDC ; 0.5 A; 30 VA
	D	250 VDC ; 0.5 A; 30 VA
	E	250 VDC ; 1.5 A; 30 VA
	F	250 VDC ; 3.0 A; 100 VA
	G	250 VDC ; 5.0 A; 250 VA
	H	250 VDC ; 1.0 A; 60 VA
	K	250 VDC ; 0.5 A; 30 VA
	L	250 VDC ; 1.0 A; 60 VA
	M	250 VDC ; 1.0 A; 80 VA
	N	250 VDC ; 1.0 A; 60 VA
	O	120 VDC ; 0.5 A; 10 VA
	P	250 VDC ; 5.0 A; 250 VA
	R	28 VDC ; 0.25 A; 3 VA
	W	250 VDC ; 1.0 A; 60 VA
	X	100 VDC ; 0.25 A; 5 VA
	Y	100 VDC ; 0.5 A; 10 VA

TRIAC		
	K	24 - 250 VDC ; 1.5 A a. 300 VA b. 330 VA
Hall		
11	-	Dash (fixed)
Cable length in metres		
12	e.g. 1	1 m cable
	e.g. 2	2 m cable
	...	etc.
13	-	Dash (fixed)
Special features		
14 - 17	T	Temperature resistant from -40 °C to +150 °C
	SI	With miniature fuse
	VDR	With VDR
	WID	With resistor
	LED	With LED
	SPK	Spiral cable
	SK	Special cable
	SOK	Connector type without head (without device socket)
	SMK	Connector type with head (with device socket)
	PG11	Type of thread
	RZ	Time delay with relay
	220 V	220 Volt version
	24 V	24 Volt version

Magnetic Switches

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
M	A	K	-	0	1	1	2	-	D	-	1	-	S	O	K			
Product group			Type			Contact specifications				Cable length			Special features					

Type		
5-6	01-99	Cylindrical and rectangular types
	01	45 x 13 x 9 mm [MA-01] PA
	02	80 x 20 x 15 mm [MA-02] PA/AL
	03	110 x 58 x 29 mm [MA-03] AL
	04	Ø 15.5 x 87 mm [MA-04] PC
	05	Currently not used
	06	Ø 12 x 81 mm [MA-06] AL
	07-10	Currently not used
	11	28.6 x 18 x 6.4 mm [MA-11] PA
	12	80 x 20 x 15 mm [MA-12] PA
	13	68 x 30 x 15 mm [MA-13] PC
	14	Currently not used
	15	Ø 12 x 81 mm [MA-15] PA
	16	Ø 12 x 81 mm [MA-13] VA
	17	PG9 x 60 mm [MA-17] PA
	18	M12 x 1 x 60 mm [MA-18] Ms
	19	M18 x 1 x 80 mm [MA-19] Ms
	20	Currently not used
	21	PG9 x 80 mm [MA-21] PA
	22	Currently not used
	23	M12 x 1 x 80 mm [MA-23] Ms
	24/25	Currently not used
	26	Ø 12 x 81 mm [MA-26] PA
	27	Currently not used
	28	M12 x 1 x 60 mm [MA-28] PA
	29	M18 x 1 x 80 mm [MA-29] PA
	30	Ø 6 x 30 mm [MA-30] PA
	31	Currently not used
	32	85 x 26 x 26 mm [MA-32] PBT
	33	M12 x 1 x 80 mm [MA-33] PA
	34/35	Currently not used

	36	Ø 13 x 96 mm [MA-36] PA
	37-39	Currently not used
	40	M10 x 1 x 40 mm [MA-40] PPE
	41	50 x 31 x 11 mm [MA-41] PA
	42	88 x 25 x 13 mm [MA-42] PA
	43	PG9 x 80 mm [MA-43] Ms
	44	80 x 30 x 15 mm [MA-44] PA
	45	45 x 25.5 x 9 mm [MA-45] PA
	46	Ø 6.5 x 39.34 mm [MA-46] PA
	47	Currently not used
	48	80 x 30 x 15 mm [MA-48] PA
	49-51	Currently not used
	52	43 x 26 x 13 mm [MA-52] PBT
	53	M30 x 1.5 mm [MA-53] PA
	54	Currently not used
	55	12 x 12 x 55 mm [MA-55] S
	56-59	Currently not used
	60	M8 x 1 mm [MA-60] S
	61	M10 x 1 mm [MA-61] S
	62	M12 x 1 mm [MA-62] S
	63	M18 x 1 mm [MA-63] S
	64	M30 x 1.5 mm [MA-64] S
	65-69	Currently not used
	70	Ø 6.5 mm [MA-70] S
	71/72	Currently not used
	73	68 x 30 x 15 mm [MA-73] S
	74-79	Currently not used
	80	8 x 8 x 40 mm [MA-80] S
	81-98	Currently not used
	99	other [MA-99] S

Magnetic Switch Monitoring Devices

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
M	Ü	Z	-	1	0	2	/	U	2	4	-	F	L	-	2	S	-	E	2	0	-	H	G
Product group			Numb. of magnetic switches	Number of relays			Voltage			Special features													

Product group		
1	M	Magnetic limit switch, general
2	Ü	Monitoring
	C	Controller
3	Z	Control station
	S	Interface
	N	Power supply unit
4	-	Dash (fixed)
Number of connectable magnetic switches		
5	1	1 unit
	2	2 units
	...	etc.
Number of relays		
6 - 7	01	1 unit
	02	2 units
	03	Constant current source
	04	4 units
	...	etc.
8	/	Slash (fixed)

Voltage		
9	A	AC
	D	DC
	U	UC
	1	Mains voltage
	2	Mains voltage
10 - 11	24	24 Volt
	The following applies when there is a "1" in the 9 th position:	
	10	110 Volt
	20	120 Volt
	30	130 Volt
	The following applies when there is a "2" in the 9 th position:	
	10	210 Volt
	20	220 Volt
	30	230 Volt

Special features		
13 - 24	FL	Flat design
	2S	NO contact signal (to outside)
	E20	20 transducer units, externally
	HG	Hall sensor
	VC	Voltage control
	PRT	Print version
	DA	Data output
	Special features are separated by a dash with no specific position assignment.	

Magnetic Switches/Slot sensors with reed contact (sort by type designation)

Type	Art. No.	Page	Type	Art. No.	Page
MAA-0213-LT-1	6316302389	78	MAM-1811-2	6310118626	75
MAA-0213-STK	6310302636	78	MAM-1812-B-1	6311218294	74
MAA-0214-FT-3	6314402566	77	MAM-1813-L-1	6316318002	74
MAA-0312-F	6314203232	79	MAM-2312-F-1	6314223268	74
MAA-0313-M	6317303312	79	MAM-3114-2-LED	6310431569	75
MAA-0314-P	6319403532	79	MAM-4313-L-2	6316343544	75
MAA-0612-D-1	6312206321	72	MAN-0812-B-1	6311208596	74
MAA-0612-F-1	6314206246	72	MAN-0813-STK	6310308595	74
MAA-0612-NT-4	6410206399	73	MAN-0813-Y-1	6310308597	74
MAA-0613-K-1	6315306314	72	MAN-1612-F-3	6314216476	72
MAA-0613-L-1	6316306248	73	MAN-1612-FT-8	6314216585	72
MAA-0613-LT-1	6316306004	73	MAN-1613-L-1	6316316259	72
MAA-0613-M-1	6317306315	72			
MAA-0614-P-1	6310406554	73			
MAA-9912-0,3/S	6310299661	93			
MAA-9912-2	6310299660	93			
MAK-0112-B-2	6311201095	76			
MAK-0212-D-1	6312202316	77			
MAK-0212-F-1	6314202204	77			
MAK-0213-K-1	6315302309	76			
MAK-0213-L-1	6316302206	77			
MAK-0214-P-3	6419402397	77			
MAK-0413-M-5	6317304313	74			
MAK-1112-B-1	6311211541	76			
MAK-1113-1	6310311615	75			
MAK-1113-1,5	6410311368	75			
MAK-1114-B-5	6311411603	76			
MAK-1212-F-1	6314212217	77			
MAK-1213-K-1	6315312196	76			
MAK-1213-L-1	6316312220	77			
MAK-1214-L-2	6410412143	77			
MAK-1313-L-1	6316313004	76			
MAK-1713-K-1	6315317001	75			
MAK-2612-F-1	6314226423	72			
MAK-2613-K-1	6315326425	73			
MAK-2613-L-1	6316326426	73			
MAK-2812-L-3	6416228260	74			
MAK-3012-B-1	6311230571	72			
MAK-3013-X-1	6310330572	72			
MAK-3214-F-3	6314432609	78			
MAK-3214-P-1	6310432598	78			
MAK-3214-P-STK4.8	6310432590	78			
MAK-3312-F-2	6314233002	74			
MAK-3313-L-1	6316333005	74			
MAK-3314-P-2	6410433350	75			
MAK-3611-P-1	6310136616	73			
MAK-3615-L-1	6310536617	73			
MAK-4212-F-1	6314242533	78			
MAK-4213-M-1	6317342535	78			
MAK-4214-P-1	6310442534	79			
MAK-4214-P-3	6310442622	79			
MAK-4411-F-1	6314144542	78			
MAK-4412-F-1	6314244536	78			
MAK-4413-M-1	6317344538	78			
MAK-4414-P-1	6310444537	78			
MAK-4512-B-1	6311245539	76			
MAK-4513-L-1	6316345540	76			
MAK-4612-A-2	6310246500	72			
MAK-8112-0,3/S	6310281657	93			
MAK-8112-0,3/S	6310281659	93			
MAK-8112-2	6310281656	93			
MAK-8112-2	6310281658	93			
MAK-9912-STK	6310299652	76			

Magnetic Switches/Slot sensors with reed contact (sort by article number)

Art. No.	Type	Page	Art. No.	Type	Page
6310118626	MAM-1811-2	75	6317303312	MAA-0313-M	79
6310136616	MAK-3611-P-1	73	6317304313	MAK-0413-M-S	74
6310246500	MAK-4612-A-2	72	6317306315	MAA-0613-M-1	72
6310281656	MAK-8112-2	93	6317342535	MAK-4213-M-1	78
6310281657	MAK-8112-0,3/S	93	6317344538	MAK-4413-M-1	78
6310281658	MAK-8112-2	93	6319403532	MAA-0314-P	79
6310281659	MAK-8112-0,3/S	93	6410206399	MAA-0612-NT-4	73
6310299652	MAK-9912-STK	76	6410311368	MAK-1113-1,5	75
6310299660	MAA-9912-2	93	6410412143	MAK-1214-L-2	77
6310299661	MAA-9912-0,3/S	93	6410433350	MAK-3314-P-2	75
6310302636	MAA-0213-STK	78	6416228260	MAK-2812-L-3	74
6310308595	MAN-0813-STK	74	6419402397	MAK-0214-P-3	77
6310308597	MAN-0813-Y-1	74			
6310311615	MAK-1113-1	75			
6310330572	MAK-3013-X-1	72			
6310406554	MAA-0614-P-1	73			
6310431569	MAM-3114-2-LED	75			
6310432590	MAK-3214-P-STK4.8	78			
6310432598	MAK-3214-P-1	78			
6310442534	MAK-4214-P-1	79			
6310442622	MAK-4214-P-3	79			
6310444537	MAK-4414-P-1	78			
6310536617	MAK-3615-L-1	73			
6311201095	MAK-0112-B-2	76			
6311208596	MAN-0812-B-1	74			
6311211541	MAK-1112-B-1	76			
6311218294	MAM-1812-B-1	74			
6311230571	MAK-3012-B-1	72			
6311245539	MAK-4512-B-1	76			
6311411603	MAK-1114-B-5	76			
6312202316	MAK-0212-D-1	77			
6312206321	MAA-0612-D-1	72			
6314144542	MAK-4411-F-1	78			
6314202204	MAK-0212-F-1	77			
6314203232	MAA-0312-F	79			
6314206246	MAA-0612-F-1	72			
6314212217	MAK-1212-F-1	77			
6314216476	MAN-1612-F-3	72			
6314216585	MAN-1612-FT-8	72			
6314223268	MAM-2312-F-1	74			
6314226423	MAK-2612-F-1	72			
6314233002	MAK-3312-F-2	74			
6314242533	MAK-4212-F-1	78			
6314244536	MAK-4412-F-1	78			
6314402566	MAA-0214-FT-3	77			
6314432609	MAK-3214-F-3	78			
6315302309	MAK-0213-K-1	76			
6315306314	MAA-0613-K-1	72			
6315312196	MAK-1213-K-1	76			
6315317001	MAK-1713-K-1	75			
6315326425	MAK-2613-K-1	73			
6316302206	MAK-0213-L-1	77			
6316302389	MAA-0213-LT-1	78			
6316306004	MAA-0613-LT-1	73			
6316306248	MAA-0613-L-1	73			
6316312220	MAK-1213-L-1	77			
6316313004	MAK-1313-L-1	76			
6316316259	MAN-1613-L-1	72			
6316318002	MAM-1813-L-1	74			
6316326426	MAK-2613-L-1	73			
6316333005	MAK-3313-L-1	74			
6316343544	MAM-4313-L-2	75			
6316345540	MAK-4513-L-1	76			

Magnetic Switches/Slot sensors with reed contact

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15					
M	E	K	-	M	1	2	P	S	/	H	1	0	-	K	L	2			
Product group			Type of enclosure				Output		Sensitivity			Options							

Product group		
1	M	Magnetic sensor
2	E	Electronic
3	K	Plastic
	M	Brass
	N	Stainless steel
4	-	Dash (fixed)
Type of enclosure		
5	M	Metric thread
	D	Round enclosure
	E	Rectangular enclosure
	Q	Cuboid enclosure
6-7		Two-digit number for:
		Metric enclosure = standard designation
		Round enclosure = Ø as specified
		Rectangular enclosure = enclosure width
		Cuboid enclosure = edge length

Output		
8	P	PNP
	N	NPN
9	S	NO contact
	Ö	NC contact
	B	Bistable
	A	Analogue
	D	Speed
10	/	Slash (fixed)
Sensitivity		
11	H	Hall
	M	Magnetoiresistive
12-13		Sensitivity in mT
	z. B. 10	10 mT
	z. B. 01	1 mT
14	-	Dash (fixed)
Options		
15		See type code "OPTIONS" (0850174076)

Magnetic Switches/Slot sensors with reed contact (sort by type designation)

Type	Art. No.	Page	Type	Art. No.	Page
MEA-E30PS/HP-KL0,3S	6370299143	91	MEM-M12PÖ/M01-KL2	6373162096	84
MEA-E30PS/HP-KL2	6370299136	91	MEM-M12PS/H10-KL10	6472262077	84
MEK-E22PS/HP-KL0,3S	6370281110	91	MEM-M12PS/H10-KL2	6372262090	84
MEK-E22PS/HP-KL0,3S	6370281145	91	MEM-M12PS/M01-KL2	6373262094	84
MEK-E22PS/HP-KL0,3S	6372281147	92	MEM-M12PS/M01-KL5	6373262123	84
MEK-E22PS/HP-KL0,3S	6372281149	92	MEM-M18NB/H11-K2	6363863037	85
MEK-E22PS/HP-KL0,3S	6372299151	92	MEM-M18NS/H10-K2	6362663006	85
MEK-E22PS/HP-KL0,3S-EX	6370281153	91	MEM-M18PB/H11-KL2	6373463128	85
MEK-E22PS/HP-KL2	6370281109	91	MEM-M18PD/H-KL2	6379263122	86
MEK-E22PS/HP-KL2	6370281144	91	MEM-M18PÖ/H10-KL2	6372163100	85
MEK-E22PS/HP-KL2	6372281146	92	MEM-M18PÖ/M01-KL2	6373163104	86
MEK-E22PS/HP-KL2	6372281148	92	MEM-M18PS/H10-KL2	6372263098	85
MEK-E22PS/HP-KL2	6372299150	92	MEM-M18PS/M01-KL2	6373263102	86
MEK-E22PS/HP-KL2-EX	6370281152	91	MEM-Q05PS/M03-K2	6373299134	86
MEK-E27NB/H02-K2	6363893031	87	MEM-Q08NB/H11-K2	6363880043	87
MEK-E27NB/H11-K2	6363893041	87	MEM-Q08NS/H10-K2	6362680012	87
MEK-E27NS/H10-K2	6362693010	87	MEM-Q08PS/M02-K2	6373280106	87
MEK-E29NB/H11-K2	6363811039	87	MEM-Q12NB/H11-K2	6363855044	87
MEK-E29NS/H10-K2	6362611008	87	MEM-Q12NS/H10-K2	6362655013	87
MEK-E45NB/H11-K2	6363845040	88	MEM-Q12PB/H11-KL2	6373455131	87
MEK-E45NS/H10-K2	6362645009	88	MEM-Q12PÖ/H10-KL2	6372155084	87
MEK-E45PB/H11-KL2	6373445129	88	MEM-Q12PS/H10-KL2	6372255083	87
MEK-E45PÖ/H10-KL2	6372145080	88	MEN-D04PS/M03-K2	6373299132	82
MEK-E45PS/H10-KL2	6372245079	88	MEN-D06NB/H11-K2	6363870032	82
MEK-E50NB/H11-K2	6363890042	88	MEN-D06NS/H10-K2	6362670001	82
MEK-E50NS/H10-K2	6362690011	88	MEN-D06PS/M02-K2	6373270105	82
MEK-E50PB/H11-KL2	6373490130	88			
MEK-E50PÖ/H10-KL2	6372190082	88			
MEK-E50PS/H10-KL2	6372290081	88			
MEK-M12NB/H11-K2	6363862036	83			
MEK-M12ND/H-K2	6369662027	85			
MEK-M12NS/H10-K2	6362662005	83			
MEK-M12PB/H11-KL2	6373462125	84			
MEK-M12PD/H-KL2	6379262119	85			
MEK-M12PÖ/H10-KL2	6372162091	84			
MEK-M12PÖ/M01-KL2	6373162095	84			
MEK-M12PS/H10-KL2	6372262089	84			
MEK-M12PS/M01-KL2	6373262093	84			
MEK-M18NB/H11-K2	6363863038	85			
MEK-M18NS/H10-K2	6362663007	85			
MEK-M18PB/H11-KL2	6373463127	85			
MEK-M18PD/H-KL2	6379263121	86			
MEK-M18PÖ/H10-KL2	6372163099	85			
MEK-M18PÖ/M01-KL2	6373163103	86			
MEK-M18PS/H10-KL2	6372263097	85			
MEK-M18PS/M01-KL2	6373263101	86			
MEM-M05PS/M03-K2	6373299133	82			
MEM-M08NB/H11-K2	6363860033	83			
MEM-M08NS/H10-K2	6362660002	83			
MEM-M08PS/M02-K2	6373260107	83			
MEM-M10NB/H11-K2	6363861034	83			
MEM-M10NS/H10-K2	6362661003	83			
MEM-M10PB/H11-KL2	6373461124	83			
MEM-M10PÖ/H10-KL2	6372161086	83			
MEM-M10PÖ/M01-KL2	6373161088	83			
MEM-M10PS/H10-KL2	6372261085	83			
MEM-M10PS/M01-KL2	6373261087	83			
MEM-M12NB/H11-K2	6363862035	83			
MEM-M12ND/H-K2	6369662028	85			
MEM-M12NS/H10-K2	6362662004	83			
MEM-M12PB/H11-KL2	6373462126	84			
MEM-M12PD/H-KL2	6379262120	85			
MEM-M12PÖ/H10-KL2	6372162092	84			

Magnetic Switches/Slot sensors with reed contact (sort by article number)

Art. No.	Type	Page	Art. No.	Type	Page
6362611008	MEK-E29NS/H10-K2	87	6373163104	MEM-M18PÖ/M01-KL2	86
6362645009	MEK-E45NS/H10-K2	88	6373260107	MEM-M08PS/M02-K2	83
6362655013	MEM-Q12NS/H10-K2	87	6373261087	MEM-M10PS/M01-KL2	83
6362660002	MEM-M08NS/H10-K2	83	6373262093	MEK-M12PS/M01-KL2	84
6362661003	MEM-M10NS/H10-K2	83	6373262094	MEM-M12PS/M01-KL2	84
6362662004	MEM-M12NS/H10-K2	83	6373262123	MEM-M12PS/M01-KL5	84
6362662005	MEK-M12NS/H10-K2	83	6373263101	MEK-M18PS/M01-KL2	86
6362663006	MEM-M18NS/H10-K2	85	6373263102	MEM-M18PS/M01-KL2	86
6362663007	MEK-M18NS/H10-K2	85	6373270105	MEN-D06PS/M02-K2	82
6362670001	MEN-D06NS/H10-K2	82	6373280106	MEM-Q08PS/M02-K2	87
6362680012	MEM-Q08NS/H10-K2	87	6373299132	MEN-D04PS/M03-K2	82
6362690011	MEK-E50NS/H10-K2	88	6373299133	MEM-M05PS/M03-K2	82
6362693010	MEK-E27NS/H10-K2	87	6373299134	MEM-Q05PS/M03-K2	86
6363811039	MEK-E29NB/H11-K2	87	6373445129	MEK-E45PB/H11-KL2	88
6363845040	MEK-E45NB/H11-K2	88	6373455131	MEM-Q12PB/H11-KL2	87
6363855044	MEM-Q12NB/H11-K2	87	6373461124	MEM-M10PB/H11-KL2	83
6363860033	MEM-M08NB/H11-K2	83	6373462125	MEK-M12PB/H11-KL2	84
6363861034	MEM-M10NB/H11-K2	83	6373462126	MEM-M12PB/H11-KL2	84
6363862035	MEM-M12NB/H11-K2	83	6373463127	MEK-M18PB/H11-KL2	85
6363862036	MEK-M12NB/H11-K2	83	6373463128	MEM-M18PB/H11-KL2	85
6363863037	MEM-M18NB/H11-K2	85	6373490130	MEK-E50PB/H11-KL2	88
6363863038	MEK-M18NB/H11-K2	85	6379262119	MEK-M12PD/H-KL2	85
6363870032	MEN-D06NB/H11-K2	82	6379262120	MEM-M12PD/H-KL2	85
6363880043	MEM-Q08NB/H11-K2	87	6379263121	MEK-M18PD/H-KL2	86
6363890042	MEK-E50NB/H11-K2	88	6379263122	MEM-M18PD/H-KL2	86
6363893031	MEK-E27NB/H02-K2	87	6472262077	MEM-M12PS/H10-KL10	84
6363893041	MEK-E27NB/H11-K2	87			
6369662027	MEK-M12ND/H-K2	85			
6369662028	MEM-M12ND/H-K2	85			
6370281109	MEK-E22PS/HP-KL2	91			
6370281110	MEK-E22PS/HP-KL0,3S	91			
6370281144	MEK-E22PS/HP-KL2	91			
6370281145	MEK-E22PS/HP-KL0,3S	91			
6370281152	MEK-E22PS/HP-KL2-EX	91			
6370281153	MEK-E22PS/HP-KL0,3S-EX	91			
6370299136	MEA-E30PS/HP-KL2	91			
6370299143	MEA-E30PS/HP-KL0,3S	91			
6372145080	MEK-E45PÖ/H10-KL2	88			
6372155084	MEM-Q12PÖ/H10-KL2	87			
6372161086	MEM-M10PÖ/H10-KL2	83			
6372162091	MEK-M12PÖ/H10-KL2	84			
6372162092	MEM-M12PÖ/H10-KL2	84			
6372163099	MEK-M18PÖ/H10-KL2	85			
6372163100	MEM-M18PÖ/H10-KL2	85			
6372190082	MEK-E50PÖ/H10-KL2	88			
6372245079	MEK-E45PS/H10-KL2	88			
6372255083	MEM-Q12PS/H10-KL2	87			
6372261085	MEM-M10PS/H10-KL2	83			
6372262089	MEK-M12PS/H10-KL2	84			
6372262090	MEM-M12PS/H10-KL2	84			
6372263097	MEK-M18PS/H10-KL2	85			
6372263098	MEM-M18PS/H10-KL2	85			
6372281146	MEK-E22PS/HP-KL2	92			
6372281147	MEK-E22PS/HP-KL0,3S	92			
6372281148	MEK-E22PS/HP-KL2	92			
6372281149	MEK-E22PS/HP-KL0,3S	92			
6372290081	MEK-E50PS/H10-KL2	88			
6372299150	MEK-E22PS/HP-KL2	92			
6372299151	MEK-E22PS/HP-KL0,3S	92			
6373161088	MEM-M10PÖ/M01-KL2	83			
6373162095	MEK-M12PÖ/M01-KL2	84			
6373162096	MEM-M12PÖ/M01-KL2	84			
6373163103	MEK-M18PÖ/M01-KL2	86			

Ultrasonic Sensors

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
U	T	1	8	I	-	D	P	E	0	-	0	6	.	0	-	C	3	I	
Product group		Enclosure size		Installation/use		Type of voltage	Output				Range					Type of connection	Teach-in	Interface	Options

Product group		
1		Ultrasonic sensor
2	T	Thermoplastic enclosure
	N	Stainless steel enclosure
Enclosure size details		
3 - 4	e.g. 12	M12 (stainless steel)
	e.g. 15	M30 (stainless steel)
	e.g. 18	M18 (stainless steel)
	e.g. 30	M30 (plastic)
	e.g. 25	30 x 25 x 11 (plastic)
	e.g. 80	80 x 80 x 43 (plastic)
	e.g. 36	101 x 36 x 22 (plastic)
Installation/use		
5	I	Internal transductor
	S	True scan transmitter and receiver
6	-	Dash (fixed)
Type of voltage		
7	A	AC
	D	DC 12-30 V

Digital output		
8	0	None
	P	PNP
	N	NPN
9	0	None
	E	Electrically programmable NC/NO
	...	etc.
Analogue output		
10	0	None
	I	Current - analogue
	U	Voltage - analogue
11	-	Dash (fixed)
Range		
12 - 15	The range and sensing distance are always a 4-digit specification - Millimetre values with no decimal point - Metre values with decimal point	
	e.g. 06.0	6 m
	e.g. 15.0	15 m
	e.g. 0500	500 mm
16	-	Dash (fixed)

Type of connection		
17	C	Cable type (standard C = 2 m or length in m)
	S	Connector (M12, 5-pin)
	V	Connector (M8, 4-pin)
	B	Connector (M16, 8-pin)
Teach-in method		
18	0	None
	1	Button
	2	Serial interface
	3	Contact
	...	etc.
Serial interface		
19	0	None
	1	RS232
	2	RS485
	3	I/O link
	4	CANopen
	...	etc.
Options		
20 onwards	e.g.	Preset switching points
	...	etc.

Float Switches, Standard Range

1	2	3	4	5	6	7	8	9	10	11	12	13						
M	A	A	-	7	1	3		K	S	S		1	0	0	0			
Product group		Immersion tube/float combination		General design		Number of switching points	Contact function	Switching power	Connection head	Range	Switch length in mm							

Product group		
1	M	Magnetic switch
2	Type of output	
	A	Reed contact
	I	Triac
Immersion tube/float combination		
3	Immersion tube material 1.4571	
	A	Cylindrical float rd. 40 x 27 POM
	V	Cylindrical float rd. 42 x 44 PVC
	T	Cylindrical float rd. 30 x 44 PP
	R	Cylindrical float rd. 30 x 44 NBR
	N	Cylindrical float rd. 45 x 47 1.4571
	E	Ball float rd. 52 1.4571
	B	Ball float rd. 62 1.4571
	G	Ball float rd. 84 1.4571
	Immersion tube material brass MS63	
	M	Cylindrical float rd. 40 x 27 POM
	L	Cylindrical float rd. 42 x 44 PVC
	C	Cylindrical float rd. 30 x 44 PP
	S	Cylindrical float rd. 30 x 44 NBR
	P	Cylindrical float rd. 45 x 47 1.4571
	F	Ball float rd. 52 1.4571
	O	Ball float rd. 62 1.4571
	H	Ball float rd. 84 1.4571
	Immersion tube material PVC	
	K	Cylindrical float rd. 40 x 27 POM
	D	Cylindrical float rd. 42 x 44 PVC
	I	Cylindrical float rd. 30 x 44 PP
	U	Cylindrical float rd. 30 x 44 NBR
4	-	Dash (fixed)

General design		
5	7	Float switch
Number of switching points		
6	1	1 switching point
	2	2 switching points
	...	etc.
Contact function		
7	1	NC contact
	2	NO contact
	3	Changeover contact
	4	Mixed configuration (NC, NO, CO)
8		Space (fixed)
Switching power		
9	B	250 V; 0.5 A; 10 VA
	F	250 V; 3.0 A; 100 VA
	K	250 V; 0.5 A; 30 VA
	L	250 V; 1.0 A; 60 VA
	P	250 V; 5.0 A; 250 VA
	X	100 V; 0.25 A; 5 VA
Connection head		
10	Straight immersion tube	
	A	Half cable gland G3/8"
	V	Cable gland PG9
	D	Degussa plastic enclosure
	F	Aluminium enclosure DIN 43729
	K	PVC screw connection R2" connector DIN 43650
	N	PVC screw connection R1.5" connector Amphenol
	O	PVC screw connection R2" connector Amphenol
	R	PVC screw connection R1.5" connector DIN 43650

	S	Flange enclosure rd. 78
	T	PC flange rd. 75 connector DIN 43650
	TO	PC oval flange connector DIN 43650
	FL120	Flange enclosure rd. 120
	DN50	Flange DN65 with enclosure 80 x 80
	DN65	Flange DN65 with enclosure 80 x 80
	R1,5	Tank cable gland R1.5" with enclosure 80 x 80
	R2	Tank cable gland R2" with enclosure 80 x 80
	Elbow immersion tube	
	C	Half cable gland G3/8"
	H	Cable gland PG9
	E	Degussa plastic enclosure
	G	Aluminium enclosure DIN 43729
	L	PVC screw connection R2" connector DIN 43650
	M	PVC screw connection R1.5" connector Amphenol
	P	PVC screw connection R2" connector Amphenol
	I	PVC screw connection R1.5" connector DIN 43650
	B	Flange enclosure rd. 78
	W	PC flange rd. 75 connector DIN 43650
	TW	PC oval flange connector DIN 43650
	WFL120	Flange enclosure rd. 120
	WDN50	Flange DN50 with enclosure 80 x 80
	WDN65	Flange DN65 with enclosure 80 x 80
Range		
11	S	Standard range
12		Space (fixed)
Switch length in mm		
13		Switch length - X

Adjustable Float Switches

1	2	3	4	5	6	7	8	9	10	11	12	13						
M	A	N	-	V	S	T	-	R	2,0	/	0	2	5	0				
Product group		Immersion tube/float combination		Type			Connection head			Switch length in mm								

Product group		
1 – 2	MA	Magnetic switch, reed contact
Immersion tube/float combination		
3	Immersion tube material 1.4571	
	N	Cylindrical float rd. 52 x 55 1.4571
	V	Cylindrical float rd. 52 x 55 PVC
Immersion tube material brass MS63		
	P	Cylindrical float rd. 52 x 55 1.4571
	L	Cylindrical float rd. 52 x 55 PVC
Immersion tube material brass MS63		
	D	Cylindrical float rd. 52 x 55 PVC
4	-	Dash (fixed)

Type		
5 – 7	VST	Adjustable
8	-	Dash (fixed)
Connection head		
9 – 11	R2,0	Tank cable gland R2" with enclosure 80 x 80
	R1,5	Tank cable gland R1.5" with enclosure 80 x 80
	FL165	Flange DN50 with enclosure 80 x 80
	FL185	Flange DN65 with enclosure 80 x 80
	FL120	Flange enclosure rd. 120
	FLS120	Flange enclosure rd. 120 with protective tube
12	/	Slash (fixed)
Switch length in mm		
13		Switch length – X

Miniature Float Switches

1	2	3	4	5	6	7	8	9	10				
MS	K1	-	PVC	-	R1/8	-	OSO		0	3	5	0	
Range	Float		Immersion tube material		Connection head		Position and number of switching points, with switching function		Switch length in mm				

Range		
1	MS	Miniature float switches
Float		
2	K1	rd. 25 x 20, PP
	K2	rd. 25 x 20, PVC
	K3	rd. 20 x 20, NBR
	K4	rd. 23 x 25, NBR
	K5	rd. 23 x 32, NBR
	K6	rd. 17,5 x 25, NBR
	K7	rd. 25 x 20, PVDF
	K8	rd. 25 x 20, PTFE
	N1	rd. 30, 1.4571
	KS	Pivoted float
3	-	Dash (fixed)
Immersion tube material		
4	NI	Stainless steel 1.4571
	MS	Brass MS63
	PVC	Polyvinyl chloride
	PP	Polypropylene
	POM	Polyacetal

Immersion tube material		
	PVDF	Polyvinyl idenfluoride
	PTFE	Polytetrafluoroethylene
	PA	Polyamide
5	-	Dash (fixed)
Connection head		
6	R1/8	Screw connection R1/8"
	R1/4	Screw connection R1/4"
	R3/8	Screw connection R3/8"
	R1	Screw connection R1"
	R1,5	Screw connection R1,5"
	PG7	Screw connection PG7
	PG9	Screw connection PG9
	M12X1	Screw connection M12x1
	M24X1	Screw connection M24x1
	F40	Flange, rd. 40
	FL75	Flange, rd. 75
	FL36	Flange, 36 x 36 with cable
	FL36ST	Flange, 36 x 36 with connector
	TO	Oval flange
	OV	No connection head

7	-	Dash (fixed)
Position and number of switching points, with switching function		
8	Switching function	
	O	NC contact
	S	NO contact
	U	Changeover contact
	Position and number	
	3 switching points	e.g. NC/NO/NC = top/middle/bottom
	2 switching points	e.g. CO/NO = top/bottom
	1 switching point	e.g. NC = bottom
9		Space
Switch length in mm		
10		Switch length - X

Options

1	2	3	4	5	6	7	8	9	10	11	12	13	14				
K	L	2	E	V	P	S	N	T	F	Z	I	D	G				

1	K	Short circuit-proof
2	L	LED
3	2	Cable length in m
4	E	Extended sensing distance (sn large)
5	V	Shortened type
6	P	Potentiometer
7	S	Device connector (terminals)
	PU	PUR cable
	SD	Connector to DIN 43650 (including socket)
	SM	Mini snap-in device connector
	S8	M8 device connector with union nut
	S12	Mini snap-in/M8 screw-on device connector
	SM8	M12 device connector with union nut, AC version
	S12A	M16 device connector with union nut and dust cap
	S16S	M12 Ultra-Lock device connector
	S12U	M5 x 0.5 device connector
	S5	Screw connection with cable

8	N	Stainless steel enclosure
9	T	Extended temperature range
10	F	Extended switching frequency
11	Z	Time-delayed
12	I	Programmable (intelligent)
13	D	ATEX products, dust Ex
14	G	ATEX products, gas Ex

Cable Connectors

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17			
W	D	K	-	M	1	2	P	S	/	L	L	2	-	2	P	U			
Device specifications			Type of connection				Classification			LEDs			Cable length	Options					

Device specifications		
1		Cable output
	W	Elbow
	G	Straight
2		Product group
	D	Socket
	S	Connector (the sensor connections should always be used as the basis for connecting lines with different outputs)
	A	Adapter (socket and connector)
3		Preassembly
	K	Fixed cable
	A	Connection space, self-configurable
	V	Connecting line (extension)
4	-	Dash (fixed)
Type of connection		
5 - 7		(Immer auf Dose/Stecker bezogen)
	M12	Union nut M12 x 1
	M08	Union nut M8 x 1
	R06	Round snap-in connection Ø 6.5 mm
	R12	Round snap-in connection, Ultra-Lock M12
	M05	M5 x 0.5 screw-on connection

Classification		
8		Configuration for switch output
	P	PNP (LED to negative)
	N	N = NPN (LED to positive)
	U	Universal (no LED)
	A	AC (M12 special coding Pin 1 + 2)
9		Pin assignments of cable sockets for switch output
	S	NO contact 1 - 3 - 4 for M12 1 - 3 - 2 for Mini 1 - 2 for M12 AC
	Ö	NC contact 1 - 3 - 2 for M12
	A	Antivalent 1 - 3 - 4 - 2 for M12
	N	NAMUR 1 - 3 for M12
	U	More than 4 connections
	T	Teach-in function
10	/	Slash (fixed)
Manufacturer		
11		Internal information

LEDs		
12	L	Integrated LED
	O	Without LED
13		Number of LEDs
	0	No LED
	1	1 LED
	2	2 LEDs etc.
14	-	Dash (fixed)
Cable length		
15		In m (moulded cable)
Options		
16 - 17	PU	Polyurethane cable
	HF	Highly flexible cable
	SD	Connector/socket
	BD	Socket both ends
	R	Vibration safeguard
	Without	PVC cable

Mounting Material

1	2	3	4	5	6	7	8	9											
B	K	S	-	D	2	0	P	A											
Product group			Type group				Material												

Product group		
1	B	Mounting material
2		Type of product
	K	Retaining bracket
	W	Mounting bracket
	H	Retaining plate
3		Specification
	S	Bracket, 2-piece
	B	Block, 1-piece
	R	Reducer
	N	90° elbow
4	-	Dash (fixed)

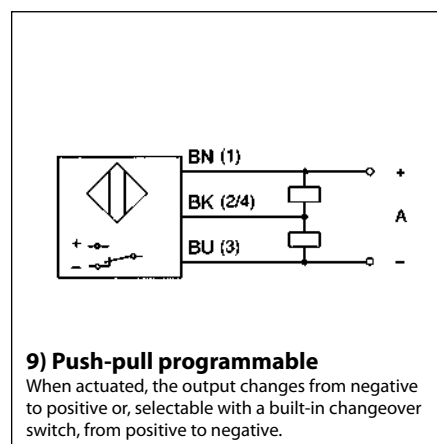
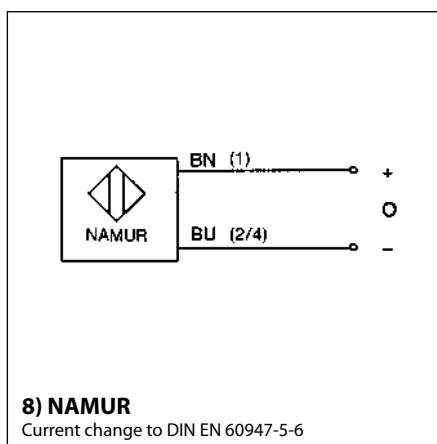
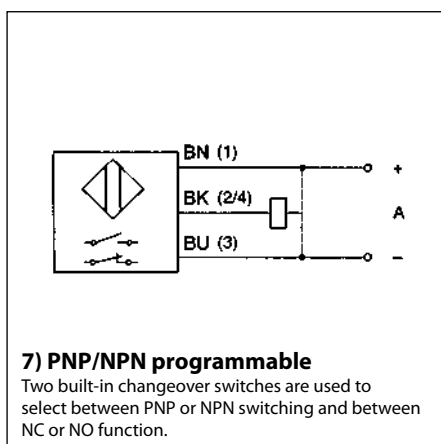
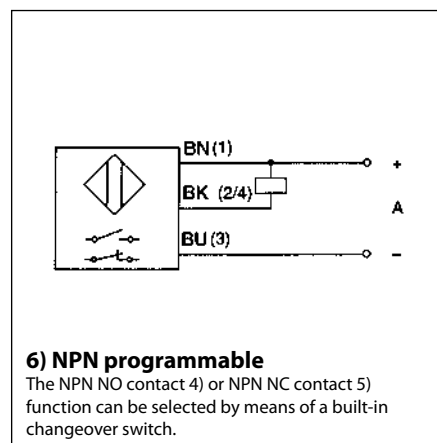
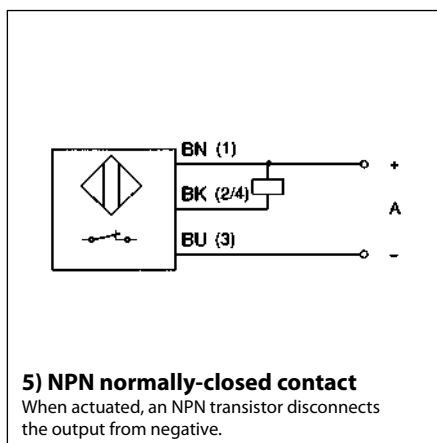
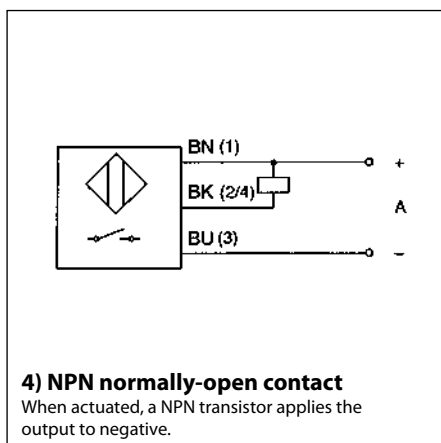
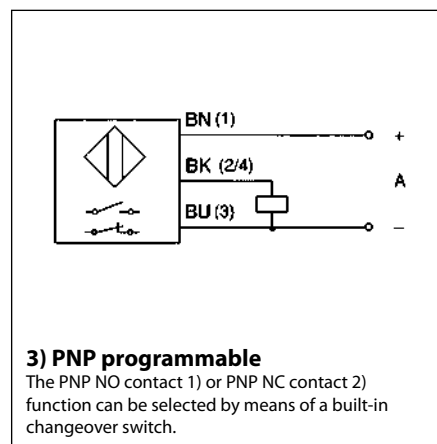
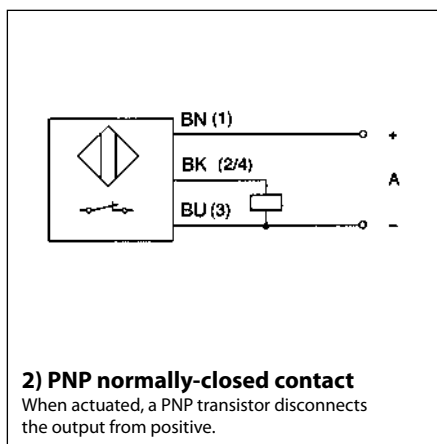
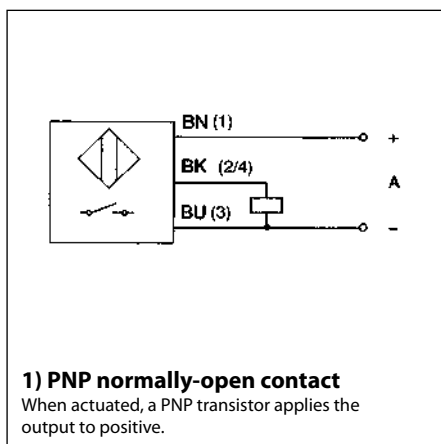
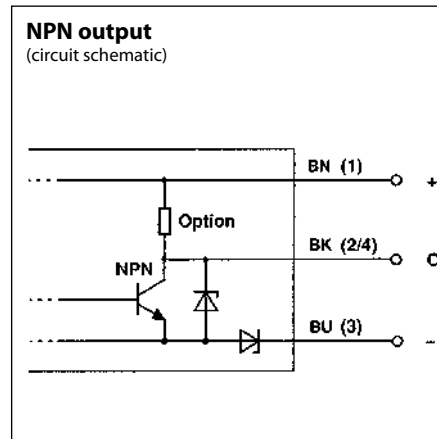
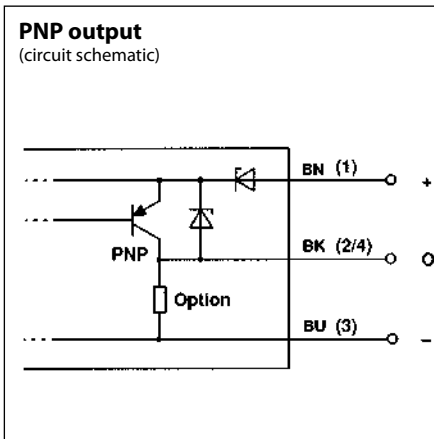
Type group		
5-7		For clips:
		Diameter in mm corresponding to matching sensor
		For elbows: Type group
	e.g. L05	Light barrier OR05
	e.g. M06	Magnetic switch M06
Material		
8-9		Material
	ST	Steel
	NI	Stainless steel
	AL	Aluminium
	PA	Polyamide
	PP	Polypropylene

Wiring Diagrams

Ausgangsarten DC 1

Cable colour abbreviations

BN = Brown
 BU = Blue
 BK = Black (switch output)

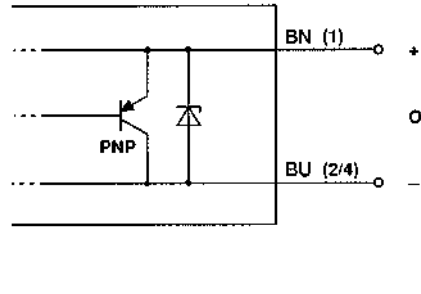


Types of Output DC 2

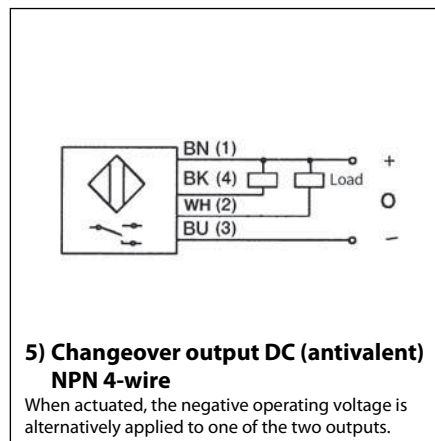
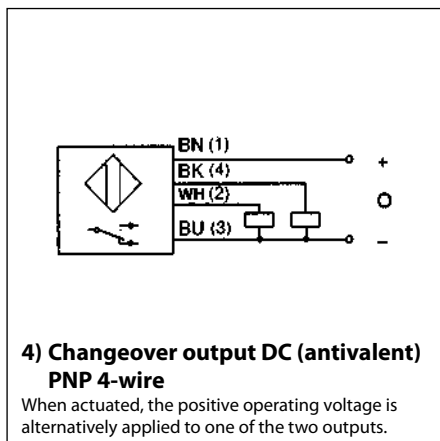
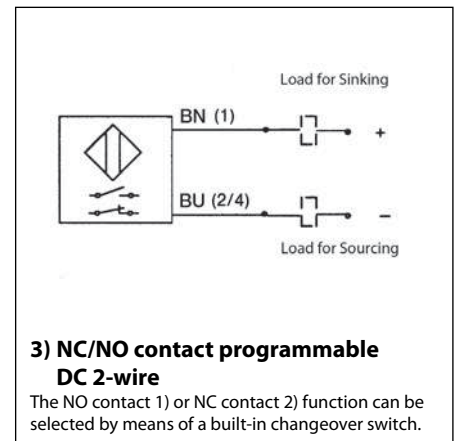
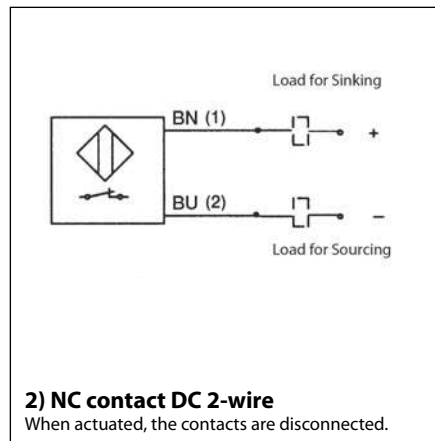
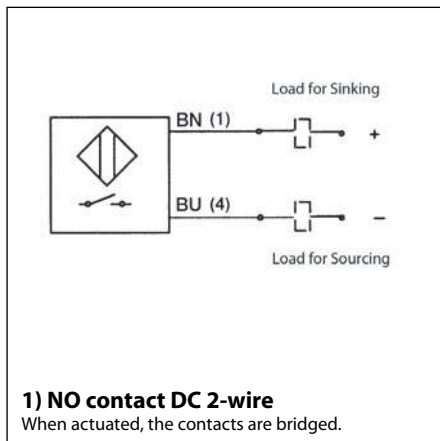
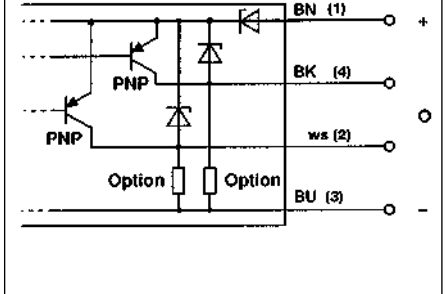
Cable colour abbreviations

BN = Brown
 BU = Blue
 BK = Black (switch output)
 WH = White (switch output)

DC 2-wire
 (circuit schematic)



DC 4-wire
 (circuit schematic)



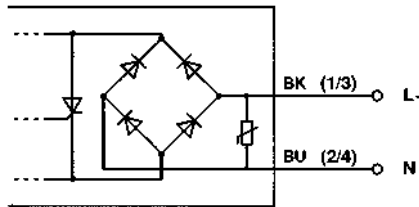
Wiring Diagrams

Types of Output AC 1

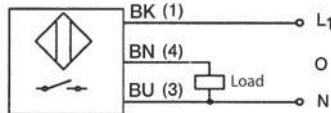
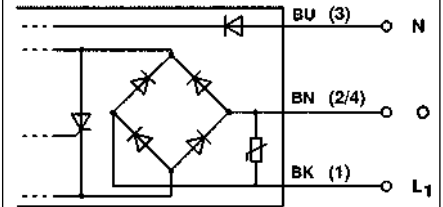
Cable colour abbreviations

BN = Brown
 BU = Blue
 BK = Black

AC 2-wire
 (circuit schematic)

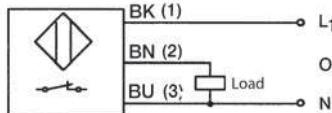


AC 3-wire
 (circuit schematic)



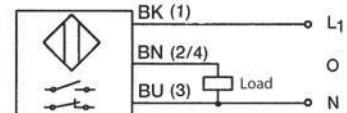
1) NO contact AC 3-wire

When actuated, a thyristor connected across a rectifier bridge applies the operating voltage to the output.



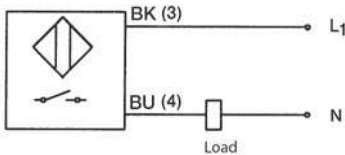
2) NC contact AC 3-wire

When actuated, a thyristor connected across a rectifier bridge disconnects the operating voltage from the output.



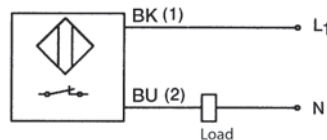
3) NC/NO contact programmable AC 3-wire

The AC NO contact 1) or AC NC contact 2) function can be selected by means of a built-in changeover switch.



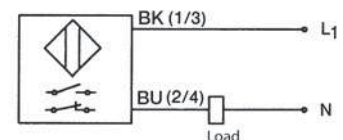
4) NO contact AC 2-wire

When actuated, a thyristor connected across a rectifier bridge applies the load to the operating voltage.



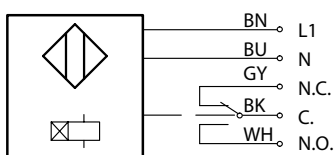
5) NC contact AC 2-wire

When actuated, a thyristor connected across a rectifier bridge disconnects the load from the operating voltage.



6) NC/NO contact programmable AC 2-wire

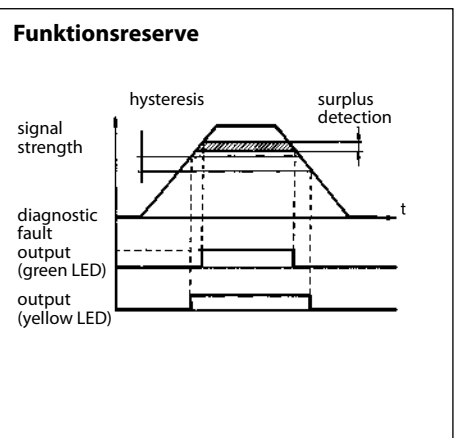
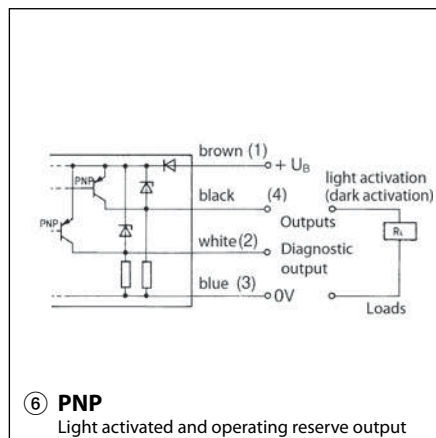
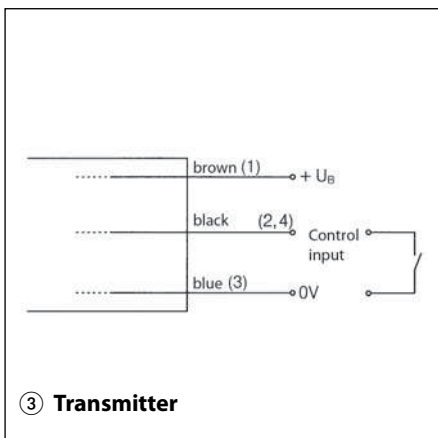
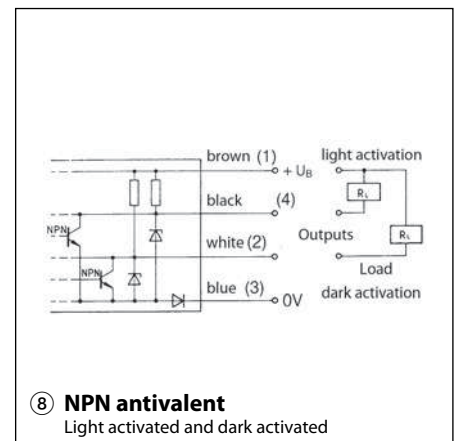
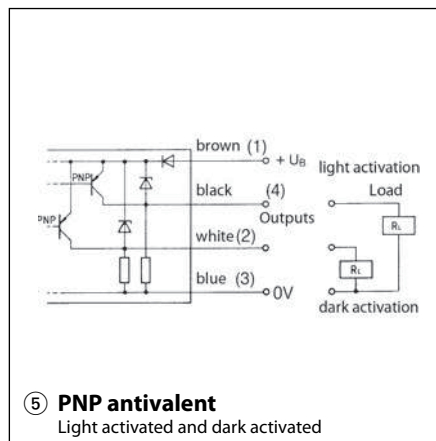
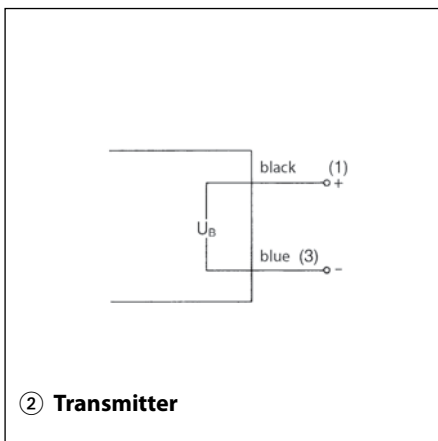
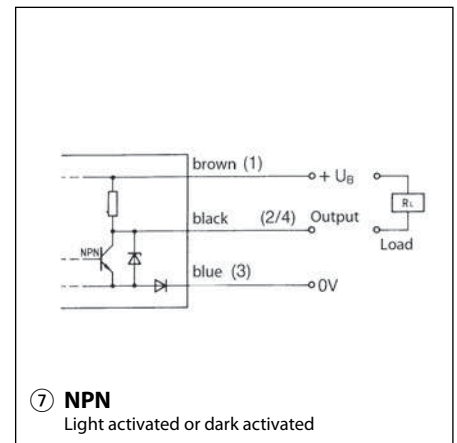
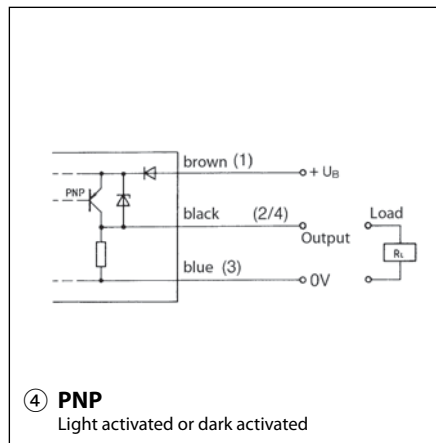
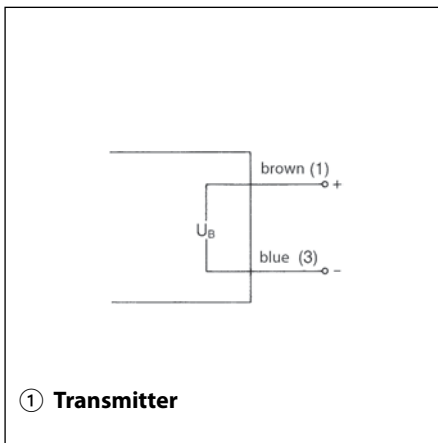
The AC NO contact 4) or AC NC contact 5) function can be selected by means of a built-in changeover switch.



7) AC relay output

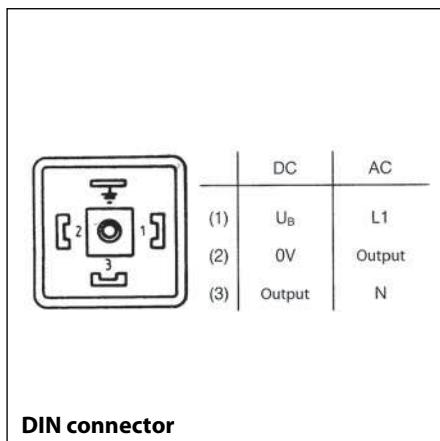
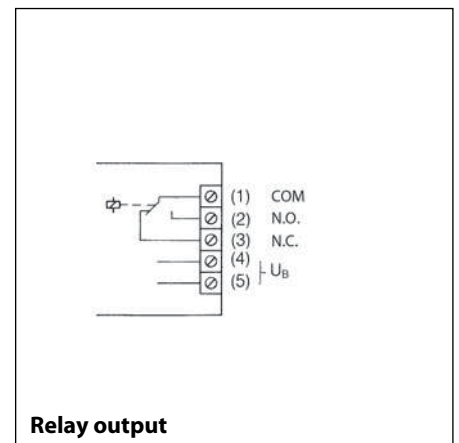
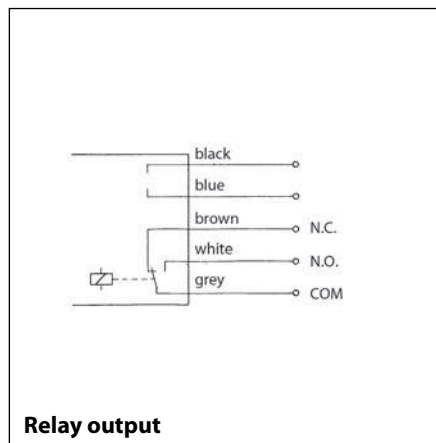
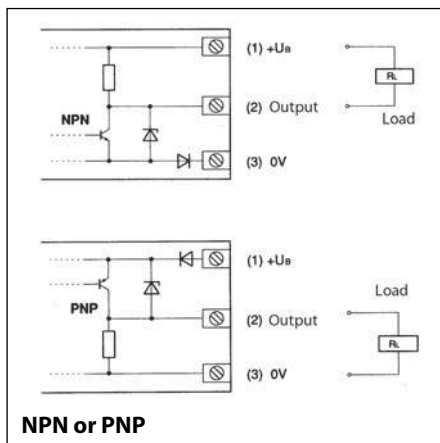
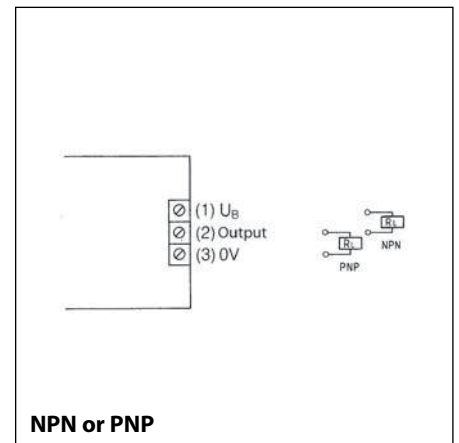
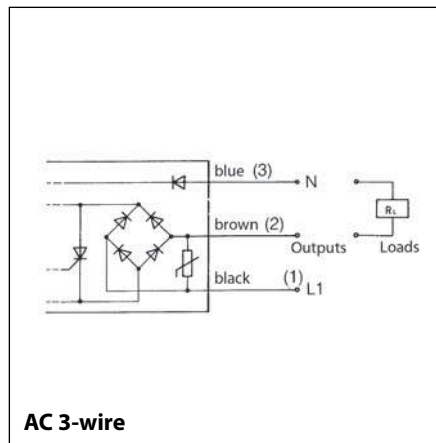
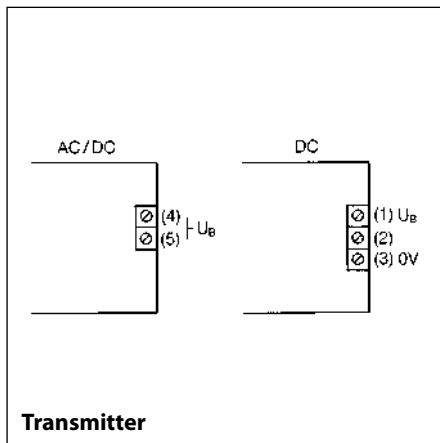
With adjustable pickup delay

Optoelectronic Sensors 1



Wiring Diagrams

Optoelectronic Sensors 2




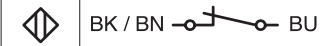



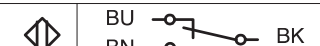



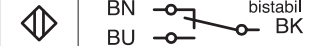
Type of Contact

Electric Loading Capacity of Reed Contacts AC/DC

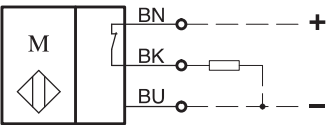
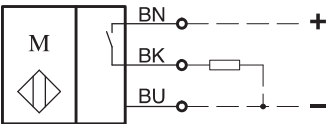
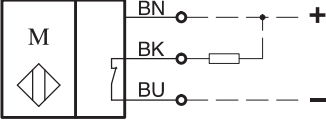
Contact type ID	Power	Voltage	Current
R	3 VA	28 V	0.25 A
X	5 VA	100 V	0.25 A
B	10 VA	250 V	0.5 A
Y	10 VA	100 V	0.5 A
A	20 VA	250 V	0.5 A
K	30 VA	250 V	0.5 A
H	60 VA	250 V	1.0 A
L	60 VA	250 V	1.0 A
M	80 VA	250 V	1.0 A
F	100 VA	250 V	3.0 A
G	250 VA*	250 V	5.0 A*
P	250 VA*	250 V	5.0 A*

* Maximum make current for the duration of 2 ms
2.5 A; 100 W/VA in continuous operation

Wiring Diagrams Electromechanical Magnetic Switches

contact		
NO contact		
Changeover contact		
Bistable ON-OFF		
Bistable Changeover contact		

Wiring Diagrams Electronic Magnetic Switches

NC contact, PNP	
NO contact, PNP/PNP, bistable	
NC contact, NPN	
NO contact, NPN	