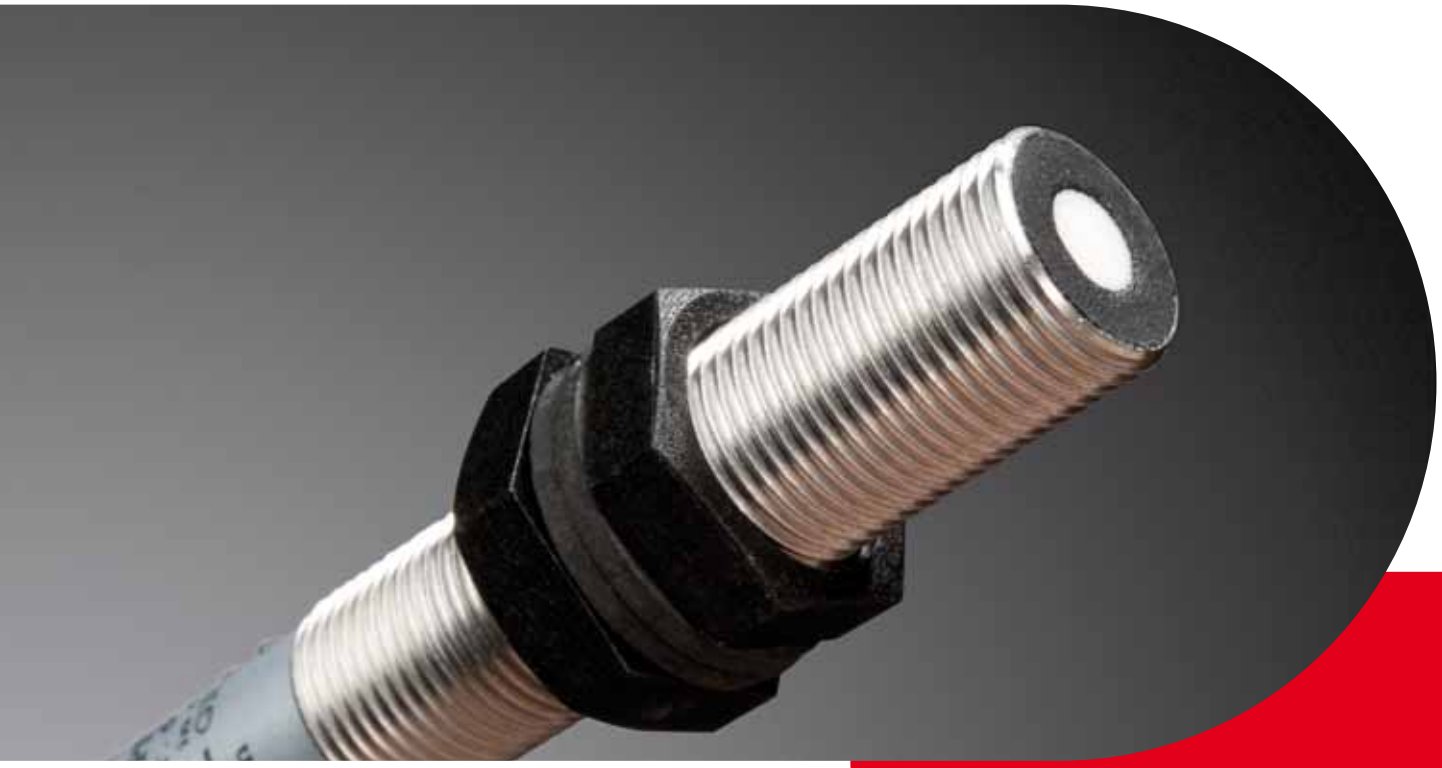
BERNSTEIN



Complete Range
Sensor Systems

BERNSTEIN



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.

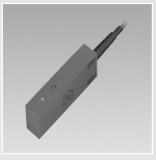


This functionality is achieved by the use of state-of-the-art microcontrollers and advanced sensor technologies. Modern sensors from BERNSTEIN therefore open up new applications, extend the range of functions and as a result significantly increase efficiency.

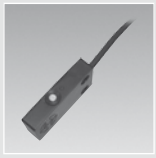
Complementing our product range we offer attractive customer services:

- 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
	• ø 3 mm • ø 4 mm • ø 6,5 mm • M4 • M5	14
	• M8	16
	• M12	18
	• M18	22
	• M30	28
	• ø 34 mm	32
	• 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
	• 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
	• 68 x 30 x 15 mm • 40 x 40 mm	36

Capacitive Sensors

	Type	Page
	General	38
	• M12 • M18	42
	• M30 • M32	44
	• ø 20 mm • ø 34 mm	46
	• 50 x 25 x 10 mm • 68 x 30 x 15 mm	47

Optoelectronic Sensors

	Type	Page
	General	48
	• M12	50
	• M18 • M30	51
	• 12 x 12 x 55 mm • 12 x 12 x 60 mm • 12 x 12 x 65 mm	60
	• 30 x 30 x 15 mm • 40 x 26 x 12 mm	61
	• 50 x 50 x 15 mm	63
	• 88 x 63 x 24 mm	64
	• ø 20 mm	67

Magnetic Switches

Type	Page
General	**68**
 **Electromechanical magnetic switches** • Plastic • Metal	**72**
General	**80**
 **Electronic magnetic sensors** • Plastic • Metal	**82**

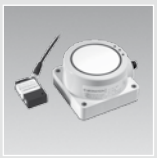
Slot Sensors

Type	Page
General	**90**
 **• E22** **• E30** • Teachable • Electronic • Reed contact	**92**

Magnetic Monitoring Systems

Type	Page
General	**94**
 • Magnetic monitoring stations • Coded magnetic switches	**96**

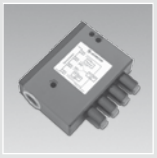
Ultrasonic Sensors

Type	Page
General	**98**
 **• M12** **• M18** **• M30**	**100**
 **• 40 x 26 x 12 mm** **• 80 x 80 x 50 mm**	**104**

Float Switches

Type	Page
General	**106**
 **Standard float switches** • Stainless • Brass • PVC	**112**
 **Miniature float switches** • Stainless • Brass • PP • PVC	**120**
 **Adjustable float switches** • Stainless • PVC	**124**
 **Accessories** • Range of floats • Technical data • Chemical resistance table • Enquiry/order form	**128**

Accessories

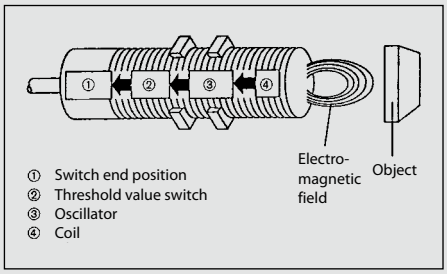
 **Magnets**	**136**
 **Cable couplers**	**141**
 **• Reflectors** **• Mounting brackets**	**144**
 **Sensor tester**	**147**

Annex

Type code	**148**
Wiring diagrams	**162**

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.

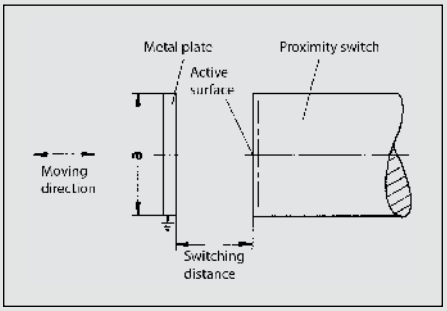


Sensing distance

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)

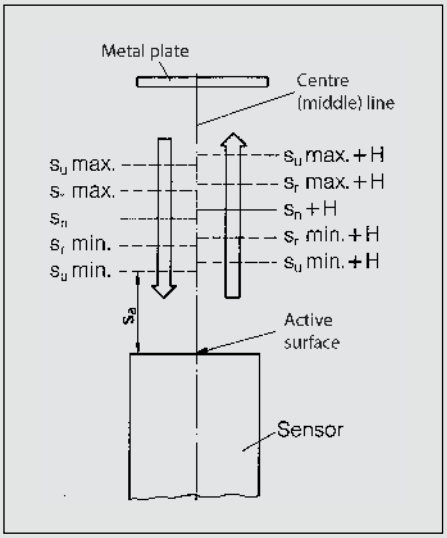
The useable sensing distance is measured within the permissible temperature and voltage ranges and is 90 % – 110 % of the real sensing distance.

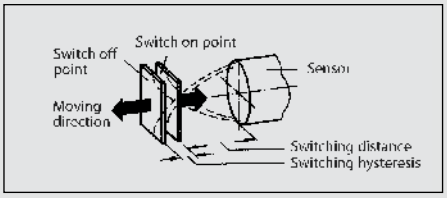
Operational sensing distance: (Sa)
(Assured operation distance)

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. Sa ~ 0.81 Sn

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.



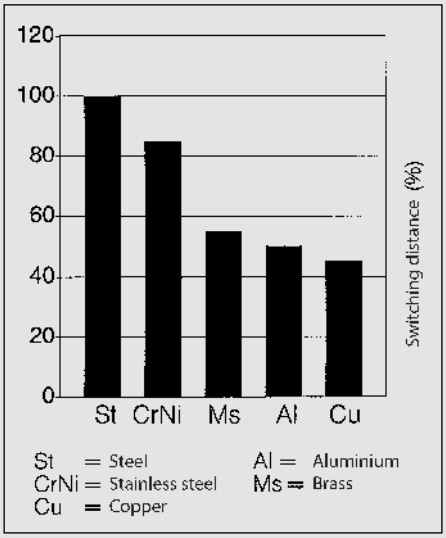


Repeatability

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

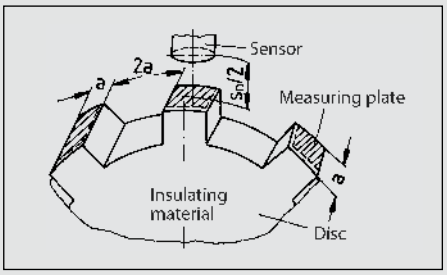
Reduction factors

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 redating, 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 µs.

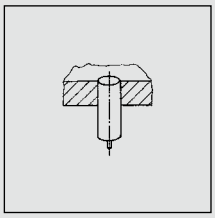
Temperaturee range

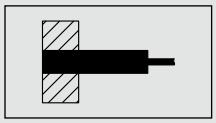
For most sensors, the permissible ambient temperature range is between -25 °C and +70 °C (-13 °F to +158 °F). Sensors with an extended temperature range of -40 °C to +100 °C are also available.

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

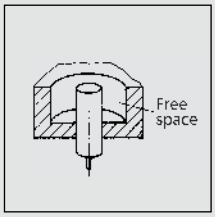


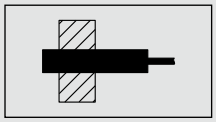


Catalogue symbol for flush mount

The active face can be flush with a metal surface.

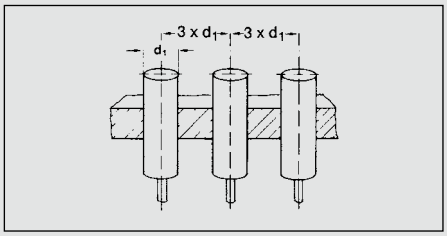
Non-flush mount



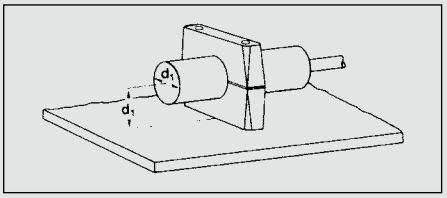


Catalogue symbol for non-flush mount

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



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 predected 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 predected 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

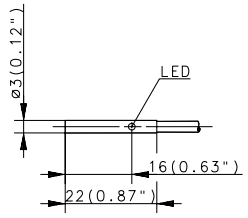
Standards and approvals

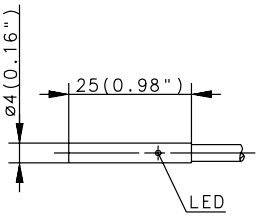
All sensors are CE-certified. The following European standards apply in accordance with CENELEC:

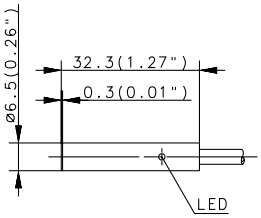
- EN 60947-5-2 Proximity switches
- EN 60947-5-6 NAMUR sensors

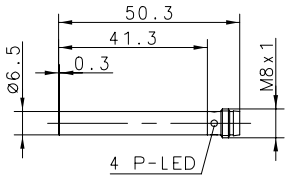
Inductive Sensors (Type Ø 3 mm, Ø 4 mm, Ø 6.5 mm, M4, M5)

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	**6502999019**	**6502999004**	**6502999010**	**6502999012**
		NC contact	**6502799007**	**6502799002**	**6502799011**	
		Antivalent NO/NC				
NPN	DC	NO contact		**6502399004**	**6502399009**	
		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				

Technical data

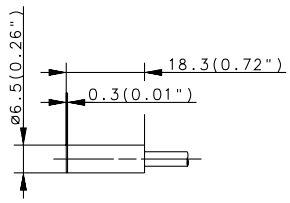
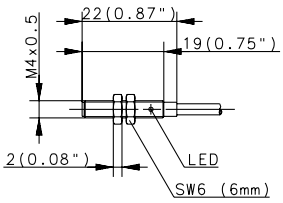
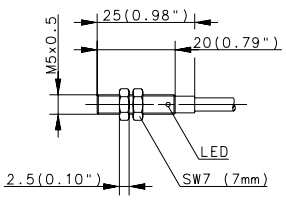
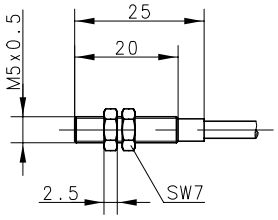
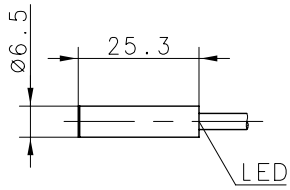
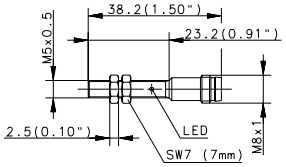
Rated operating voltage	U_B	10-30 VDC	10-30 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_B	≤ 100 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	3000 Hz	3000 Hz	1000 Hz	1000 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		LED/-	LED/-	LED/-	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 mm²	3 x 0.14 mm²	3 x 0.14 mm²	M8 x 1

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



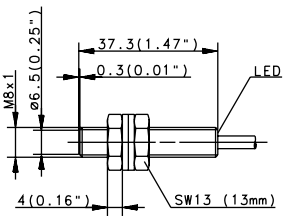
Ø 6.5 mm		**M4**	**M5**		**M5**	
Flush	Flush	Flush	Flush	Flush	Flush	
1.5 mm	1.5 mm	0.6 mm	1 mm	1 mm	1 mm	
Cable 2 m	Cable 5 m	Cable 2 m	Cable 2 m	Connector M8	Cable 2 m NAMUR	
						
						
6502999034	**6602999460**	**6502999020** **6502799008**	**6502999003** **6502799001**	**6502999018** **6502799019**		
			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 mm²	3 x 0.14 mm²	3 x 0.055 mm²	3 x 0.14 mm²	M8 x 1	2 x 0.14 mm²	

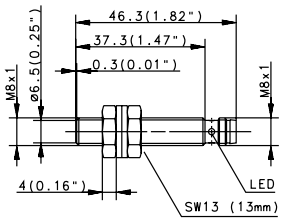
You will find detailed data sheets to the products under www.bernstein.eu

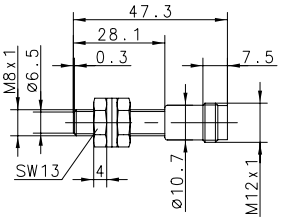


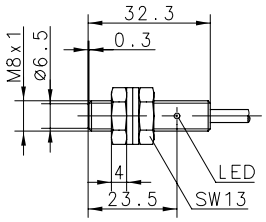
Inductive Sensors (Type M8)

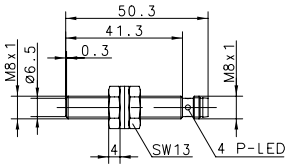
Type			**M8**		**M8**		**M8**
Type of installation			Flush	Flush	Flush	Flush	Flush
Nominal sensing distance			1.5 mm	1.5 mm	1.5 mm	1.5 mm	1.5 mm
Type of connection			Cable 2 m	Cable 6 m	Connector M8	Connector M8	Connector M12
Special feature							











PNP	DC	NO contact	**6932901001**	**6502901004**	**6932942001**		**6502942007**
		NC contact		**6502701001**		**6502742001**	
		Antivalent NO/NC					
NPN	DC	NO contact	**6932301001**		**6932342001**		
		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					

Technical data

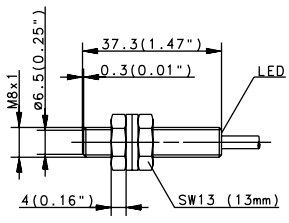
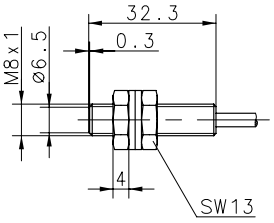
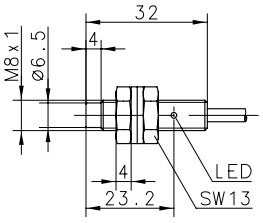
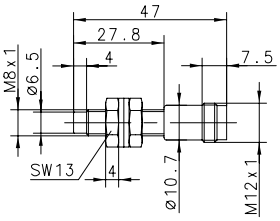
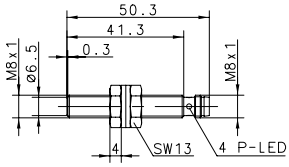
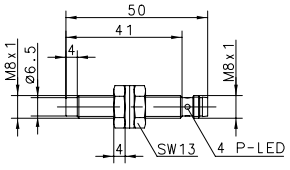
Rated operating voltage	U_B	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_B	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	1000 Hz	1000 Hz	1000 Hz	1000 Hz	1000 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage 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 mm²	3 x 0.14 mm²	M8 x 1	M8 x 1	M12 x 1

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

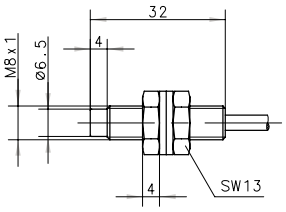
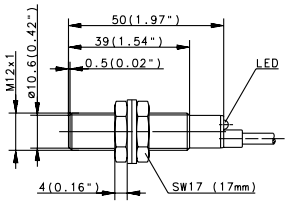
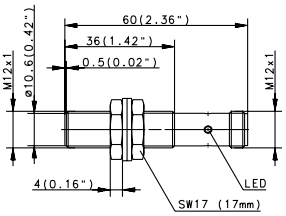
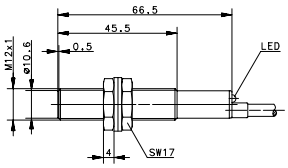
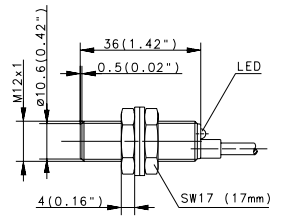


M8		M8	M8		M8	
Flush	Flush	Flush	Non-flush	Non-flush	Non-flush	
1.5 mm	1.5 mm	1.5 mm	2 mm	2 mm	2 mm	
Cable 2 m	Connector M8	Cable 2 m	Cable 2 m	Connector M8	Connector M12	
Temperature	Temperature	NAMUR				
						
						
6502901008	**6502942013**		**6502916003**	**6502942006**	**6502942008**	
6502301006						
		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 mm²	M8 x 1	2 x 0.25 mm²	3 x 0.14 mm²	M8 x 1	M12 x 1	

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



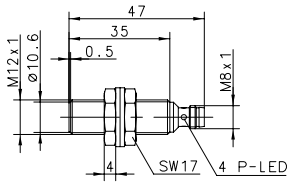
Inductive Sensors (Type M8, M12)

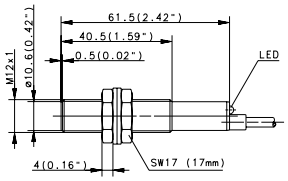
Type			**M8**	**M12**		**M12**	
Type of installation			Non-flush	Flush	Flush	Flush	Flush
Nominal sensing distance			2 mm	2 mm	2 mm	2 mm	2 mm
Type of connection			Cable 2 m	Cable 2 m	Cable 2 m	Connector M12	Cable 2 m
Special feature			NAMUR				
							
							
PNP	DC	NO contact		**6932903001**		**6932943001**	**6502903016**
		NC contact				**6602743112**	**6502703005**
		Antivalent NO/NC					
NPN	DC	NO contact		**6932303001**		**6932343001**	**6502303007**
		NC contact					**6502103003**
		Antivalent NO/NC					
PNP/NPN	DC	NO/NC prog.					
		push-pull operation					
NAMUR	DC		**6501601005**				
Analogue	DC						
2-wire	DC	NO contact					
		NC contact					
	AC	NO contact			**6503503001**		
		NC contact			**6503403001**		
		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 mm²	3 x 0.14 mm²	2 x 0.14 mm²	M12 x 1	3 x 0.14 mm²

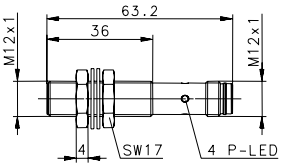
Please refer to Accessories for cable couplers, mounting brackets and sensor tester.

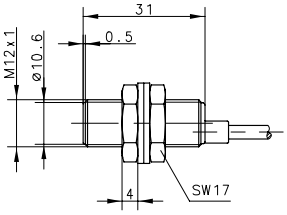


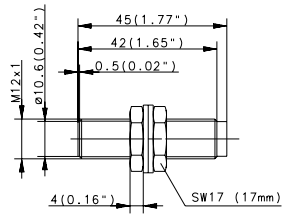
M12		M12		M12	M12	
Flush	Flush	Flush	Flush	Flush	Flush	
2 mm	2 mm	2 mm	2 mm	2 mm	2 mm	
Connector M8	Connector M12	Cable 2 m	Cable 2 m	Connector M12	Cable 2 m	
		4000 Hz	Temperature	Ultralock	NAMUR	

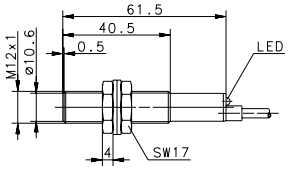












6502943008	**6502943006** **6502743005**	**6502903012**	**6502903026**	**6502943017**		
				6502343009		
					6501624760	

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/-	-/-	

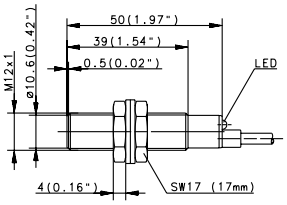
-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-40°C/+100°	-25°C/+70°C	-25°C/+70°C	
IP67	IP67	IP67	IP67	IP67	IP67	
CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	
M8 x 1	M12 x 1	3 x 0.14 mm²	3 x 0.14 mm²	M12 x 1	2 x 0.25 mm²	

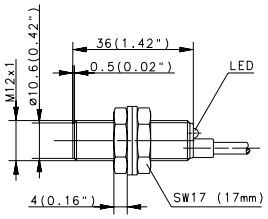
You will find detailed data sheets to the products under www.bernstein.eu

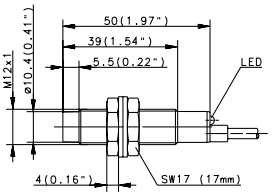


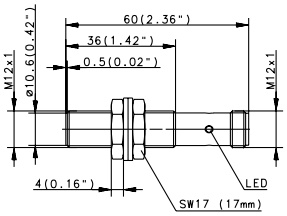
Inductive Sensors (Type M12)

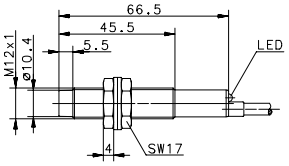
Type			**M12**		**M12**	**M12**	
Type of installation			Flush	Flush	Flush	Non-flush	Non-flush
Nominal sensing distance			4 mm	4 mm	4 mm	4 mm	4 mm
Type of connection			Cable 2 m	Connector M12	Cable 2 m	Cable 2 m	Cable 2 m
Special feature			Sensing dist.	Sensing dist.	Sensing dist.		











PNP	DC	NO contact	**6502903025**	**6502943015**	**6502903023**	**6932904001**	
		NC contact				**6932704001**	
		Antivalent NO/NC					
NPN	DC	NO contact				**6932304001**	
		NC contact				**6932104001**	
		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					**6503504001**
		NC contact					**6503404001**
		Changeover contact					

Technical data

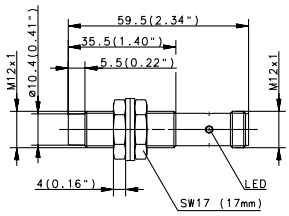
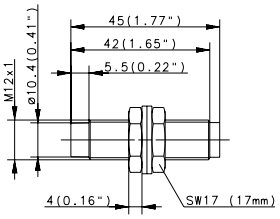
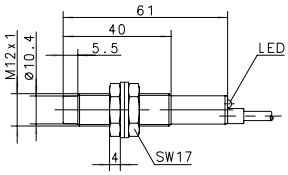
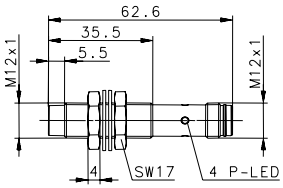
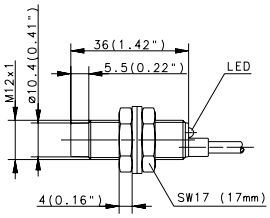
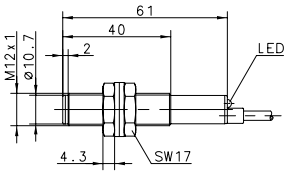
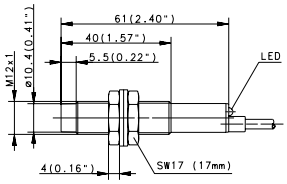
Rated operating voltage	U_B	10-30 VDC	10-36 VDC	10-36 VDC	10-36 VDC	76-250 V AC
Rated operating current	I_B	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	800 Hz	800 Hz	800 Hz	400 Hz	≈ 10 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	-
Function/operating voltage indicator		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 mm²	M12 x 1	3 x 0.14 mm²	3 x 0.14 mm²	2 x 0.14 mm²

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



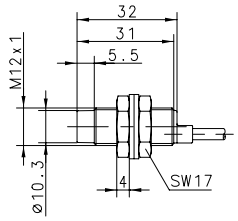
M12		M12		M12		M12	
Non-flush	Non-flush	Non-flush	Non-flush	Non-flush	Non-flush	Non-flush	
4 mm	4 mm	4 mm	4 mm	4 mm	4 mm	4 mm	
Connector M12	Cable 2 m	Connector M12	Cable 2 m Plastic	Cable 2 m	Cable 2 m 3000 Hz	Connector M12 Ultralock	
							
							
6932944001 **6502744003**	**6502904014**	**6502944006**	**6502919001**		**6502904010**	**6502944015**	
6932344001	**6502304007**					**6502344010**	
				6501304001			
10-36 VDC	10-36 VDC	10-36 VDC	10-30 VDC	10-60 VDC	10-60 VDC	10-36 VDC	
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	
400 Hz	400 Hz	400 Hz	400 Hz	400 Hz	3000 Hz	400 Hz	
Cyclic	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	-25°C/+70°C	
IP67	IP67	IP67	IP67	IP67	IP67	IP67	
CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	PA, red	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	
M12 x 1	3 x 0.14 mm²	M12 x 1	3 x 0.14 mm²	2 x 0.14 mm²	3 x 0.14 mm²	M12 x 1	

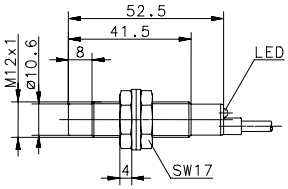
You will find detailed data sheets to the products under www.bernstein.eu

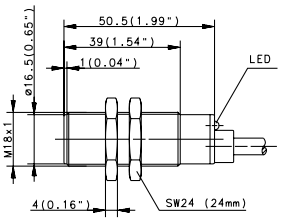


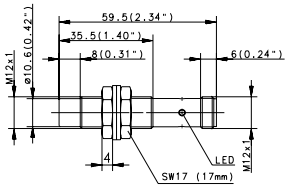
Inductive Sensors (Type M12, M18)

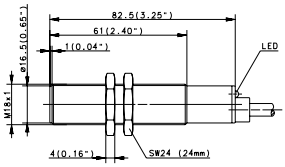
Type			**M12**	**M12**		**M18**	
Type of installation			Non-flush	Non-flush	Non-flush	Flush	Flush
Nominal sensing distane			4 mm	8 mm	8 mm	5 mm	5 mm
Type of connection			Cable 2 m	Cable 2 m	Connector M12	Cable 2 m	Cable 2 m
Special feature			NAMUR	Sensing dist.	Sensing dist.		











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

Technical data

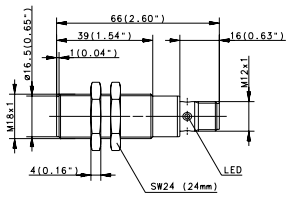
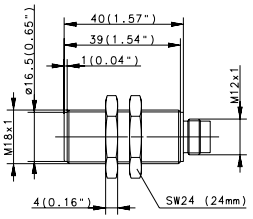
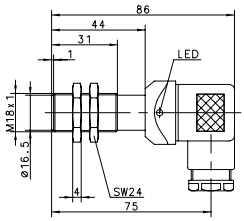
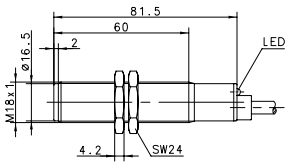
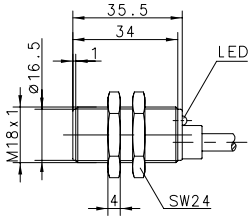
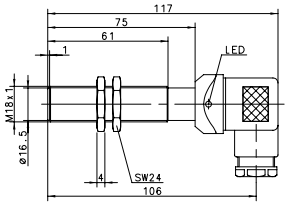
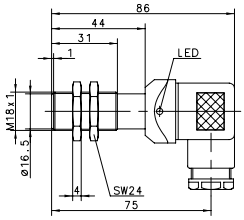
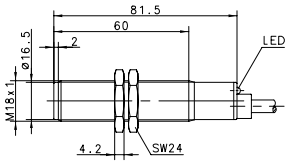
Rated operating voltage	U_B	5-25 VDC	10-36 VDC	10-36 VDC	10-36 VDC	20-250 V AC
Rated operating current	I_B	-	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 400 mA
Switching frequency (max)	F	≤ 400 Hz	400 Hz	400 Hz	500 Hz	≈ 10 Hz
Short circuit-protection		-	Cyclic	Cyclic	Cyclic	-
Function/operating voltage indicator		-/-	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 mm²	3 x 0.14 mm²	M12 x 1	3 x 0.5 mm²	2 x 0.5 mm²

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



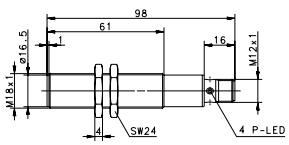
M18		M18		M18		M18		
Flush	Flush	Flush	Flush	Flush	Flush	Flush	Flush	
5 mm	5 mm	5 mm	5 mm	5 mm	5 mm	5 mm	5 mm	
Connector M12	Cable 6 m	Connector M12	DIN Connector	DIN Connector	DIN Connector	Cable 2 m Plastic	Cable 2 m Plastic	
							
							
6932905004	**6502905013**	**6502905012** **6502705007**	**6602905662** **6502705001**	**6502940001**	**6502840002**	**6502920990**		
6932305004								
							6503520697	
10-36 VDC	10-60 VDC	10-60 VDC	10-60 VDC	10-60 VDC	10-60 VDC	10-60 VDC	24-250 V AC	
≤ 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	≈ 10 Hz	
Cyclic	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	-25°C/+70°C	-25°C/+70°C	
IP67	IP67	IP67	IP65	IP65	IP65	IP67	IP67	
CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	PA, red	PA, red	
M12 x 1	3 x 0.5 mm²	M12 x 1	DIN 43650	DIN 43650	DIN 43650	3 x 0.5 mm²	2 x 0.5 mm²	

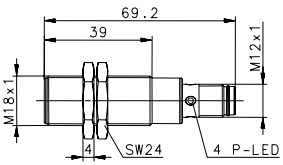
You will find detailed data sheets to the products under www.bernstein.eu

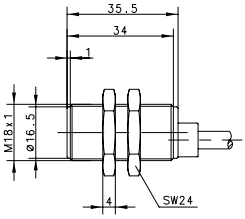


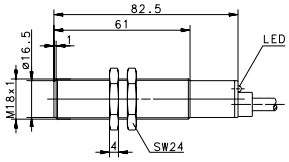
Inductive Sensors (Type M18)

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









PNP	DC	NO contact	**6502940006**	**6502905023**	**6502905026**	
		NC contact				
		Antivalent NO/NC				
NPN	DC	NO contact			**6502305013**	
		NC contact				
		Antivalent NO/NC				
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

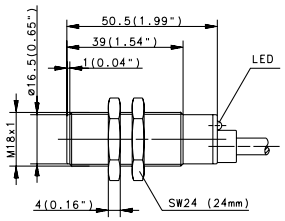
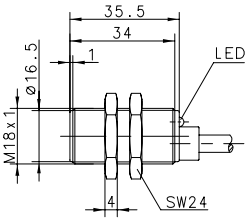
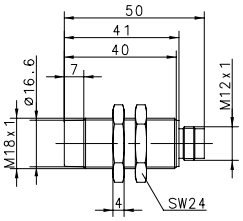
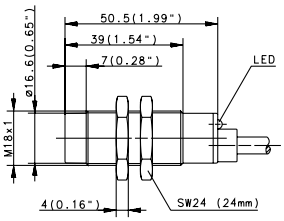
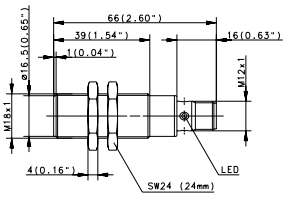
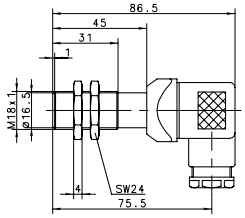
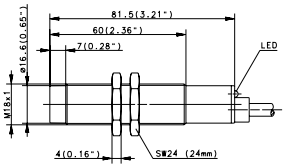
Rated operating voltage	U_B	10-30 VDC	10-30 VDC	10-36 VDC	5-25 VDC
Rated operating current	I_B	≤ 200 mA	≤ 200 mA	≤ 200 mA	-
Switching frequency (max)	F	500 Hz	500 Hz	500 Hz	≤ 400 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	-
Function/operating voltage indicator		LED/-	LED/-	LED/-	-/-
Sensing distance,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



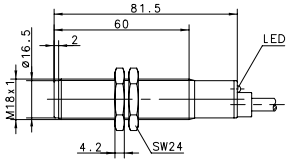
M18		M18		M18	M18		
Flush	Flush	Flush	Flush	Flush	non-Flush	non-Flush	
8 mm	8 mm	8 mm	8 mm	8 mm	8 mm	8 mm	
Cable 2 m	Connector M12	Cable 2 m	DIN Connector	Connector M12	Cable 2 m	Cable 2 m	
Sensing dist.	Sensing dist.	Sensing dist.	Sensing dist.	Sensing dist.			
							
							
6502905022	**6502940005**	**6502905010**	**6602840128**	**6502906009**	**6932906001** **6932706001**		
					6932306001		
						6503506002 **6503406001**	
10-36 VDC	10-36 VDC	10-36 VDC	12-48 VDC	10-60 VDC	10-36 VDC	20-250 V AC	
≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 400 mA	≤ 200 mA	≤ 200 mA	≤ 400 mA	
500 Hz	500 Hz	500 Hz	500 Hz	200 Hz	200 Hz	≈ 10 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	-25°C/+70°C	-25°C/+70°C	
IP67	IP67	IP67	IP65	IP67	IP67	IP67	
CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	
3 x 0.5 mm²	M12 x 1	3 x 0.5 mm²	DIN 43650	M12 x 1	3 x 0.5 mm²	2 x 0.5 mm²	

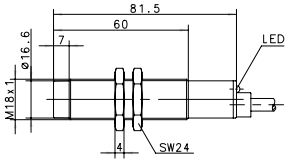
You will find detailed data sheets to the products under www.bernstein.eu

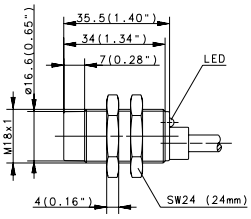


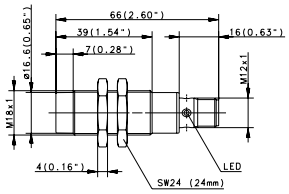
Inductive Sensors (Type M18)

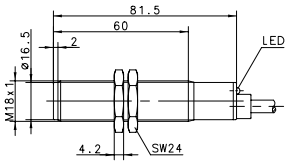
Type			**M18**		**M18**		**M18**
Type of installation			Non-flush	Non-flush	Non-flush	Non-flush	Non-flush
Nominal sensing distance			8 mm	8 mm	8 mm	8 mm	8 mm
Type of connection			Cable 2 m	Connector M12	Cable 2 m	Cable 2 m	Cable 2 m
Special feature			Plastic			Plastic	











PNP	DC	NO contact		**6932906004**		**6502921975**	**6502906006**
		NC contact		**6932706002**			**6502706002**
		Antivalent NO/NC					
NPN	DC	NO contact		**6932306004**			**6502306004**
		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				**6501306001**	
	AC	NO contact	**6503521705**				
		NC contact	**6503421704**				
		Changeover contact					

Technical data

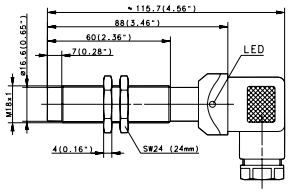
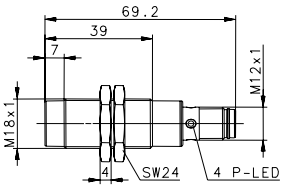
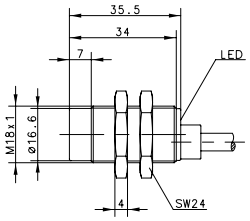
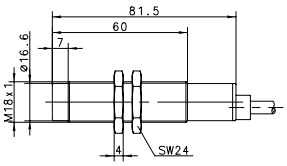
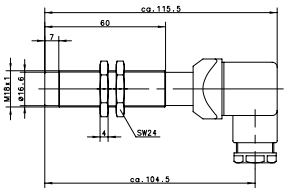
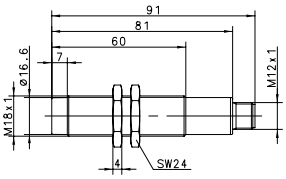
Rated operating voltage	U_B	24-250 V AC	10-36 VDC	10-60 VDC	10-60 VDC	10-60 VDC
Rated operating current	I_B	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	≈ 10 Hz	200 Hz	200 Hz	200 Hz	200 Hz
Short circuit-protection		-	Cyclic	-	Cyclic	Cyclic
Function/operating voltage indicator		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 mm²	M12 x 1	2 x 0.5 mm²	3 x 0.5 mm²	3 x 0.5 mm²

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



M18		M18	M18	M18	
Non-flush	Non-flush	Non-flush	Non-flush	Non-flush	Non-flush
8 mm	8 mm	8 mm	8 mm	8 mm	8 mm
DIN Connector	DIN Connector	Connector M12	Cable 2 m	Cable 2 m	Connector M12
		Ultralock	NAMUR		
					
					
6502941001 **6502741001**	**6602841421**	**6502906021**			
		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/-	-/-	-/-	-/-

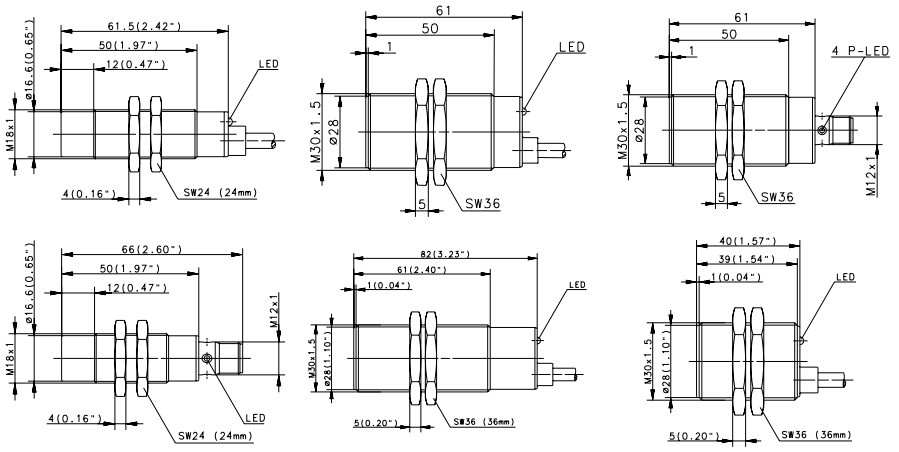
-25°C/+70°C	-40°C/+80°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
IP65	IP65	IP67	IP67	IP67	IP67
CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
DIN 43650	DIN 43650	M12 x 1	2 x 0.5 mm^2	3 x 0.5 mm^2	M12 x 1

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	**6502906018**	**6502941004**	**6932907001**		**6932907002**	**6502907003**
		NC contact						**6502707001**
		Antivalent NO/NC						
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				**6503507378**		
		NC contact				**6503407240**		
		Changeover contact						

Technical data

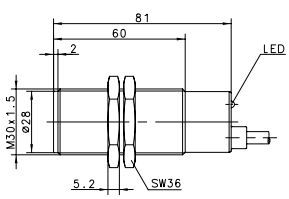
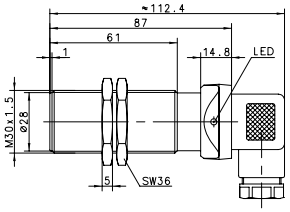
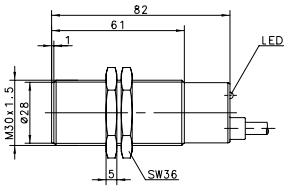
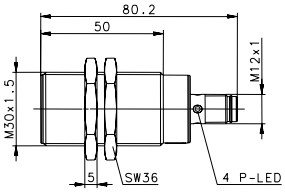
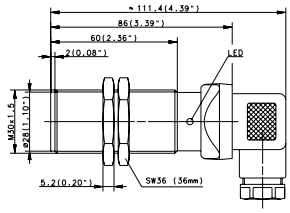
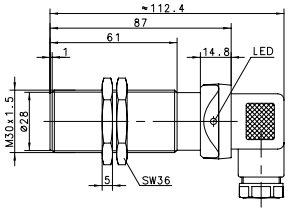
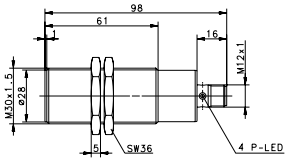
Rated operating voltage	U_B	10-36 VDC	10-36 VDC	10-36 VDC	20-250 V AC	10-36 VDC	10-60 VDC
Rated operating current	I_B	≤ 200 mA	≤ 200 mA	≤ 200 mA	≤ 400 mA	≤ 200 mA	≤ 200 mA
Switching frequency (max)	F	200 Hz	200 Hz	300 Hz	≈ 10 Hz	300 Hz	300 Hz
Short circuit-protection		Cyclic	Cyclic	Cyclic	-	Cyclic	Cyclic
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 mm²	M12 x 1	3 x 0.5 mm²	2 x 0.5 mm²	M12 x 1	3 x 0.5 mm²

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



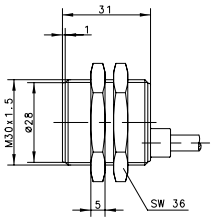
M30		M30		M30		M30	
Flush	Flush	Flush	Flush	Flush	Flush	Flush	
10 mm	10 mm	10 mm	10 mm	10 mm	10 mm	10 mm	
Cable 2 m	DIN Connector	DIN Connector	DIN Connector	Cable 2 m	Connector M12	Connector M12	
Plastic	Plastic			Temperature	Temperature	Ultralock	
							
							
6502722708		**6502939001**		**6502907013**	**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 mm²	DIN 43650	DIN 43650	DIN 43650	3 x 0.5 mm²	M12 x 1	M12 x 1	

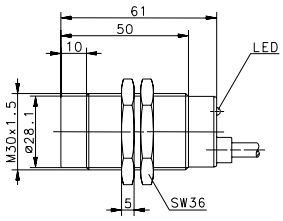
You will find detailed data sheets to the products under www.bernstein.eu

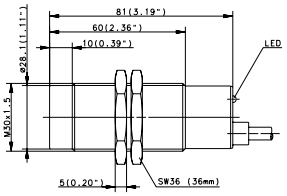


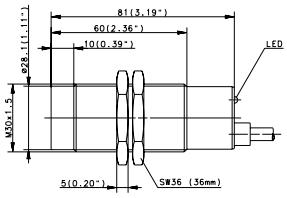
Inductive Sensors (Type M30)

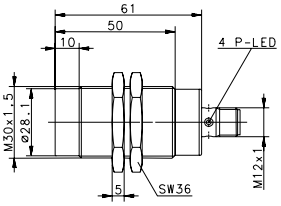
Type			**M30**	**M30**		**M30**	
Type of installation			Flush	Non-flush	Non-flush	Non-flush	Non-flush
Nominal sensing distance			10 mm	15 mm	15 mm	15 mm	15 mm
Type of connection			Cable 2 m	Cable 2 m	Cable 2 m	Cable 2.5 m	Connector M12
Special feature			NAMUR				











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

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						

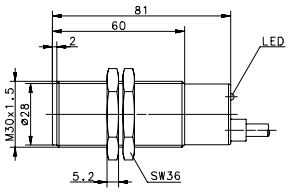
Mechanical data

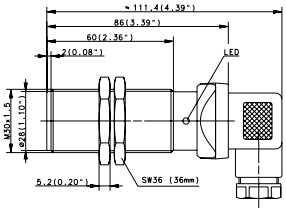
Ambient temperature (min/max)	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529	IP67	IP67	IP67	IP67	IP67
Enclosure material	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3
Connection	2 x 0.5 mm²	3 x 0.5 mm²	3 x 0.5 mm²	2 x 0.5 mm²	M12 x 1

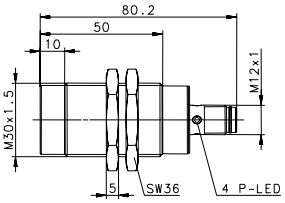
Please refer to Accessories for cable couplers, mounting brackets and sensor tester.

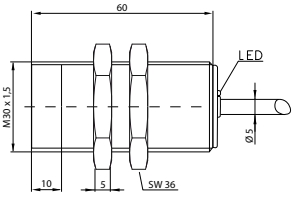


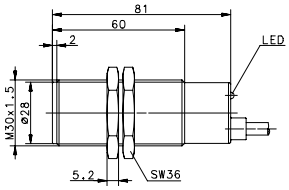
M30		M30		M30	M30	
Non-flush	Non-flush	Non-flush	Non-flush	Non-flush	Non-flush	
15 mm	15 mm	15 mm	15 mm	15 mm	40 mm	
Cable 2 m	Cable 2.5 m	DIN Connector	DIN Connector	Connector M12	Cable 2 m	
Plastic	Plastic	Plastic		Ultralock	Sensing dist.	

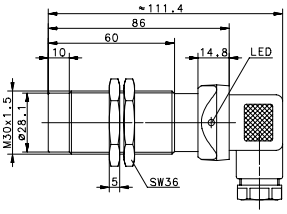












6502923981		6502935001		6502908008	6502908009	
		6502836860				
				6502008001		
	6503523956 6503423955					

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 mm²	2 x 0.5 mm²	DIN 43650	DIN 43650	M12 x 1	3 x 0.34 mm²	

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

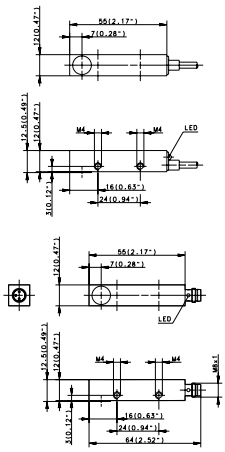
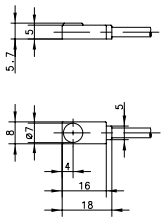
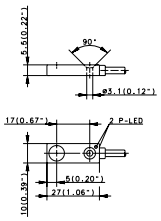
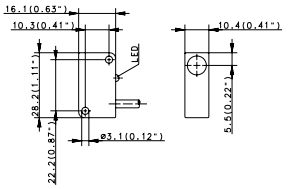
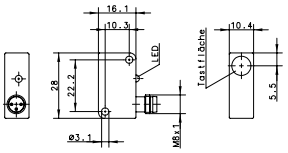


Inductive Sensors (Type Ø 34 mm, 5 x 5, 8 x 8, 12 x 12, 16 x 8, 27 x 10, 28 x 16)

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	**6502915002**	**6502999026**	**6502980004**	**6602980087**	**6502980002**
		NC contact	**6502715001**	**6502799010**	**6502780001**		**6502780002**
		Antivalent NO/NC					
NPN	DC	NO contact			**6502380001**		
		NC contact					
		Antivalent NO/NC					
PNP/NPN	DC	NO/NC prog.	**6502915001**				
		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		10-60 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 mm²	3 x 0.05 mm²	3 x 0.14 mm²	3 x 0.14 mm²	M8 x 1

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



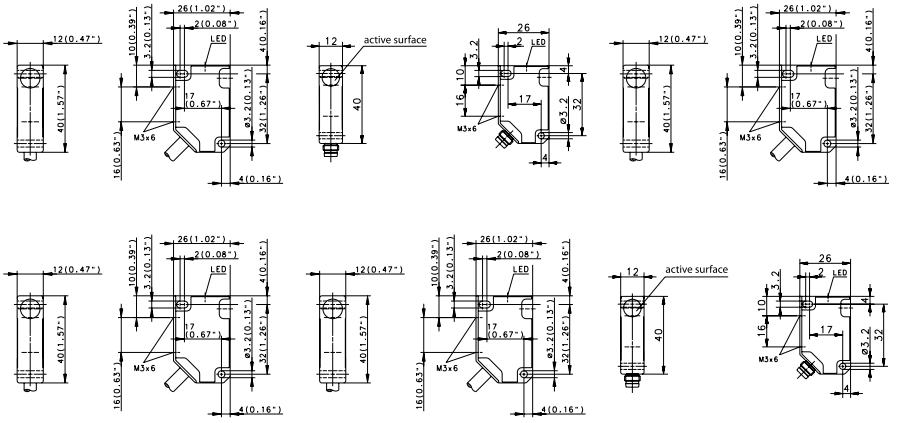
12x12x55mm		16 x 8 x 5 mm	27 x 10 x 5 mm	28x16x11mm		
Flush	Flush	Flush	Flush	Flush	Flush	
4 mm	4 mm	1.5 mm	1.5 mm	2 mm	2 mm	
Cable 2 m	Connector M8	Cable 2 m	Cable 2 m	Cable 2 m	Connector M8	
						
						
6502999028	**6502999030**	**6502985002**	**6502993001**	**6502973001**	**6502973002**	
				6502773002	**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 mm²	M8 x 1	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	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			**40x26x12mm**		**40x26x12mm**		**40x26x12mm**	
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	**6502984023**		**6502984025**	**6502984024**		**6502984026**
		NC contact	**6502784006**			**6502784007**		**6502784008**
		Antivalent NO/NC						
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		**6503584004**			**6503584005**	
		NC contact		**6503484003**			**6503484004**	
		Changeover contact						

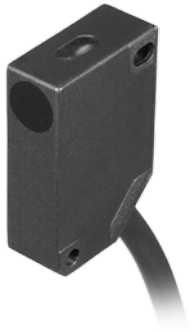
Technical data

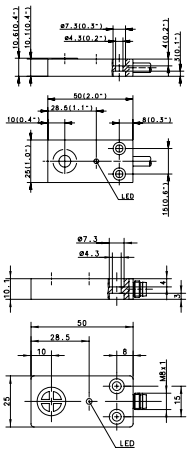
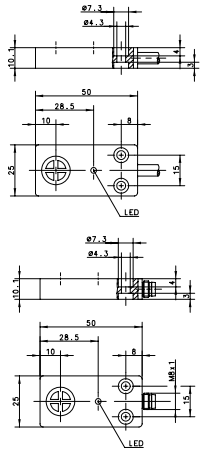
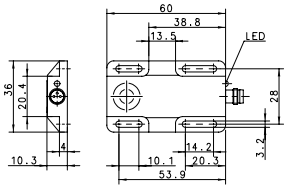
Rated operating voltage	U_B	10-36 VDC	20-250 V AC	10-36 VDC	10-36 VDC	20-250 V AC	10-36 VDC
Rated operating current	I_B	≤ 200 mA	≤ 300 mA	≤ 200 mA	≤ 200 mA	≤ 300 mA	≤ 200 mA
Switching frequency (max)	F	800 Hz	10 Hz	800 Hz	400 Hz	10 Hz	400 Hz
Short circuit-protection		Cyclic	-	Cyclic	Cyclic	-	Cyclic
Function/operating 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 mm²	2 x 0.5 mm²	M8 x 1	3 x 0.5 mm²	2 x 0.5 mm²	M8 x 1

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

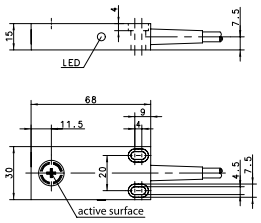
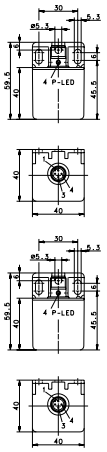
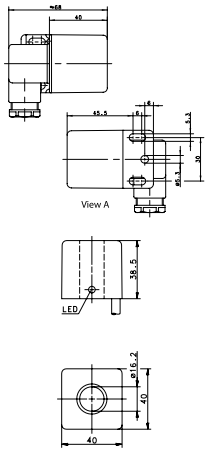


50x25x10mm		50x25x10mm		60x36x10mm		
Flush	Flush	Non-flush	Non-flush	Non-flush		
5 mm	5 mm	8 mm	8 mm	8 mm		
Cable 2 m	Connector M8	Cable 2 m	Connector M8	Connector M8		
						
6502990001	**6502990005**	**6502990003** **6502790002**	**6502990006**	**6602799048**		
6502390001		**6502390002**				
10-60 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 mm²	M8 x 1	3 x 0.5 mm²	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	**6502956076**	**6502988001**	**6502982003**		**6502999036**
		NC contact					
		Antivalent NO/NC					
NPN	DC	NO contact	**6502156058**				
		NC contact					
		Antivalent NO/NC					
PNP/NPN	DC	NO/NC prog.				**6502982001**	
		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	10-60 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.



Notes

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 ε > 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.

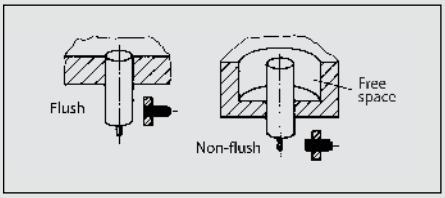
Sensitivity table	
St37 or other metals, earthed	1.00
Surface of water	1.00
St37 150 x 150 x 1 mm, not earthed	0.85
Marble 150 x 150 x 12.5 mm	0.65
Glass 150 x 150 x 7.5 mm	0.55
Stack of paper DIN A 4, 80 g/m^2, 500 sheets	0.55
Fibre board 150 x 150 x 16 mm	0.45
Ceramic tile 150 x 150 x 6 mm	0.25
PVC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

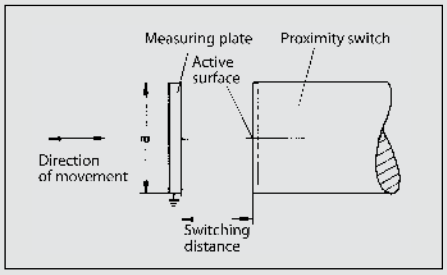
A screening electrode built into flush mount limit switches is connected to circuit ground. As both electrodes of the capacitor are now close together, flush mount capacitive proximity switches are particularly suitable for sensing dielectrics. The disadvantage is that this configuration has an increased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

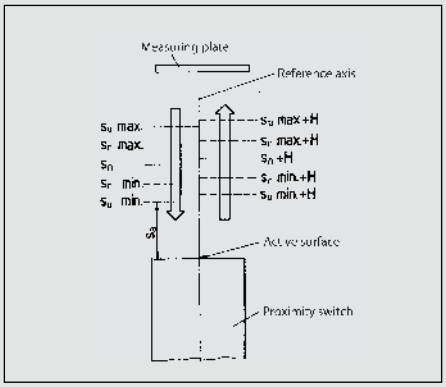
Sensing distance: The sensing distance, that changes the status of the output stage, is the distance of the influencing object in relation to the active face.

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.

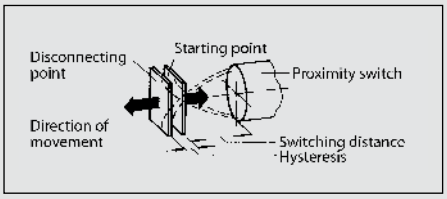
Useable sensing distance (s_u): The useable sensing distance is measured within the permissible temperature and voltage ranges and is 80 % – 120 % of the real sensing distance.

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.

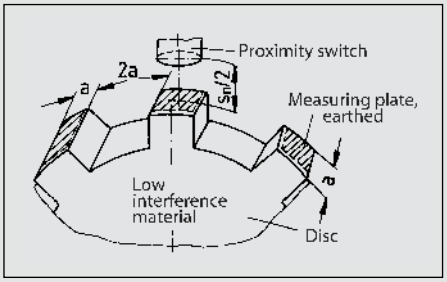


Reproducibility: The reproducibility of the switching distance is the repeat accuracy of the real sensing distance of two successive switching operations within a period of 8 hours at an ambient temperature between 18 °C and 28 °C and a supply voltage that may not deviate by more than 5 % from the rated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

CE

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.

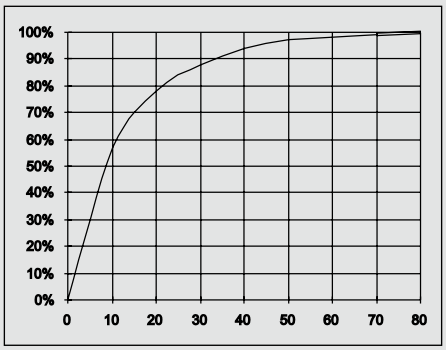
On approach of **non-conductive** materials, the dielectric constant ε of the material to be detected is of decisive significance. Depending on the application, the specified sensing distances vary by a certain factor in relation to the dielectric constant. The values determined according to the table 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 ε

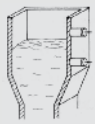
Application descriptions

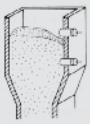
A particular application of capacitive proximity switches is to detect levels in non-metallic containers from the outside. Advantage: There is no need to make a hole in the container wall for the purpose of detecting product level. The medium to be detected does not come in contact with the limit switch. 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

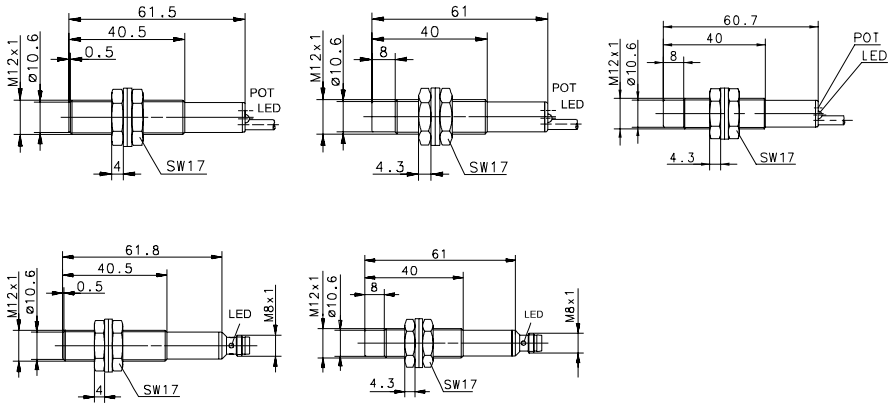

Belt breakage signalling


Level monitoring in packing systems

Notes

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	**6507903001**	**6507903004**	**6507919001**	**6507919004**	**6607919110**
		NC contact	**6507703001**				
		Antivalent NO/NC					
NPN	DC	NO contact	**6507303001**		**6507319001**		
		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					

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

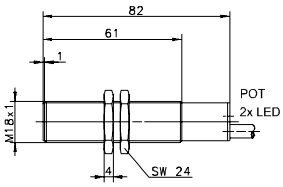
Mechanical data

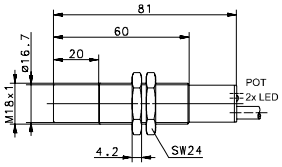
Ambient temperature (min/max)	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529	IP65	IP65	IP65	IP65	IP65
Enclosure material	CuZn39Pb3	CuZn39Pb3	PBT, black	PBT, black	PBT, black
Connection	3 x 0.14 mm²	M8 x 1	3 x 0.14 mm²	M8 x 1	3 x 0.14 mm²

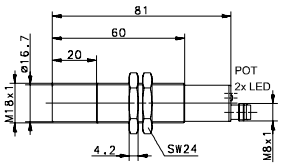
Please refer to Accessories for cable couplers, mounting brackets and sensor tester.

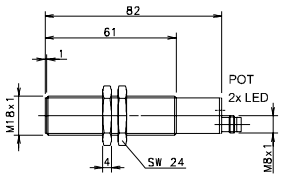


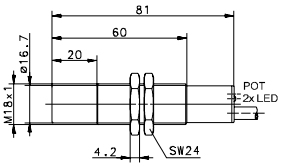
M18		M18		M18			
Flush	Flush	Non-flush	Non-flush	Non-flush	Non-flush		
5.0 mm	5.0 mm	8.0 mm	8.0 mm	8.0 mm	13.5 mm		
Cable 2 m	Connector M8	Cable 2 m	Cable 2 m	Connector M8	Connector M12		
					Sensing dist.		

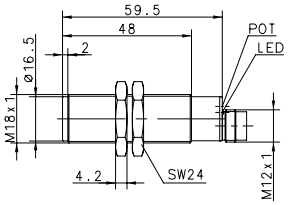












6507905001	**6507905004**	**6507921724** **6507821001**①		**6507921002**	**6507921004**		
6507305001		**6507321723**					
			6508521001 **6508421001**				

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 mm²	M8 x 1	3 x 0.5 mm²	2 x 0.5 mm²	M8 x 1	M12 x 1		

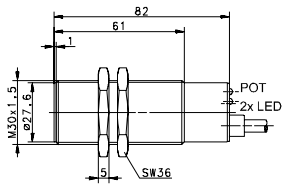
You will find detailed data sheets to the products under www.bernstein.eu

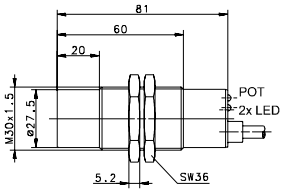
① Length 65 mm

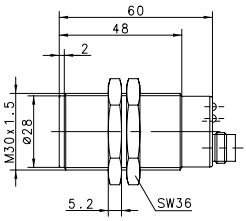


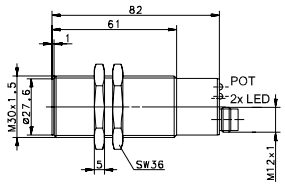
Capacitive Sensors (Type M30, M32)

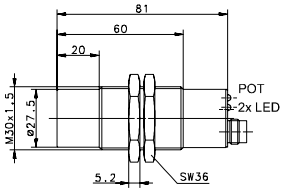
Type			M30		M30		M30	
Type of installation			Flush	Flush	Non-flush	Non-flush	Non-flush	Non-flush
Nominal sensing distance			10 mm	10 mm	20 mm	20 mm	20 mm	20 mm
Type of connection			Cable 2 m	Connector M12	Cable 2 m	Connector M12	Connector M12	Cable 2 m
Special feature							Short form	

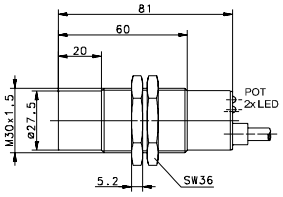












PNP	DC	NO contact	**6507907001**	**6507907004**	**6507923727**	**6507923004**	**6507923006**	
		NC contact						
		Antivalent NO/NC	**6507707001**					
NPN	DC	NO contact			**6507323001**	**6507323004**		
		NC contact						
		Antivalent NO/NC						
PNP/NPN	DC	NO/NC prog.						
		push-pull operation		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

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

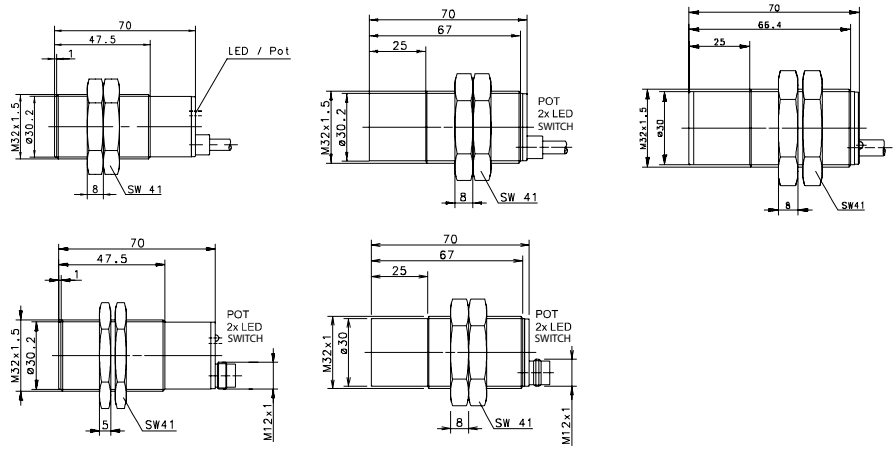
Mechanical data

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 mm²	M12 x 1	3 x 0.5 mm²	M12 x 1	M12 x 1	2 x 0.5 mm²

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		



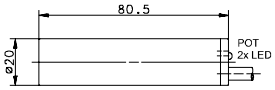
6507013013 **6507013012**	**6507013015**	**6507013001**	**6507013004**			
				6508613001		
10-60 VDC	10-60 VDC	10-60 VDC	10-60 VDC	180-250 V AC		
≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 400 mA	≤ 8 A		
25 Hz	25 Hz	25 Hz	25 Hz	-		
Cyclic	Cyclic	Cyclic	Cyclic	-		
LED/LED	LED/-	LED/-	LED/-	LED/LED		
Poti	Poti	Poti	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 mm²	M12 x 1	3 x 0.5 mm²	M12 x 1	5 x 0.5 mm²		

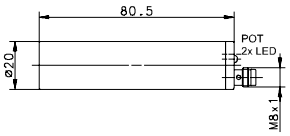
You will find detailed data sheets to the products under www.bernstein.eu

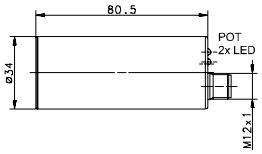


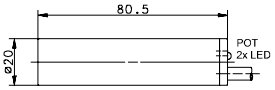
Capacitive Sensors (Type Ø 20 mm, Ø 34 mm, E50, E68)

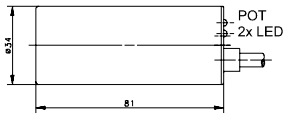
Type			**Ø 20 mm**		**Ø 20 mm**	**Ø 34 mm**	
Type of installation			Non-flush	Non-flush	Non-flush	Flush	Non-flush
Nominal sensing distance			15 mm	15 mm	15 mm	20 mm	30 mm
Type of connection			Cable 2 m	Cable 2 m	Connector M8	Connector M12	Cable 2 m
Special feature							











PNP	DC	NO contact	**6507910001**		**6507910004**	**6507915006**	**6507915001**
		NC contact					
		Antivalent NO/NC					
NPN	DC	NO contact	**6507310002**		**6507310004**		**6507315001**
		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		**6508510001**			
		NC contact		**6508410001**			
		Changeover contact					

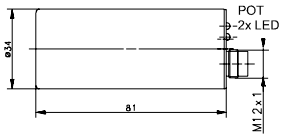
Technical data						
Rated operating voltage	U_B	10-60 VDC	20-250 V AC	10-60 VDC	10-60 VDC	10-60 VDC
Rated operating current	I_B	≤ 400 mA	≤ 300 mA	≤ 400 mA	≤ 200 mA	≤ 400 mA
Switching frequency (max)	F	25 Hz	15 Hz	25 Hz	25 Hz	25 Hz
Short circuit-protection		Cyclic	-	Cyclic	Cyclic	Cyclic
Function/operating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

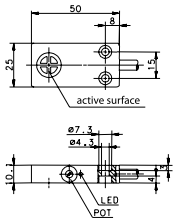
Mechanical data					
Ambient temperature (min/max)	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC 529, EN 60529	IP65	IP65	IP65	IP65	IP65
Enclosure material	PBT, red	PBT, red	PBT, red	CuZn39Pb3	PBT, red
Connection	3 x 0.5 mm^2	2 x 0.5 mm	M8 x 1	M12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

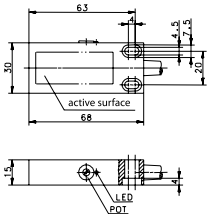
Please refer to Accessories for cable couplers, mounting brackets and sensor tester.

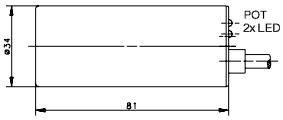


Ø 34 mm		**E50**	**E68**		
Non-flush	Non-flush	Flush	Flush		
30 mm	30 mm	8 mm	10 mm		
Connector M12	Cable 2 m	Cable 2 m	Cable 2 m		









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 mm²	3 x 0.34 mm²	3 x 0.5 mm²		

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.

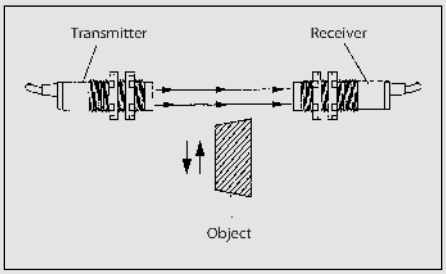
Several applications are outlined on these pages, illustrating the advantages and disadvantages of the individual operating modes.

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 optoelectric 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 an 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.

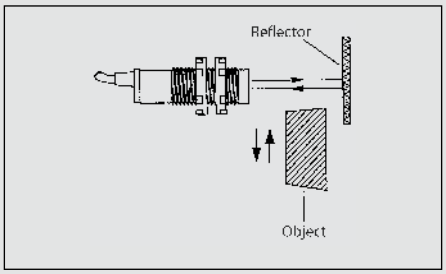
Advantages:

- 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.

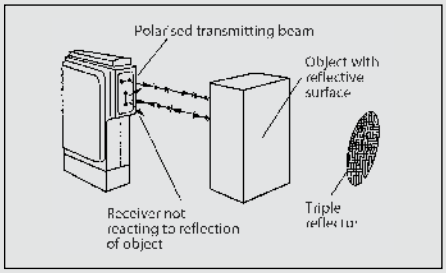
Advantages:

- 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:

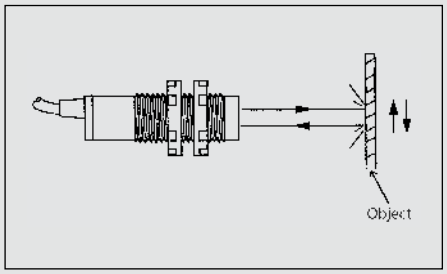
- The sensing range is reduced compared to standard sensors without polarisation filter

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 m white Kodak paper test card. 200 x 200 mm test cards are used for sensing ranges ≥ 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.

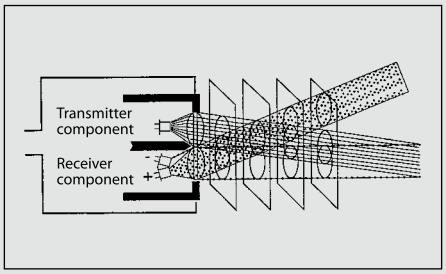
Advantages:

- 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.

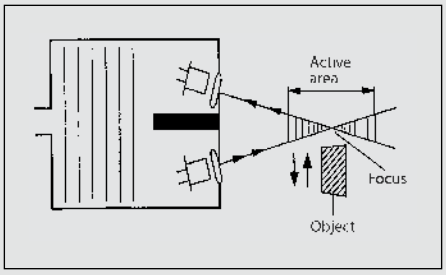
Advantages:

- 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

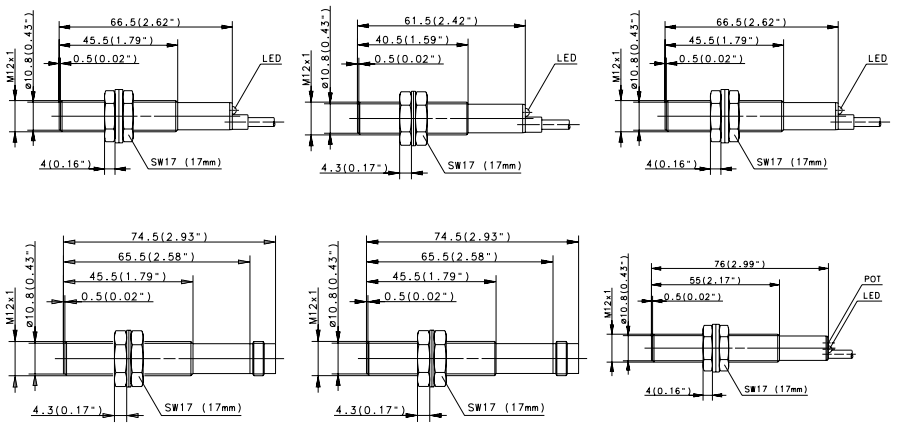
BERNSTEIN triple reflectors that consist of several triple mirrors arranged in a pyramid configuration are best suited for reflecting light in light barrier systems. The pyramid-like structure of these triple mirrors allows the reflector to be pivoted by up to 30° from the optical axis (e.g. caused by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

The specified sensing ranges of the retro-reflective sensors refer to the Ø 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** **6557728001**	**6557927001**	**6557930002**	**6557929002**	**6557928004**	**6557928003**
NPN		Light activated Dark activated Programmable						
Transmitter								
Relay output								
NAMUR								
Analogue		Current output Voltage output						
2-wire	DC AC							

Technical data

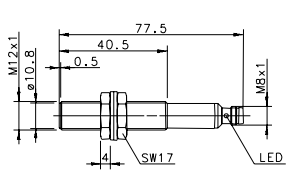
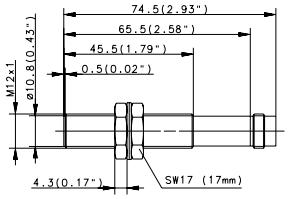
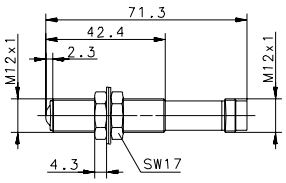
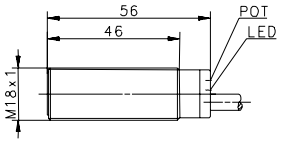
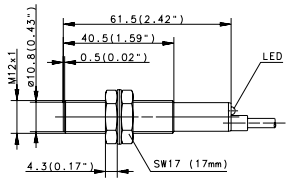
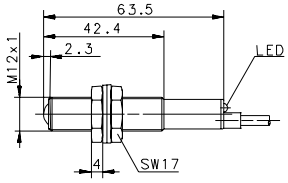
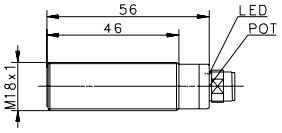
Rated operating voltage	U_B	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_B	50 mA	50 mA	50 mA	50 mA	50 mA	50 mA
Switching frequency (max)	F	> 100 Hz	> 100 Hz	> 100 Hz	> 100 Hz	> 250 Hz	> 250 Hz
Short circuit protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
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 mm²	M12 x 1	3 x 0.14 mm²	M12 x 1	3 x 0.14 mm²	3 x 0.14 mm²

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

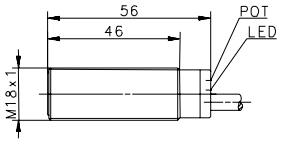
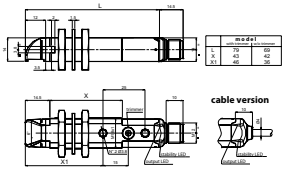
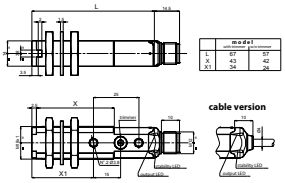
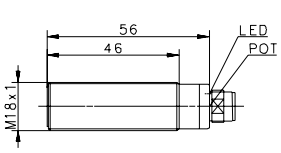
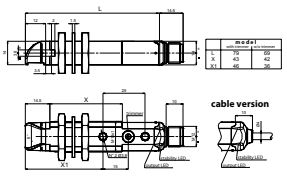
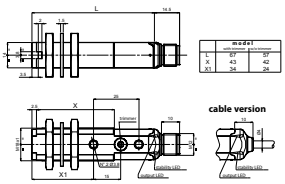


M12		M12		M12	M18		
Retro-reflective sensor Type D 200 mm Connector M12	Retro-reflective sensor Type D 200 mm Cable 2 m	Retro-reflective sensor Type D 200 mm Connector M12	Through-beam sensor Type D 6 m Cable 2 m	Through-beam sensor Type D 6 m Connector M12	Retro-reflective sensor Type D 40 mm Cable 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 mm²	M12 x 1	3 x 0.14 mm²	M12 x 1	4 x 0.34 mm²	M12 x 1	

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

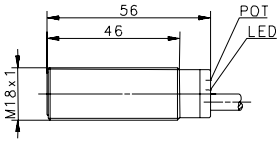
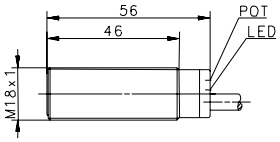
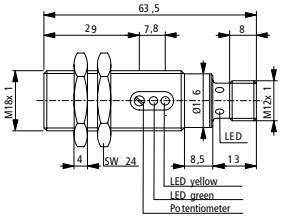
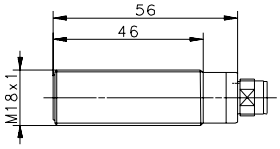
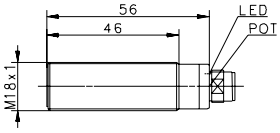
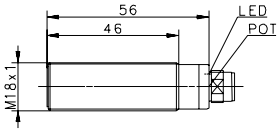
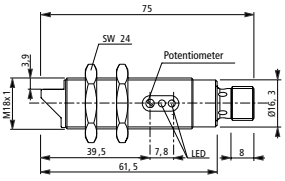
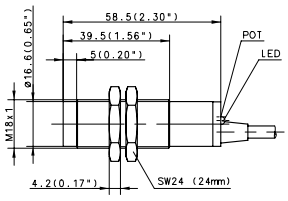


Optoelectronic Sensors (Type M18)

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 mm²	M12 x 1	4 x 0.34 mm²	M12 x 1	4 x 0.34 mm²	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 ①	Retro-reflective sensor Type D 120 mm Connector M12 ①	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**	
6557219004	**6557216001**						**6557219002**	
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 mm²	M12 x 1	4 x 0.34 mm²	M12 x 1	M12 x 1	M12 x 1	M12 x 1	4 x 0.25 mm²	

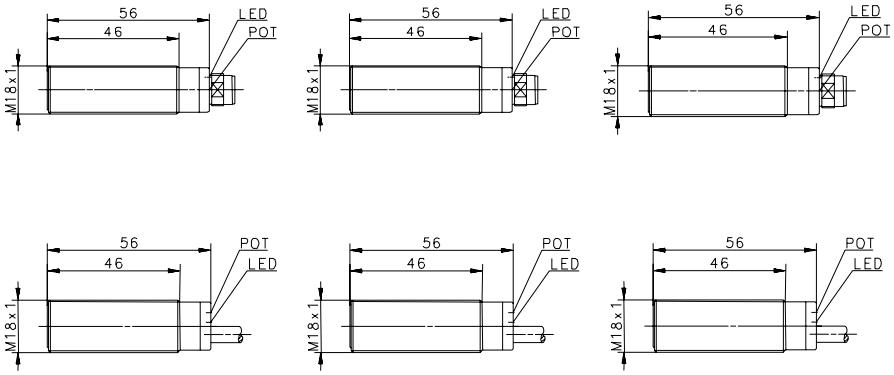
You will find detailed data sheets to the products under www.bernstein.eu

① Background suppression



Optoelectronic Sensors (Type M18)

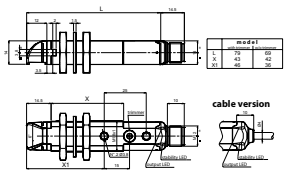
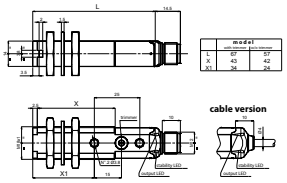
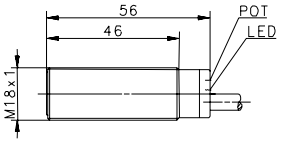
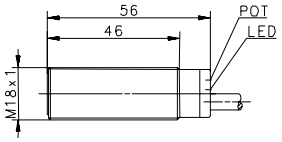
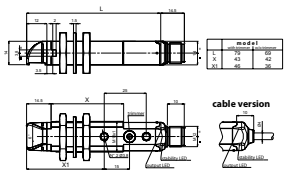
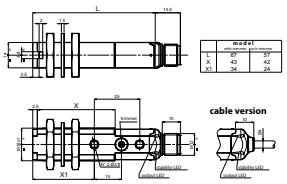
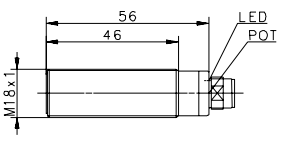
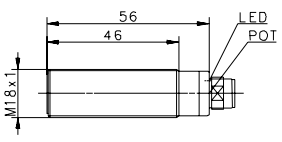
Type			M18		M18		M18	
Operating mode			Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D	Retro-reflective sensor Type D
Sensing range			300 mm	300 mm	300 mm	300 mm	300 mm	500 mm
Type of connection			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 mm²	M12 x 1	4 x 0.34 mm²	M12 x 1	4 x 0.34 mm²

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



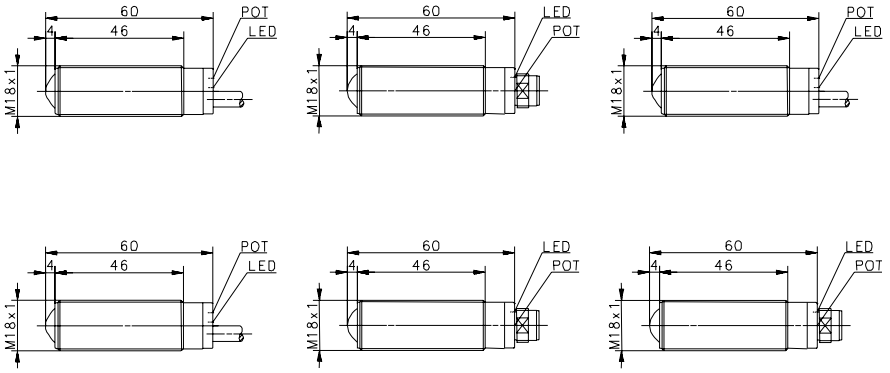
M18		M18		M18		M18		
Retro-reflective sensor Type D 300 mm Cable 2 m Angle optic	Retro-reflective sensor Type D 300 mm Connector M12 Angle optic	Retro-reflective sensor Type D 400 mm Cable 2 m	Retro-reflective sensor Type D 400 mm Connector M12	Retro-reflective sensor Type D 500 mm Cable 2 m	Retro-reflective 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 mm²	M12 x 1	4 x 0.34 mm²	M12 x 1	4 x 0.34 mm²	M12 x 1	4 x 0.34 mm²	M12 x 1	

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



Optoelectronic Sensors (Type M18)

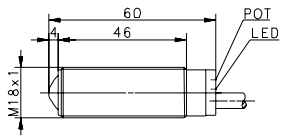
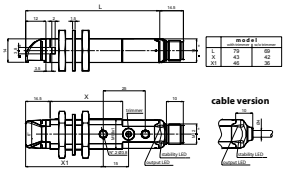
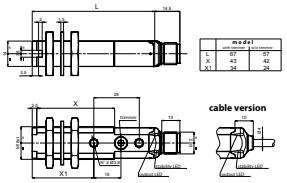
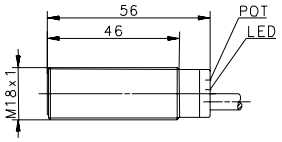
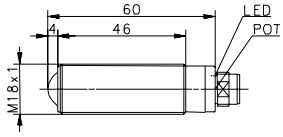
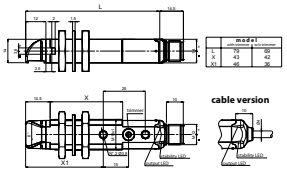
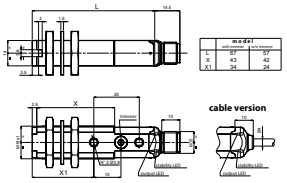
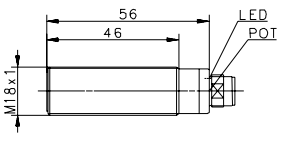
Type			M18		M18		M18	
Operating mode			Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R	Retro-reflective sensor Type R
Sensing range			800 mm	800 mm	800 mm	2.5 m	2.5 m	2.5 m
Type of connection			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 mm²	4 x 0.34 mm²	M12 x 1	M12 x 1	4 x 0.34 mm²	M12 x 1

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



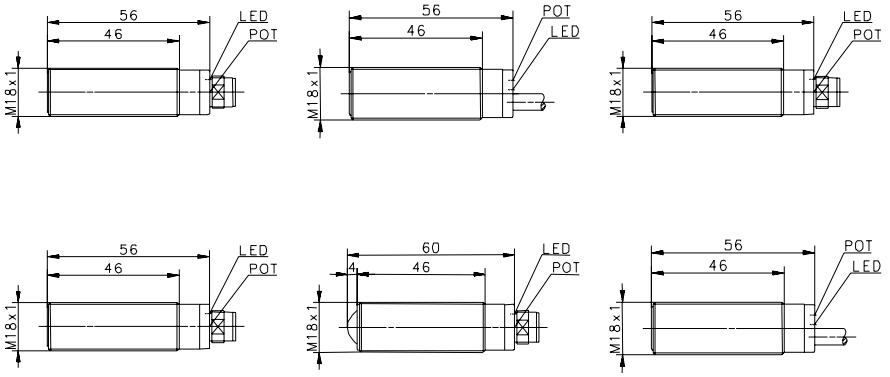
M18		M18		M18		M18		
Retro-reflective sensor Type R 2.5 m Cable 2 m Glass lens	Retro-reflective sensor Type R 2.5 m Connector M12 Glass lens	Retro-reflective sensor Type R 2.5 m Cable 2 m Angle optic	Retro-reflective sensor Type R 2.5 m Connector M12 Angle optic	Retro-reflective sensor Type R 3 m Cable 2 m	Retro-reflective sensor Type R 3 m Connector M12	Retro-reflective sensor Type R 3 m Cable 2 m	Retro-reflective sensor Type R 3 m Connector M12	
								
								
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 mm²	M12 x 1	4 x 0.34 mm²	M12 x 1	4 x 0.34 mm²	M12 x 1	4 x 0.34 mm²	M12 x 1	

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



Optoelectronic Sensors (Type M18, M30)

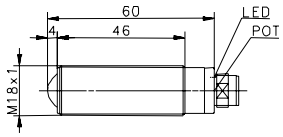
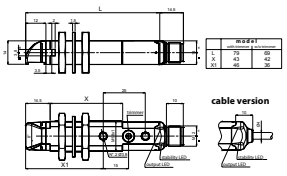
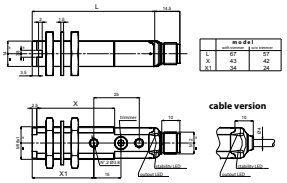
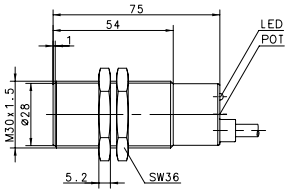
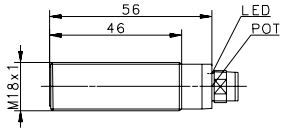
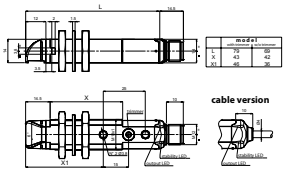
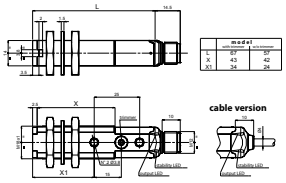
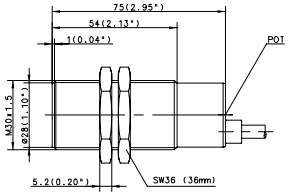
Type			M18		M18		M18	
Operating mode			Retro-reflective sensor Type R	Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D	Through-beam sensor Type D
Sensing range			3 m	8 m	8 m	8 m	8 m	8 m
Type of connection			Connector M12	Connector M12	Cable 2 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 mm²	M12 x 1	M12 x 1	4 x 0.34 mm²

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

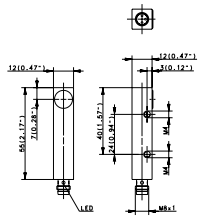
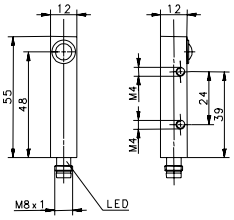
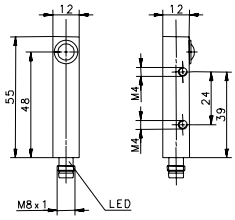
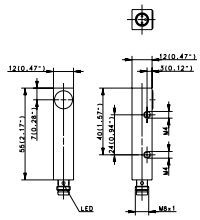
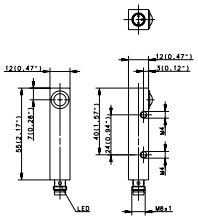


M18		M18		M18		M30		
Through-beam sensor Type D 8 m Connector M12	Through-beam sensor Type D 8 m Connector M12	Through-beam sensor Type D 15 m Cable 2 m Angle optic	Through-beam sensor Type D 15 m Connector M12 Angle optic	Through-beam sensor Type D 18 m Cable 2 m	Through-beam sensor Type D 18 m Connector M12	Retro-reflective sensor Type D 200 mm Cable 6 m	Retro-reflective sensor Type D 500 mm Cable 2 m	
								
								
6551818101	**6551818001**	**6551819004**	**6551818003**	**6551819003**	**6551818002**	**6557905008**	**6557005006**	
6551018001		**6551019004**	**6551018003**	**6551019003**	**6551018002**			
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 mm²	M12 x 1	4 x 0.34 mm²	M12 x 1	3 x 0.5 mm²	3 x 0.5 mm²	

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			12x12x55mm		12x12x55mm		12x12x55mm
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	**6551955002**		**6551955001**		**6551955005**
		Dark activated	**6551755002**	**6551755004**	**6551755001**	**6551755003**	
		Programmable					
NPN		Light activated			**6551355001**		
		Dark activated			**6551155001**		
		Programmable					
Transmitter			**6551055003**		**6551055002**		
Relay output							
NAMUR							
Analogue		Current output					
		Voltage output					
2-wire	DC						
	AC						

Technical data

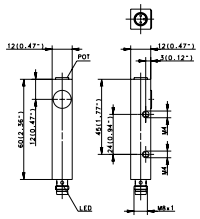
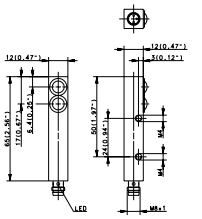
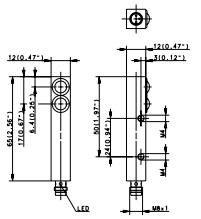
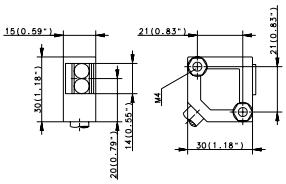
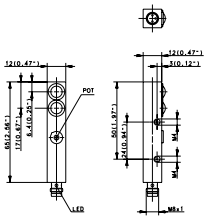
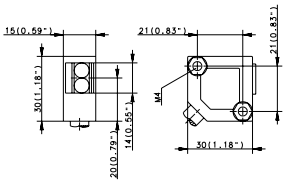
Rated operating voltage	U_B	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC	10-36 VDC
Rated operating current	I_B	200 mA	200 mA	200 mA	200 mA	200 mA
Switching frequency (max)	F	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
Short circuit protection		Cyclic	Cyclic	Cyclic	Cyclic	Cyclic
Function/operating voltage indicator		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.



12x12x60mm	12x12x65mm		12x12x65mm	30x30x15mm		
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 ②	
						
						
6557955001 6557755001	**6558955001**	**6557955002 6557755002**	**6554955001 6554755001**	**6557975004**	**6557875003** ②	
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	
100 Hz	100 Hz	100 Hz	100 Hz	< 1000 Hz	< 1 kHz	
Cyclic	Cyclic	Cyclic	Cyclic	Yes	Yes	
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	
-5°C/+70°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C	-25°C/+70°C	-25°C/+70°C	
IP65	IP65	IP65	IP65	IP67	IP67	
CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	CuZn39Pb3	PBTB	PBTB	
M8 x 1	M8 x 1	M8 x 1	M8 x 1	4 x 0.14 mm^2	4 x 0.14 mm^2	

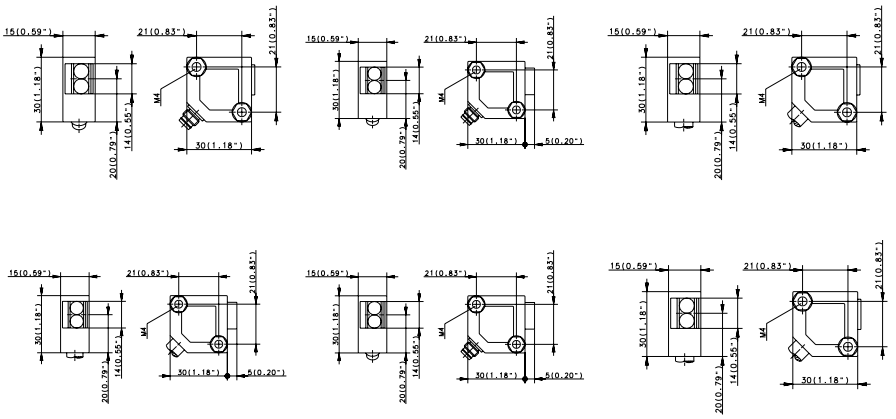
You will find detailed data sheets to the products under www.bernstein.eu

② Antivalent output



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

Type			**30x30x15mm**		**30x30x15mm**		**30x30x15mm**	
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	Cable 3 m	Connec. M8/Ø 8	Cable 3 m	Connec. M8/Ø 8
Special feature				polarised	polarised	polarised		



PNP		Light activated Dark activated Programmable	**6557975003**	**6555975002**	**6555875001** ②	**6555975001**	**6551875003** ②	**6551875004** ②
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

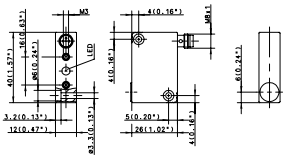
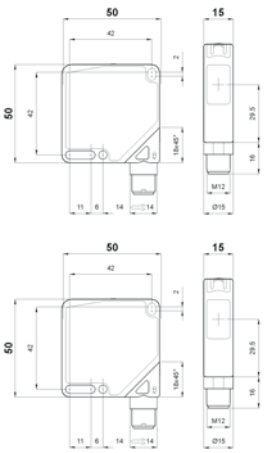
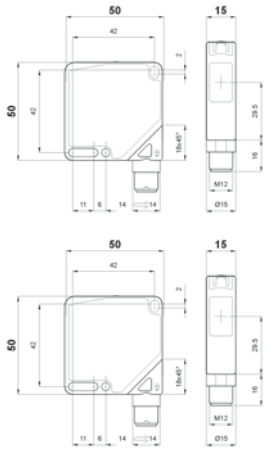
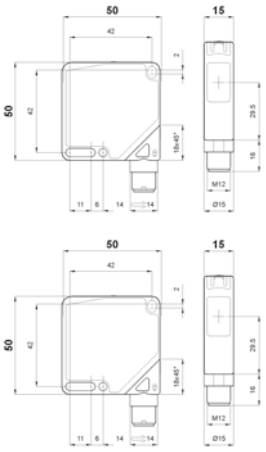
Mechanical data

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 mm²	4 x 0.14 mm²	4-pin	4 x 0.14 mm²	4-pin

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

② Antivalent output



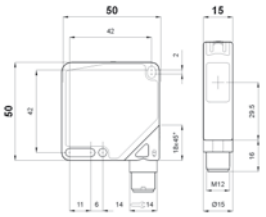
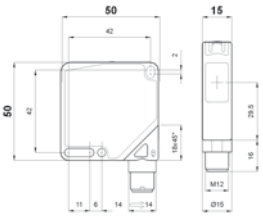
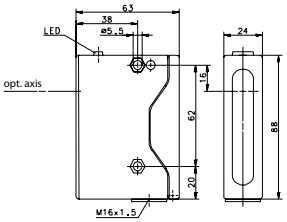
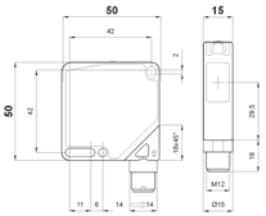
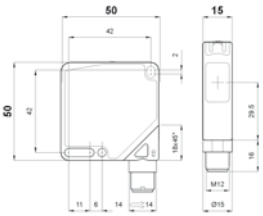
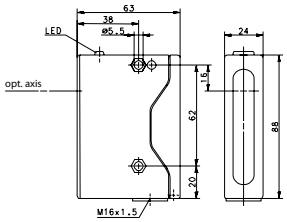
40x26x12mm	**50x50x15mm**		**50x50x15mm**		**50x50x15mm**		
Retro-reflective sensor Type D 40 mm Connector M8	Retro-reflective sensor Type D 200 mm Cable 2 m ①	Retro-reflective sensor Type D 200 mm Connector M12 ①	Retro-reflective sensor Type D 1 m Cable 2 m Antivalent	Retro-reflective sensor Type D 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



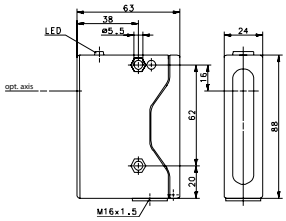
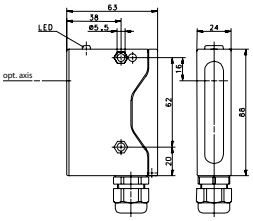
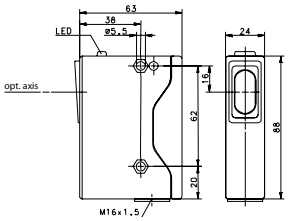
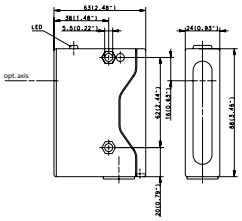
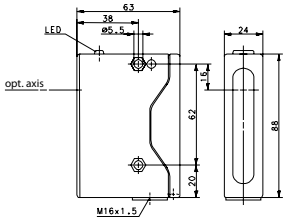
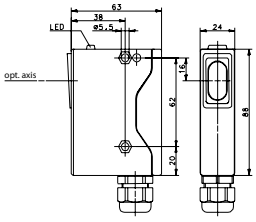
Optoelectronic Sensors (Type 50 x 50 mm, 88 x 63 mm)

Type			50x50x15mm		50x50x15mm		88x63x24mm	
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	①	
								
								
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



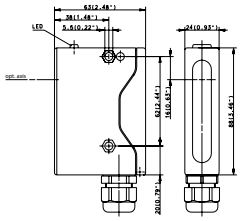
88x63x24mm		88x63x24mm	88x63x24mm		88x63x24mm	
Retro-reflective sensor Type D 600 mm Connect. space	Retro-reflective sensor Type D 1.5 m Connect. space	Retro-reflective sensor Type D 1.5 m Connect. space	Retro-reflective sensor Type R 6 m Connect. space polarised	Retro-reflective sensor Type R 6 m Connect. space polarised	Retro-reflective sensor Type R 8 m 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

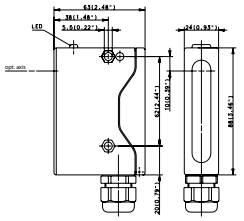
You will find detailed data sheets to the products under www.bernstein.eu

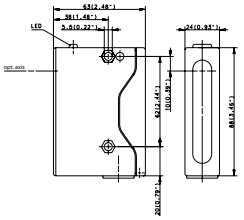


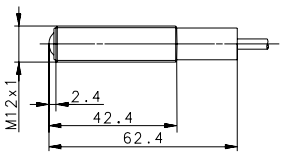
Optoelectronic Sensors (Type 88 x 63 mm, M12, Ø 20 mm)

Type		**88x63x24mm**	**88x63x24mm**		**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					Treshold 5 Lux









PNP		Light activated Dark activated Programmable		**6551886003**	**6550930001**
NPN		Light activated Dark activated Programmable			
Transmitter				**6551086003** **6551086002**	
Relay output			**6554686002**	**6551686004**	
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

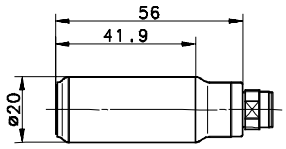
Mechanical data

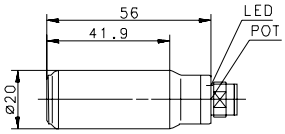
Ambient temperature (min/max)	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C	-20°C/+70°C
Protection class in accordance with IEC 529, EN 60529	IP65	IP65	IP65	IP67
Enclosure material	PA, red	PA, red	PA, red	PA, red
Connection	Connect. space	Connect. space	Connect. space	3 x 0.34 mm²

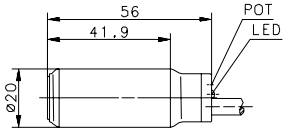
Please refer to Accessories for reflectors, mounting brackets, cable couplers and sensor tester.



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



General Information on BERNSTEIN Magnetic Switches



Electromechanical and electronic variants

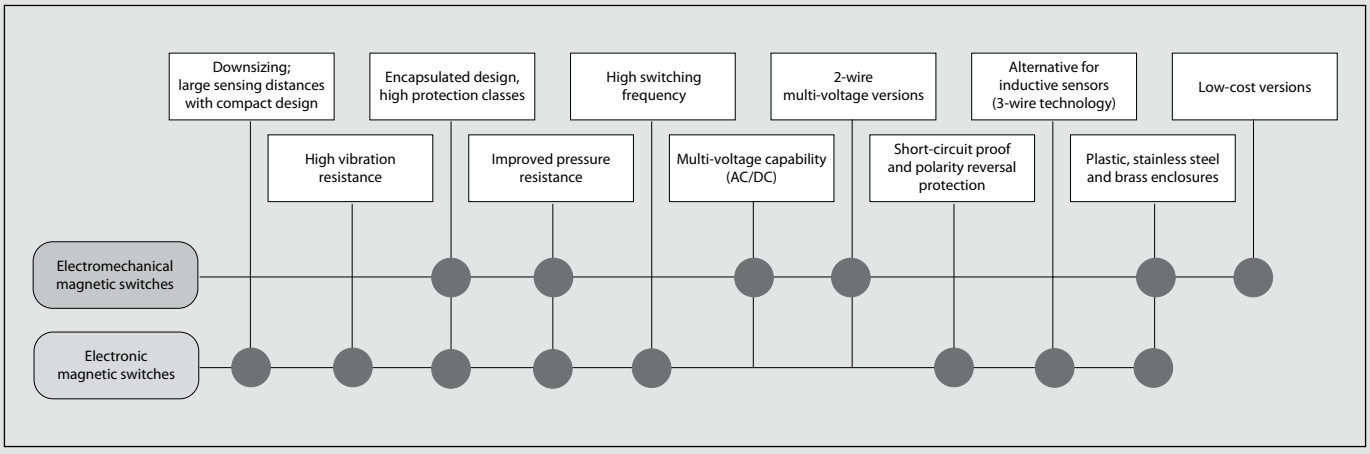
BERNSTEIN has extended its range of electromechanical magnetic switches with electronic versions which operate according to the Hall and magneto-resistive principle.

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

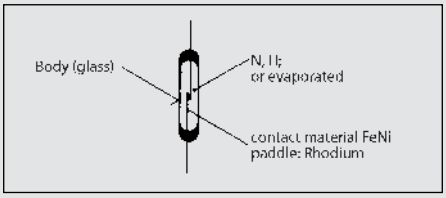
- Reliable under extreme ambient conditions such as dirt, humidity, gas, dust, etc.
- Protection class up to IP67
- Stable switching point, reproducible switching point accuracy of approx. 0.1 mm
- Can be operated from several directions
- Can be mounted in any position
- High operational reliability 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.

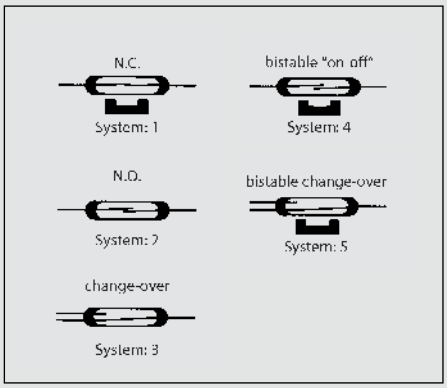
The magnetically influenced parts and their auxiliary components (resistor, diode, triac, output stage, etc.) are cast in high quality insulating material or casting compound to increase the vibration/impact strength and guarantee a protection class up to IP67. Metal versions (stainless steel, aluminium 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.



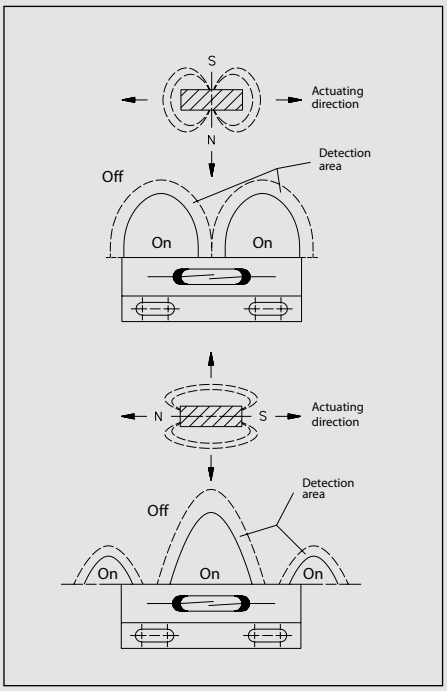
Types of reed contact switches

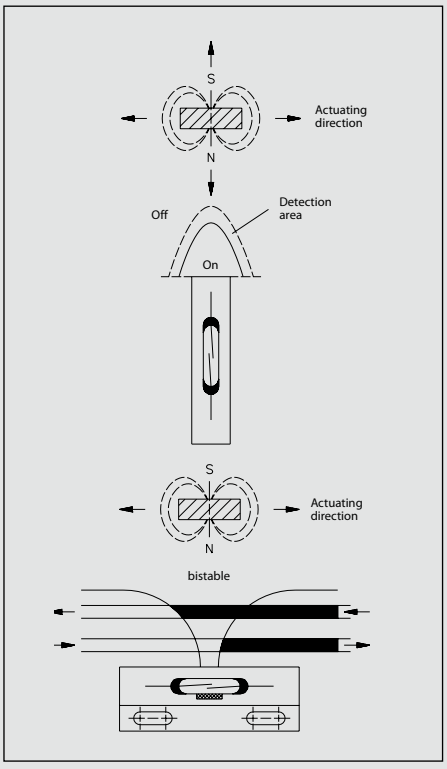
Actuation and switching characteristics

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.).





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 °C to +70 °C. Special types are also available offering an extended operating temperature range from -40 °C to +150 °C.

Electrical service life

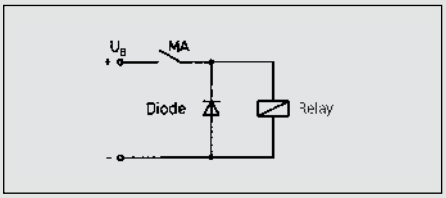
To maintain a long service life of the electrical contacts, it is important to ensure the maximum supply voltage and maximum switching current are not exceeded. Refer to the diagrams on Page 69 for the load values.

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.

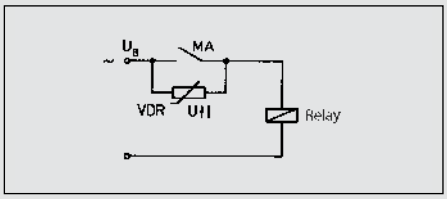
1. Inductive loads

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

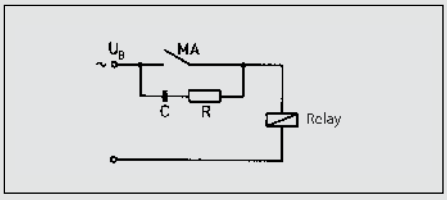
1) Voltage peaks induced by switching off inductive loads are suppressed by connecting a voltage-dependent resistor (VDR) in parallel to the reed contact.



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

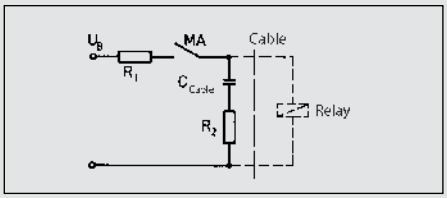
2. Capacitive loads

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.

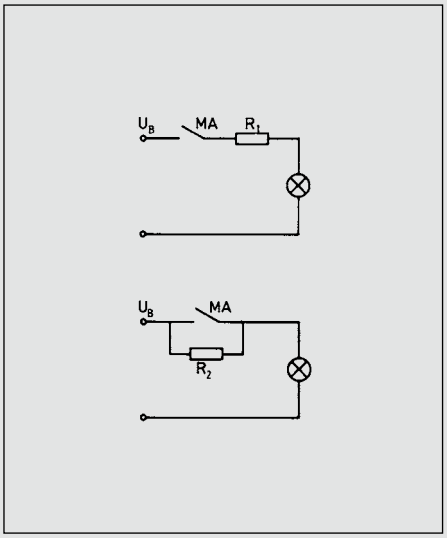
A resistor connected in series to the contact will reduce this current. The size of the resistor is determined by the characteristics of the corresponding electric circuit.

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:

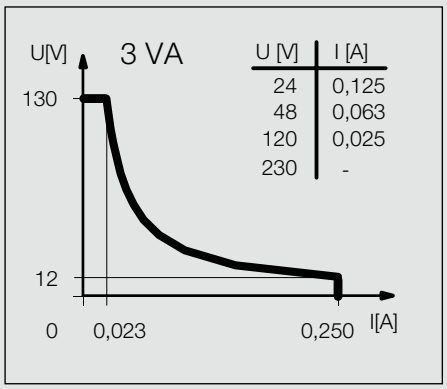


Capacitive load

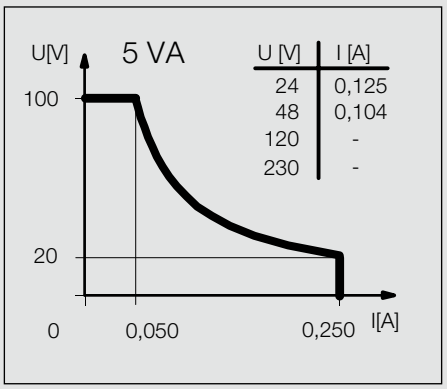


Lamp load

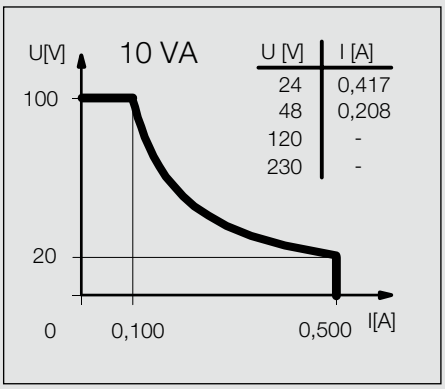
Performance diagrams for electromechanical magnetic switches



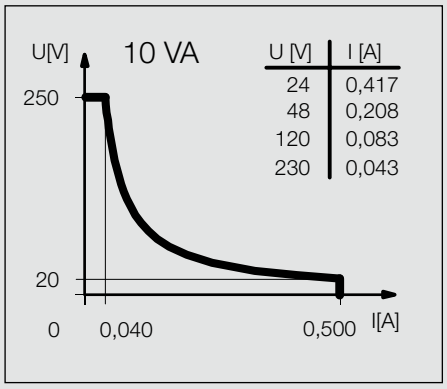
(1)



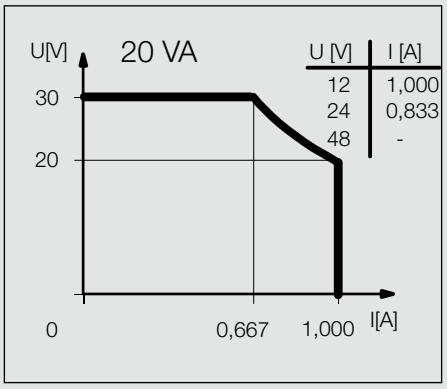
(2)



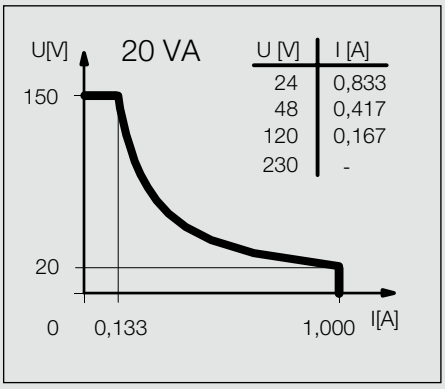
(3)



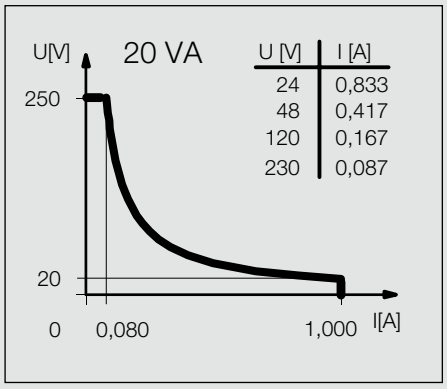
(4)



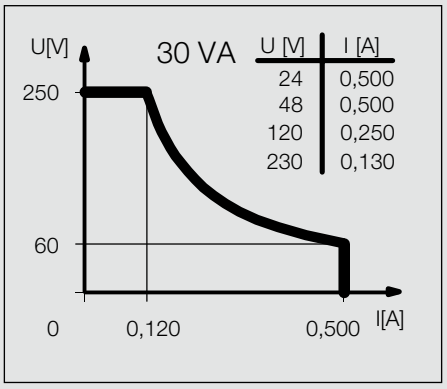
(5)



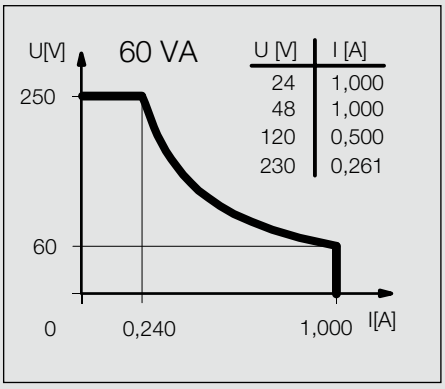
(6)



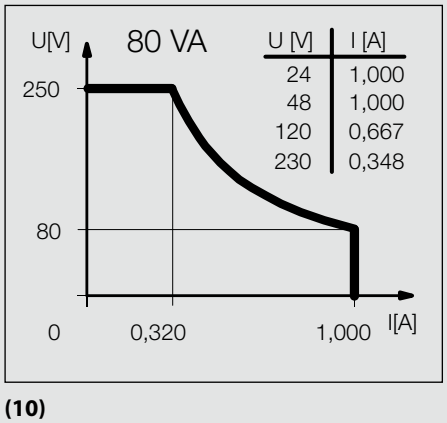
(7)



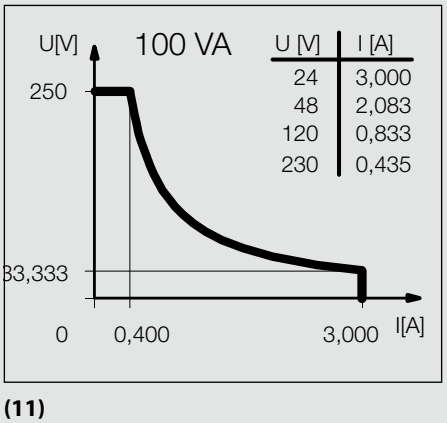
(8)



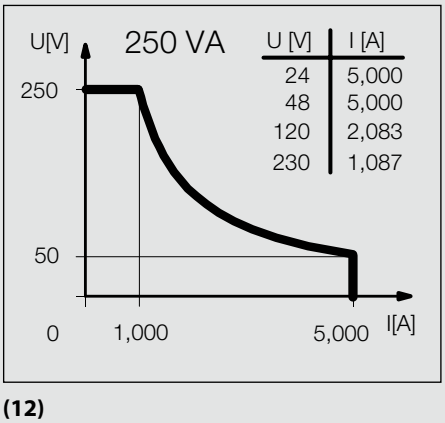
(9)



(10)

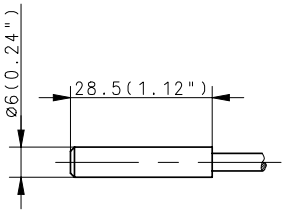
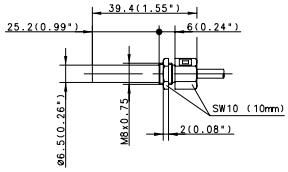
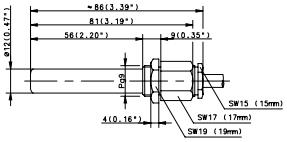


(11)

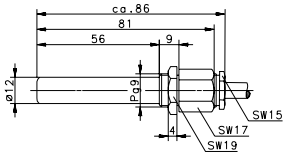
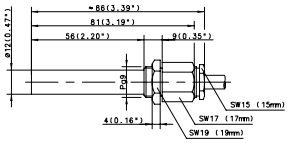
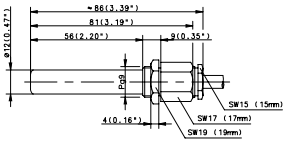


(12)

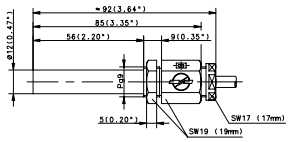
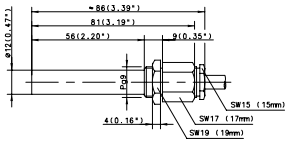
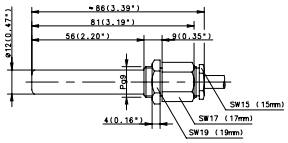
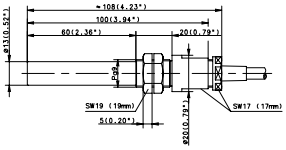
Magnetic Switches (Type Ø 6 mm, Ø 6.5 mm, Ø 12 mm, Ø 13 mm)

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						
	Changeover contact	**6310330572**				**6317306315**	
	Bistable						
Technical data							
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							
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 mm²	2 x 0.14 mm	2 x 0.14 mm²		4 x 0.75 mm²	3 x 0.75 mm²

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						
	Changeover contact					**6315306314**	**6316316259**
	Bistable						
Technical data							
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							
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 mm²	3 x 0.75 mm²	3 x 0.75 mm²	2 x 0.5 mm²	4 x 0.75 mm²	4 x 0.75 mm²

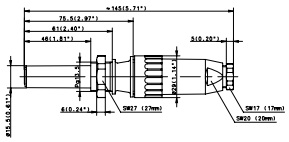
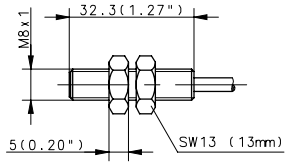
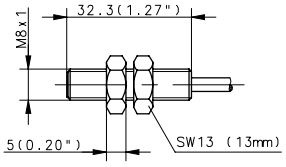
Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

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 1m	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**	
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 mm²	3 x 0.5 mm²	3 x 0.75 mm²	3 x 0.75 mm²	4 x 0.75 mm²	4 x 0.75 mm²	2 x 0.75 mm²	3 x 0.75 mm²	

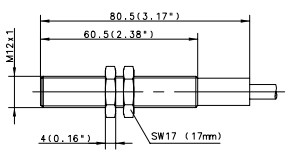
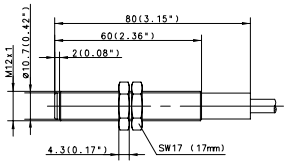
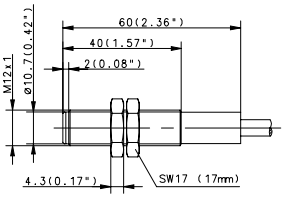
You will find detailed data sheets to the products under www.bernstein.eu



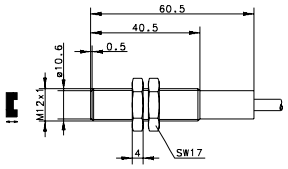
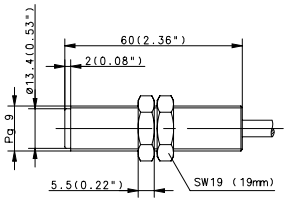
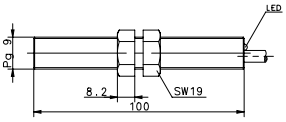
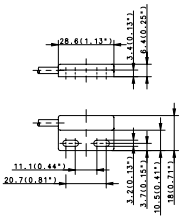
Magnetic Switches (Type Ø 15.5 mm, M8, M12, PG9, 28.6 x 18 mm)

Type		Ø 15.5 mm	M8		M8
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				**6311208596**
	NC contact				
	Changeover contact	**6317304313**	**6310308597**	**6310308595**	
	Bistable				
Technical data					
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					
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 mm²	Ø 6.5 mm	2 x 0.14 mm²

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

Type		M12		M12		M12	
Nominal switching distance (San)		7 mm	7 mm	10 mm	12 mm	15 mm	18 mm
Type of connection		Cable 1 m	Cable 2 m	Cable 1 m	Cable 1 m	Cable 3 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-68
Special feature							
							
Switching function	NO contact	**6314223268**	**6314233002**			**6416228260**	**6311218294**
	NC contact						
	Changeover contact			**6316333005**	**6316318002**		
	Bistable						
Technical data							
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							
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 mm²	2 x 0.5 mm²	3 x 0.5 mm²	3 x 0.5 mm²	2 x 0.5 mm²	2 x 0.34mm²

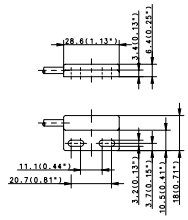
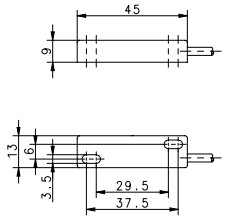
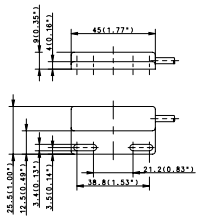
Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

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	**6410433350**	**6315317001**	**6316343544**	**6310431569**	**6310311615**	**6410311368**	
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 mm²	2 x 0.5 mm²	3 x 0.5 mm²	3 x 0.5 mm²	2 x 0.5 mm²	3 x 0.14 mm²	3 x 0.14 mm²	

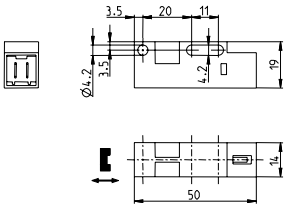
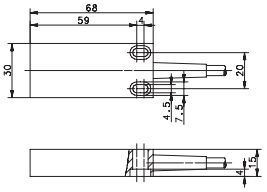
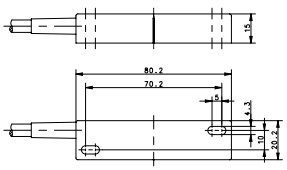
You will find detailed data sheets to the products under www.bernstein.eu



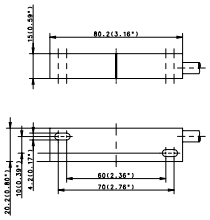
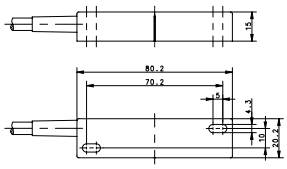
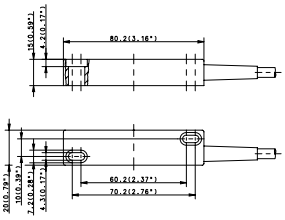
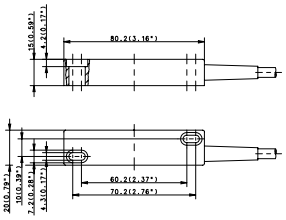
Magnetic Switches (Type 28.6 x 18, 45 x 13, 45 x 25.5, 50 x 19, 68 x 30, 80 x 20)

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	6311211541		6311201095		6311245539
	NC contact					
	Changeover contact				6316345540	
	Bistable		6311411603			
Technical data						
Max. switching voltage		250 VDC	250 VDC	250 VDC	250 VDC	250 VDC
Switching current (max)		0.5 A	0.5 A	0.5 A	1 A	0.5 A
Performance class (diagram No.)		10 VA	10 VA	10 VA	60 VA	10 VA
Shock resistance						50 g (11 ms)
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 IEC529, EN60529		IP67	IP67	IP67	IP67	IP67
Enclosure material		PA, black	PA, black	PA, black	PA	PA
Connection		2 x 0.14 mm	2 x 0.14 mm	2 x 0.14 mm	2 x 0.34 mm²	2 x 0.14 mm²

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	6310299652			
	NC contact				
	Changeover contact		6316313004	6315302309	6315312196
	Bistable				
Technical data					
Max. switching voltage		100 VDC	250 VDC	250 VDC	250 VDC
Switching current (max)		0.5 A	1 A	0.5 A	0.5 A
Performance class (diagram No.)		10 VA	60 VA	30 VA	30 VA
Shock resistance		30 g (11 ms)			
Mechanical data					
Ambient temperature (min/max)		-30°C/+120°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C
Protection class in accordance with IEC529, EN60529		IP67	IP67	IP67	IP67
Enclosure material		Nylon, black	PC, red	PA, black	PA, red
Connection		6.3 mm	3 x 0.5 mm²	3 x 0.75 mm²	3 x 0.75 mm²

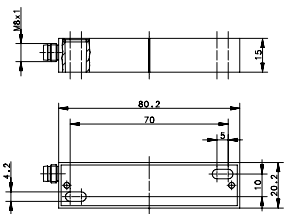
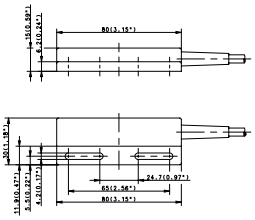
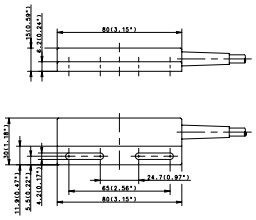
Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

80x20x15mm		**80x20x15mm**		**80x20x15mm**		**80x20x15mm**		
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**				
					6316302206	**6316312220**		
6314402566	**6419402397**						**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	
GDAlSi12, red	PA, black	PA, black	PA, black	PA, red	PA, black	PA, red	PA, red	
3 x 0.75 mm²	2 x 0.5 mm²	2 x 0.75 mm²	2 x 0.75 mm²	2 x 0.5 mm²	3 x 0.75 mm²	3 x 0.5 mm²	2 x 0.5 mm²	

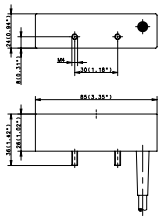
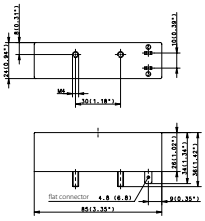
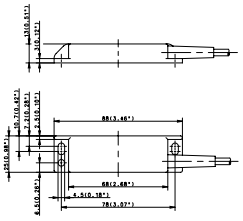
You will find detailed data sheets to the products under www.bernstein.eu



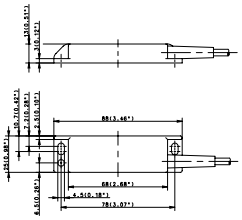
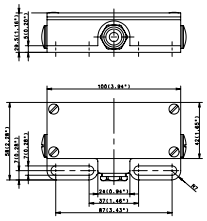
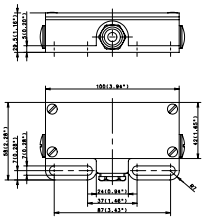
Magnetic Switches (Type 80 x 20 mm, 80 x 30 mm, 85 x 24 mm, 88 x 25 mm, 100 x 58 mm)

Type		**80x20x15mm**		**80x30x15mm**		**80x30x15mm**	
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				**6314244536**		
	NC contact			**6314144542**			
	Changeover contact	**6310302636**	**6316302389**				**6317344538**
	Bistable					**6310444537**	
Technical data							
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							
Ambient temperature (min/max)		-30°C/+80°C	-40°C/+150°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C	-5°C/+70°C
Protection class in accordance with IEC529, EN60529		IP65	IP67	IP67	IP67	IP67	IP67
Enclosure material		GDAlSi 12, red	GDAlSi12, red	PA, black	PA, black	PA, black	PA
Connection		M8 x 1	4 x 0.75 mm²	2 x 0.5 mm²	2 x 0.5 mm²	2 x 0.5 mm²	3 x 0.5 mm²

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

Type		**85x24x26mm**		**85x24x26mm**	**88x25x13mm**	
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					**6314242533**
	NC contact					
	Changeover contact				**6317342535**	
	Bistable	**6314432609**	**6310432598**	**6310432590**		
Technical data						
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						
Ambient temperature (min/max)		-25°C/+70°C	-5°C/+70°C	-20°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		PBT	PA, black	PBT, black	PA, black	PA, black
Connection		2 x 0.5 mm²	2 x 0.75 mm²	4.8 mm	3 x 0.5 mm²	2 x 0.5 mm²

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

88x25x13mm		**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			
		6317303312				
6310442534	**6310442622**			**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 magnetoresistive 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.

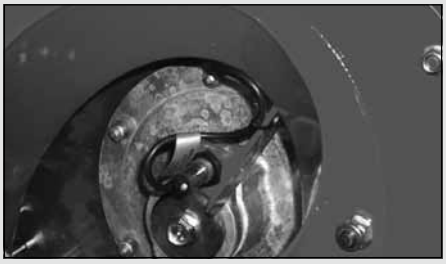
Advantages of electronic magnetic sensors over electromechanical reed contacts

- 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.

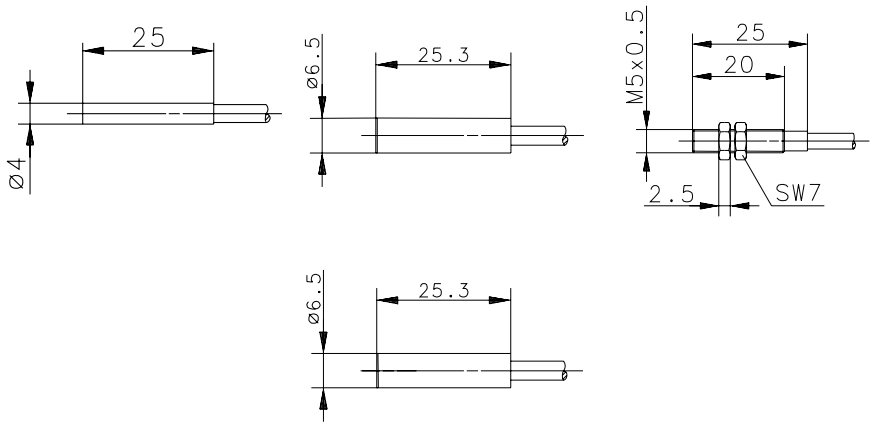
Sensing distances of electronic magnetic sensors

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 magneto-resistive 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	**6373299132**		**6373270105**	**6373299133**
	NC contact				
	Bistable				
NPN	NO contact		**6362670001**		
	NC contact				
	Bistable		**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					

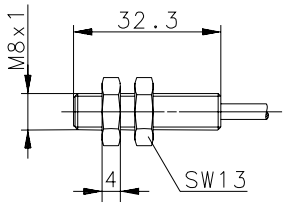
Mechanical data

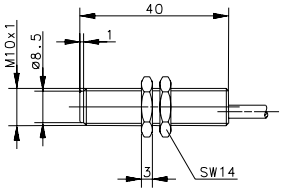
Ambient temperature (min/max)	-20°C/+70°C	-25°C/+70°C	-25°C/+70°C	-20°C/+70°C
Protection class in accordance with IEC529, EN60529	IP67	IP67	IP67	IP67
Enclosure material	Stainless steel 1.4401	Stainless steel 1.4401	Stainless steel 1.4401	CuZn39Pb3
Connection	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²

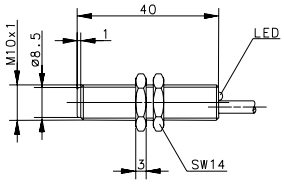
Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

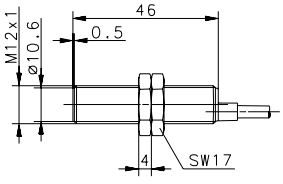


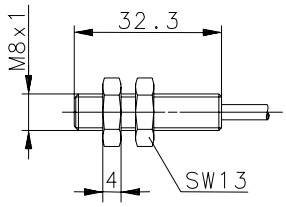
M08		M10		M10	M12		
Hall	MR	Hall	Hall	MR	Hall	Hall	
10 mT	2 mT	10 mT	10 mT	1 mT	10 mT	10 mT	
17 mm	45 mm	17 mm	17 mm	45 mm	17 mm	17 mm	
T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	
Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	
			All-metal	All-metal			

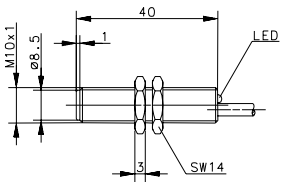


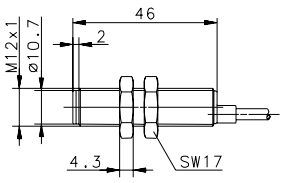






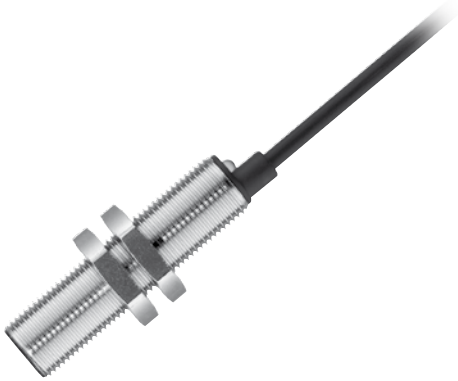






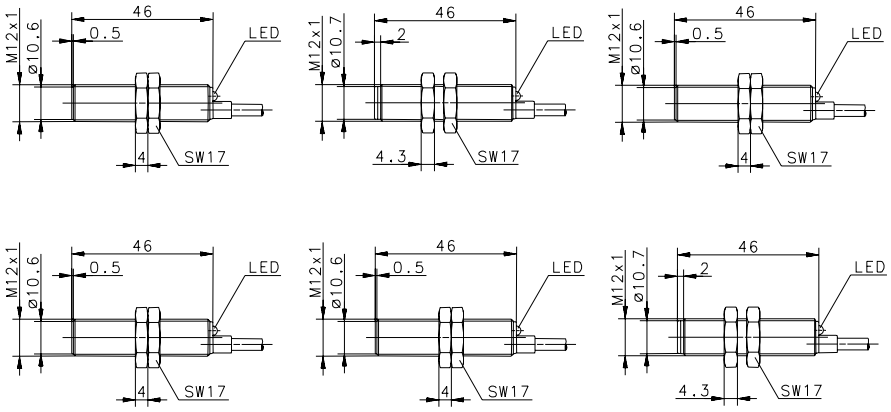
	6373260107		6372261085 6372161086 6373461124	6373261087 6373161088			
6362660002 6363860033		6362661003 6363861034			6362662004 6363862035	6362662005 6363862036	
4.5-24 VDC	10-30 VDC	4.5-24 VDC	10-39 VDC	10-39 VDC	4.5-24 VDC	4.5-24 VDC	
25 mA	200 mA	25 mA	400 mA	400 mA	25 mA	25 mA	
20 kHz	1500 Hz	20 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 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	

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						

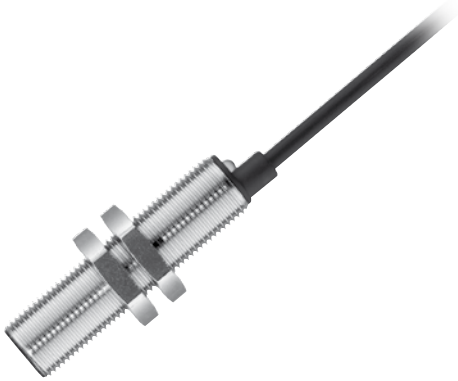
Technical data

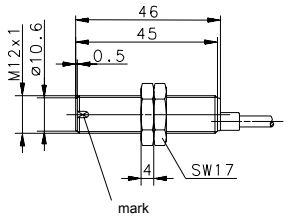
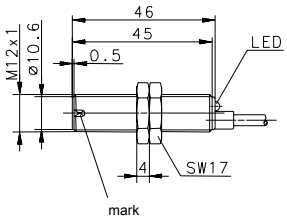
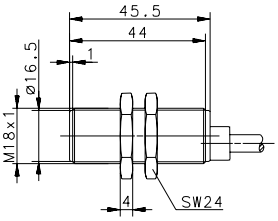
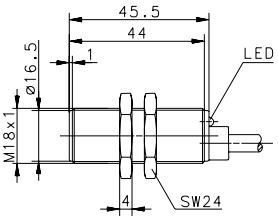
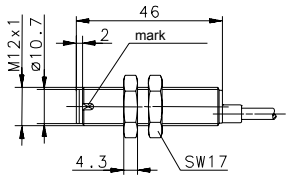
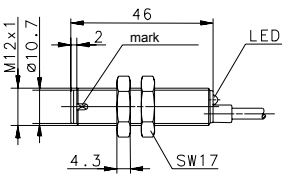
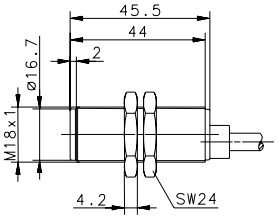
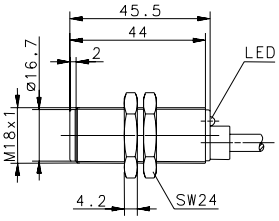
Rated operating voltage	U_B	10-39 VDC	10-39 VDC	10-39 VDC	10-39 VDC	10-39 VDC	10-39 VDC
Rated operating current	I_B	400 mA	400 mA	400 mA	400 mA	400 mA	400 mA
Max. switching voltage	F	10 kHz	10 kHz	10 kHz	10 kHz	1500 Hz	10 kHz
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	LED/-	LED/-
Sensitivity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

Mechanical data

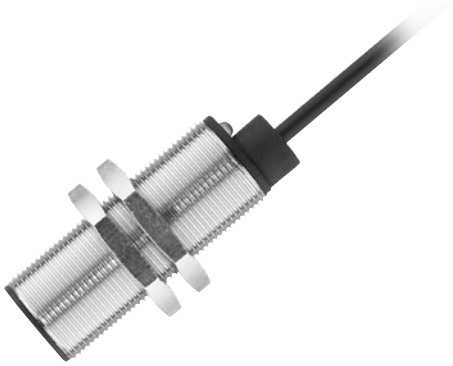
Ambient temperature (min/max)		-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C
Protection class in accordance with IEC529, EN60529		IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material		CuZn39Pb3	CuZn39Pb3	PA	CuZn39Pb3	CuZn39Pb3	PA
Connection		3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²

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



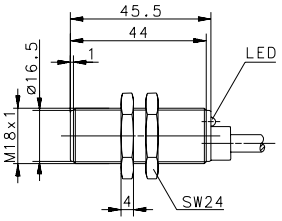
M12		**M12**		**M18**		**M18**		
Hall	Hall	Hall	Hall	Hall	Hall	Hall	Hall	
-	-	-	-	10 mT	10 mT	10 mT	10 mT	
0-2 mm	0-2 mm	0-2 mm	0-2 mm	17 mm	17 mm	17 mm	17 mm	
-	-	-	-	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	
Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	
Speed	Speed	Speed	Speed					
								
								
		6379262120	**6379262119**			**6372263098** **6372163100** **6373463128**	**6372263097** **6372163099** **6373463127**	
6369662028	**6369662027**			**6362663006** **6363863037**	**6362663007** **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 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	

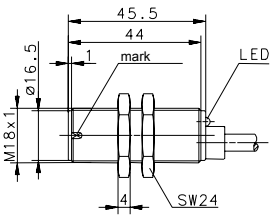
You will find detailed data sheets to the products under www.bernstein.eu

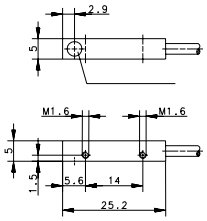


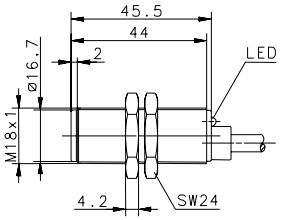
Electronic Magnetic Sensors (Type M18, Q05, Q08, Q12, E27, E29)

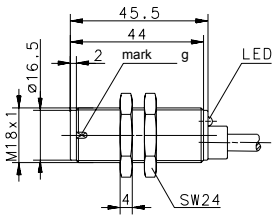
Type		**M18**		**M18**		**Q05**
Operating mode		MR	MR	Hall	Hall	MR
Magnetic sensitivity (mT)		1 mT	1 mT	-	-	3 mT
Sensing distance (Sn)		45 mm	45 mm	0 - 2 mm	0 - 2 mm	10 mm
Reference magnet (Page)		T-62 N/S	T-62 N/S	-	-	T-62 N/S
Type of connection		Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m
Special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











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

Technical data

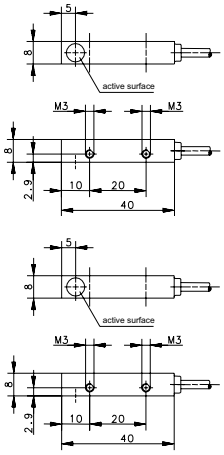
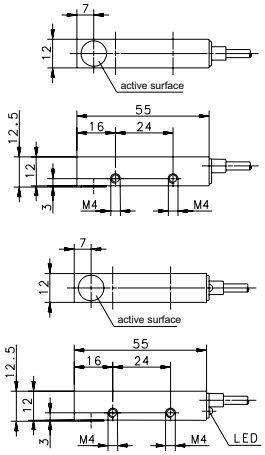
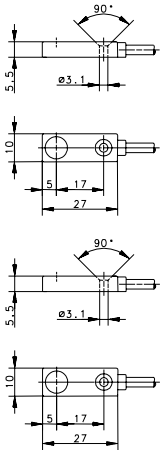
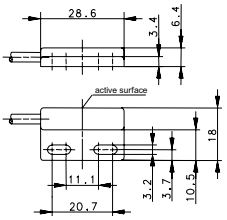
Rated operating voltage	U_B	10-39 VDC	10-39 VDC	10-39 VDC	10-39 VDC	4.5-30 VDC
Rated operating current	I_B	400 mA	400 mA	400 mA	400 mA	200 mA
Max. switching voltage	F	10 kHz	10 kHz	10 kHz	10 kHz	10 kHz
Function/operating voltage indicator		LED/-	LED/-	LED/-	LED/-	-/-
Sensitivity adjustable						
Short circuit-protection		Cyclic	Cyclic	Cyclic	Cyclic	Current limiter
Teachable						

Mechanical data

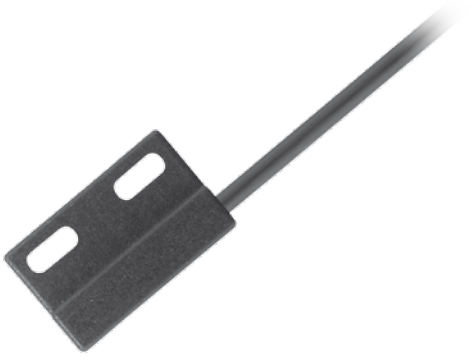
Ambient temperature (min/max)	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-25°C/+70°C	-20°C/+70°C
Protection class in accordance with IEC529, EN60529	IP67	IP67	IP67	IP67	IP67
Enclosure material	CuZn39Pb3	PBT	CuZn39Pb3	PBT, black	CuZn39Pb3
Connection	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.05 mm²

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



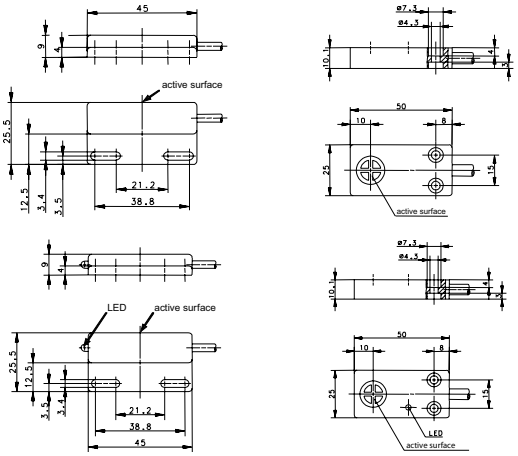
Q08		Q12		E27		E29	
Hall	MR	Hall	Hall	Hall	Hall	Hall	
10 mT	2 mT	10 mT	10 mT	10 mT	2 mT	10 mT	
17 mm	45 mm	17 mm	17 mm	17 mm	30 mm	17 mm	
T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	T-62 N/S	
Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	Cable 2 m	
							
	6373280106		**6372255083** **6372155084** **6373455131**				
6362680012 **6363880043**		**6362655013** **6363855044**		**6362693010** **6363893041**	**6363893031**	**6362611008** **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 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	3 x 0.14 mm²	

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					
	Bistable	**6363845040**		**6363890042**		
Analogue	Current output					
	Voltage output					

Technical data

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

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.

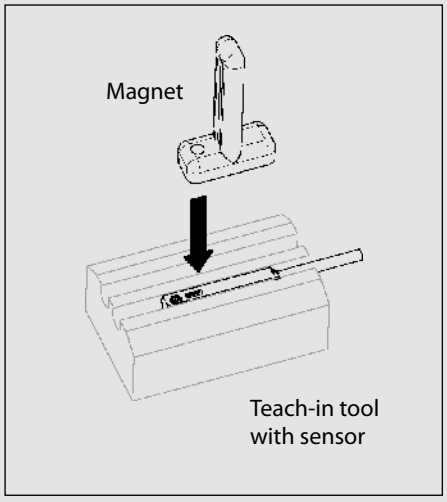


Notes

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 ±1.5 mT to ±13.5 mT
- Sensing distance up to 50 mm (depending on magnet/air gap)
- Repeat accuracy ≤ 0.1 mT
- Hysteresis 1 mT ≤ H ≤ 1.35 mT
- Operating voltage range 10 – 30 V DC
- Output current Ie ≤ 50 mA (one output switched) ≤ 25 mA per output (both outputs switched)
- Ambient temperature -20 °C to +80 °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

CE

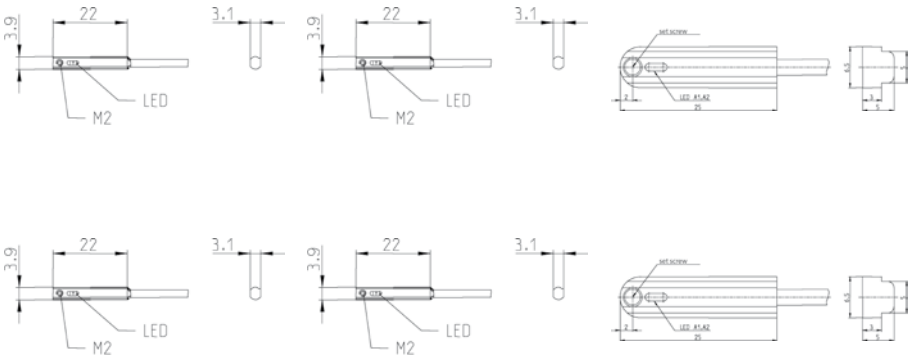
① **MEK-E22 Ex**

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

KEMA 08ATEX0130 X

Teachable Electronic Slot Sensors

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 ①	Teachable – Ex ①	Teachable	Teachable



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

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

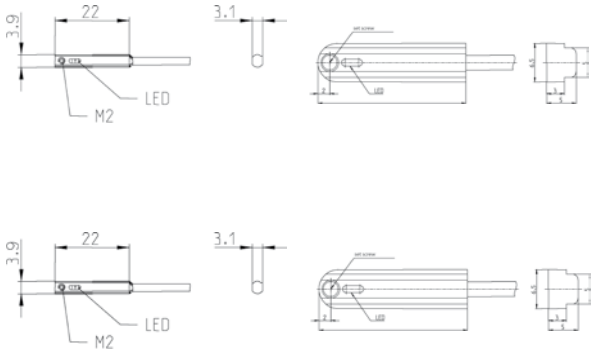
Ambient temperature (min/max)		-20°C/+80°C	-20°C/+80°C	-20°C/+80°C	-20°C/+80°C	-20°C/+80°C	-20°C/+80°C
Protection class in accordance with IEC529, EN60529		IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material		PA, black	PA, black	PA, black	PA, black	Aluminium	Aluminium
Connection		4 x 0.05 mm²	M8 x 1	4 x 0.05 mm²	M8 x 1	4 x 0.05 mm²	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	**6372281146**	**6372281147**			
	C-slot Festo	**6372281148**	**6372281149**			
	T-slot			**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		-	-	-	-	

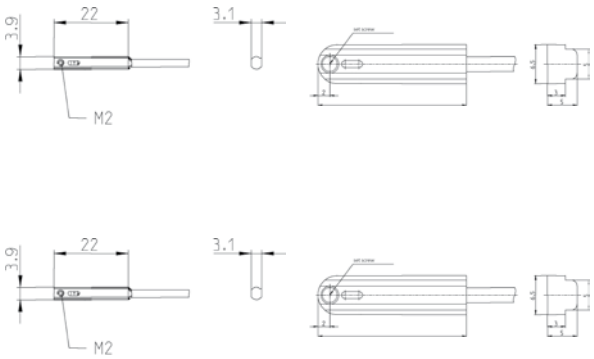
Mechanical data

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 mm²	M8 x 1	3 x 0.05 mm²	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	**6310281656**	**6310281657**			
	C-slot Festo	**6310281658**	**6310281659**			
	T-slot			**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 x 10^8	3 x 10^8	3 x 10^8	3 x 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 x 0.05 mm^2	M8 x 1	3 x 0.05 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 manufactures 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.

Notes

Magnetic controllers for safety functions

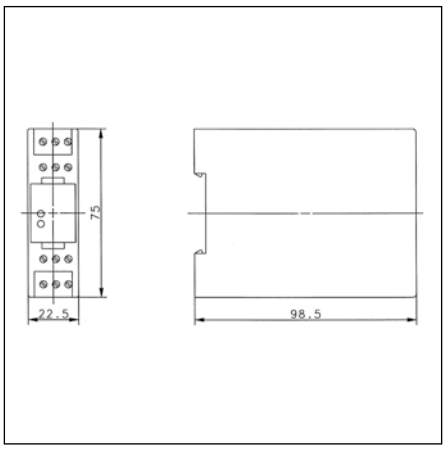
TÜV certified

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



Type designation		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	max	AC 250 V	AC 250 V
Switching current	max	8 A	8 A
Switching power	max	1700 VA	1700 VA
LED: Hazard status/switching status		●/–	●/–
LED: Supply voltage/ON		●	–
Relay: Positive-action/standard		●/–	●/–
Ambient conditions			
Temperature range	min/max	0 °C/+55 °C	0 °C/+55 °C
		32 °F/+131 °F	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 mm²	max. 2.5 mm²
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.

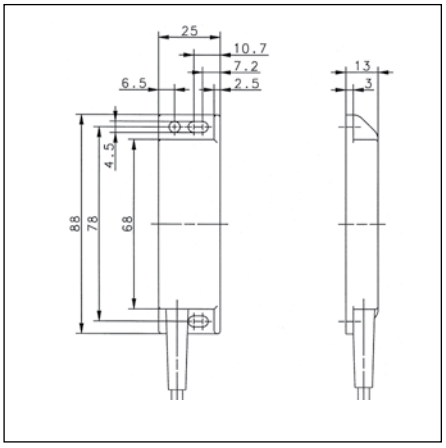


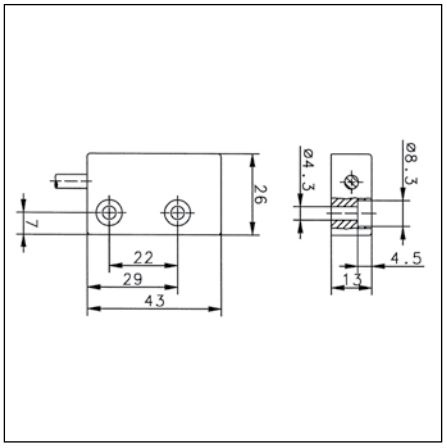


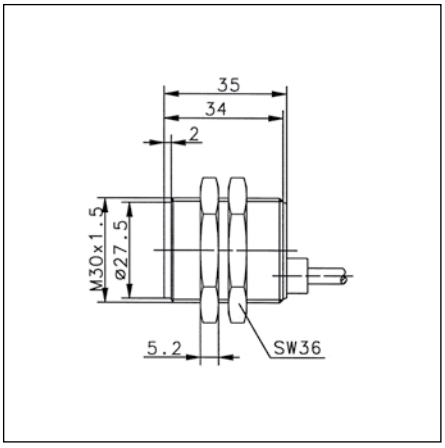


MAK-4236-3	MAK-5236-3	MAK-5336-3
6490642315	**6490652316**	**6490653317**
MAK-4236-6	MAK-5236-6	MAK-5336-6
6490642302	**6490652307**	**6490653311**
MAK-4236-9	MAK-5236-9	MAK-5336-9
6490642303	**6490652308**	**6490653312**
MAK-4236-STK	MAK-5236-STK	MAK-5336-STK
6490642305	**6490652309**	**6490653313**

-5 °C/+70 °C	-5 °C/+70 °C	-5 °C/+70 °C
+23 °F/+158 °F	+23 °F/+158 °F	+23 °F/+158 °F
IP67	IP67	IP67
PA 6.6	PBT	PA 6.6
4 mm	3 mm	3 mm
14 mm	14 mm	14 mm
TK-42-CD	TK-52-CD/2	TK-43-CD
6402042310	**6402052311**	**6402043312**
6392701306	**6392701306**	**6392701306**
6392702307	**6392702307**	**6392702307**







Ultrasonic Sensors

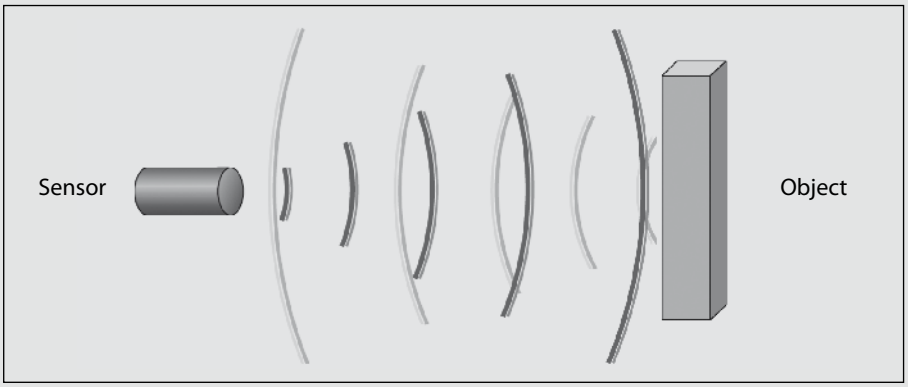
Ultrasonic sensors are used to precisely detect the position of objects of any material and colour, irrespective of external light levels even in harsh industrial environments. The sensors are characterised by high sound intensity that makes it possible to detect even the smallest of objects.

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

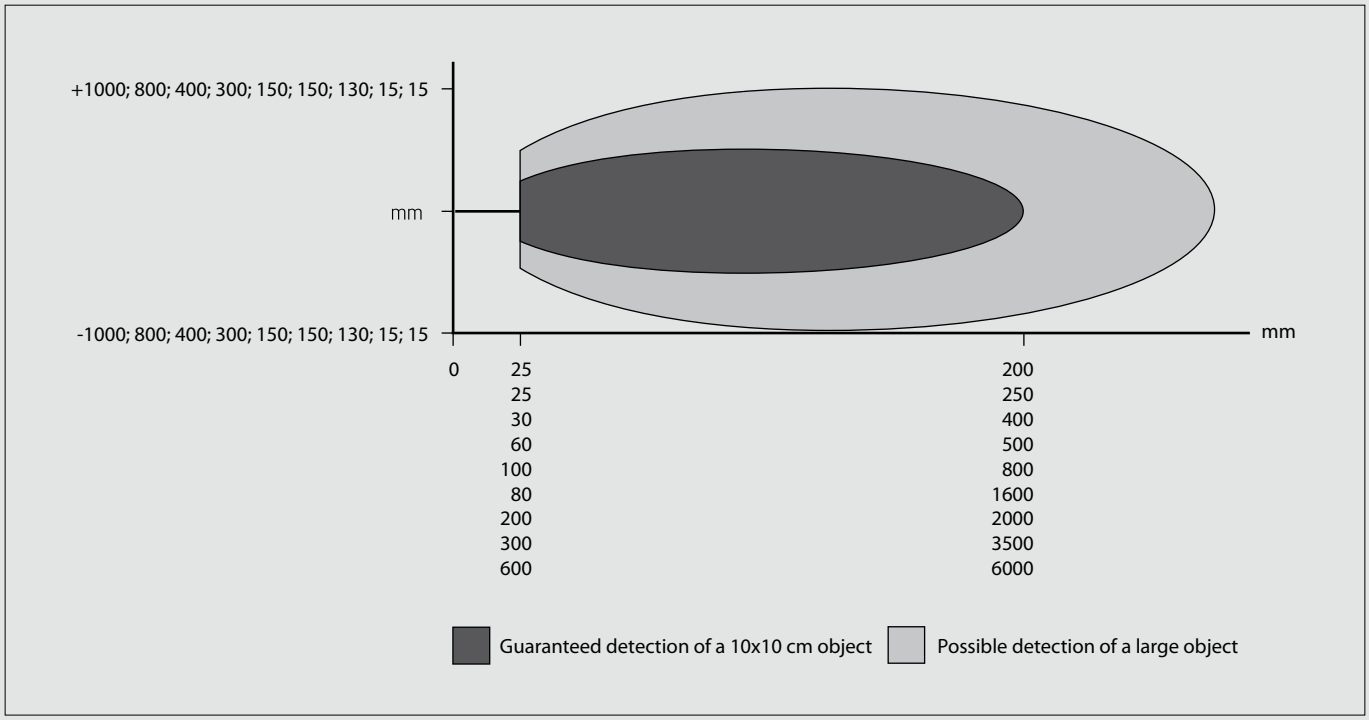
- Protection class IP67
- Large detection range of up to 6000 mm (depending on type)
- High linearity
- High repeat accuracy
- Narrow sound beam of 8°
- Adaptive 0-10 V voltage or 4-20 mA current output (analogue sensors)
- Two adaptive switching outputs, can be used individually or combined in connection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

Technical data*

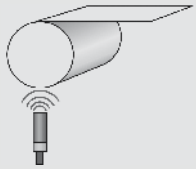
- One analogue 0 ...10 V/4 ... 20 mA output or two switching outputs.
- Rated operating voltage range 12 V – 30 V DC
- Enclosure: PBT/ GF30
- Ambient temperature -15 °C…70 °C
- Repeat accuracy ±0.2 % ±2 mm
- Hysteresis 1 %

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

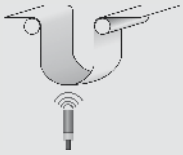
Detection range:



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.



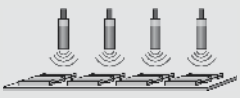
Sag control
Detection of sag loop for controlling material tension or controlling quantity of material for the downstream production process.



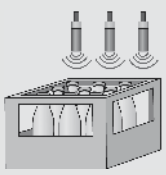
Level measurement
Level measurement of liquids of bulk materials in containers and silos.



Thickness measurement
Thickness measurement of objects.



Completeness check
For checking completeness of objects in containers.

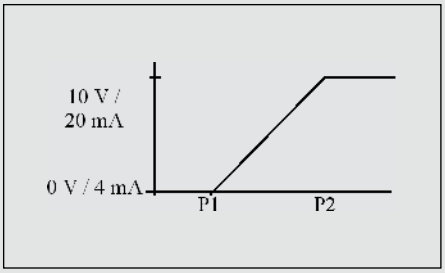


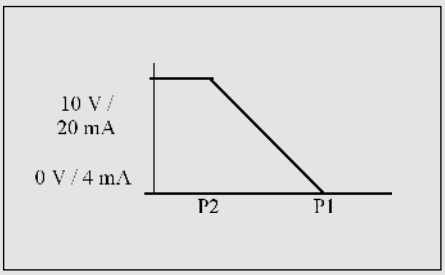
Completeness check of bottles in crates
For checking the presence and height of bottles in crates.

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

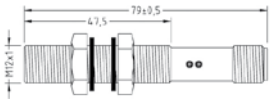
The two switching outputs are taught-in accurate to the millimetre via a teach-in input. Independent of each other, they can be optionally adapted with 1 % hysteresis as complementary windows (NO/NC) or as complementary switching outputs (NO/NC) with hysteresis adjustable to any value. P1 and P2 define 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.

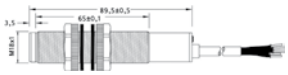
Standards and approvals:

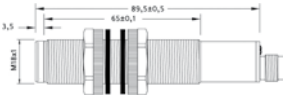
EN 60947-5-2

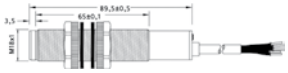
Ultrasonic Sensors (Type M12, M18)

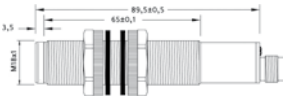
Type			**M12**	**M18**		**M18**	
Detection range			25-200 mm	30-400 mm	30-400 mm	30-400 mm	30-400 mm
Output			1 x NO/NC	2 x NO/NC	Analogue	2 x NO/NC	Analogue
Type of connection			Connector M12	Cable 2 m	Cable 2 m	Connector M12	Connector M12
Special feature							











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

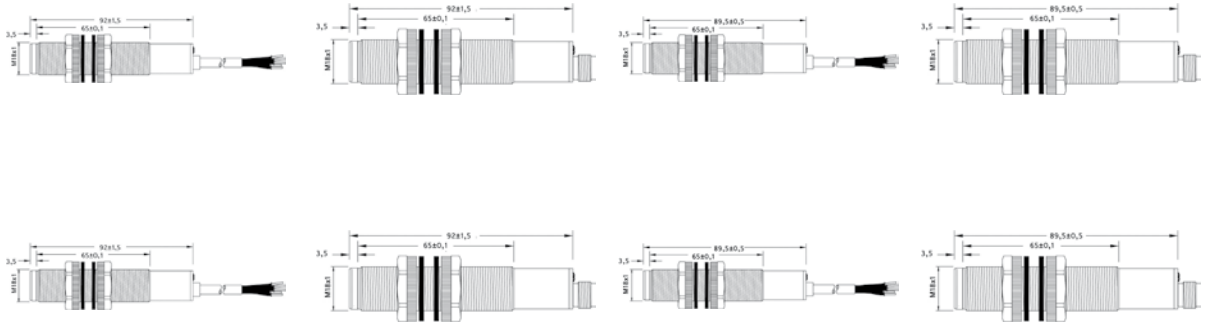
Mechanical data

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 mm²	4 x 0.14 mm²	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	

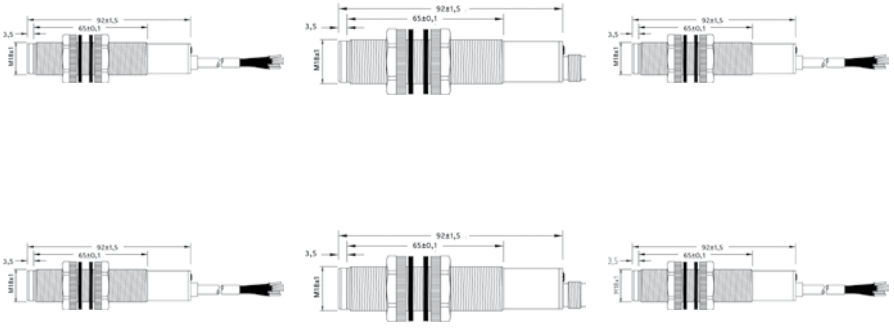
-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	
IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67	
PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	
5 x 0.14 mm²	4 x 0.14 mm²	M12 x 1	M12 x 1	5 x 0.14 mm²	4 x 0.14 mm²	M12 x 1	M12 x 1	

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		**6711402003**		**6712402003**		**6711402001**
		4-20 mA		**6711302003**		**6712302003**		**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		±0.2 % ±1 mm	±0.2 % ±1 mm	±0.2 % ±1 mm	±0.2 % ±1 mm	±0.2 % ±2 mm	±0.2 % ±2 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

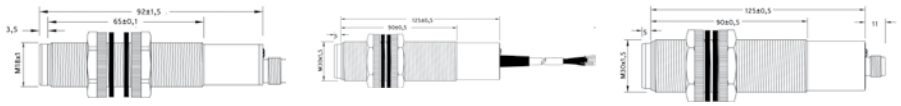
Mechanical data

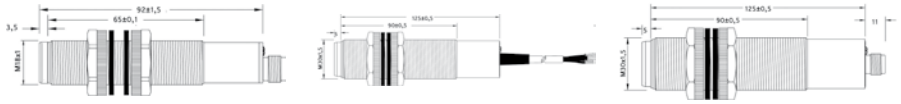
Ambient temperature (min/max)	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C
Protection class in accordance with IEC529, EN60529	IP67	IP67	IP67	IP67	IP67	IP67
Enclosure material	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30
Connection	5 x 0.14 mm^2	4 x 0.14 mm^2	M12 x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

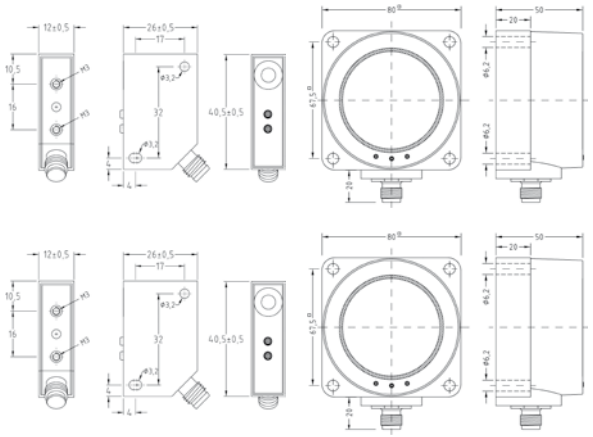
-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C	-15°C/+70°C		
IP67	IP67	IP67	IP67	IP67	IP67		
PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30	PBT/GF30		
M12 x 1	M12 x 1	5 x 0.14 mm^2	4 x 0.14 mm^2	M12 x 1	M12 x 1		

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		**6713411001**		**6712412001**	
		4-20 mA				**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



Notes

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.

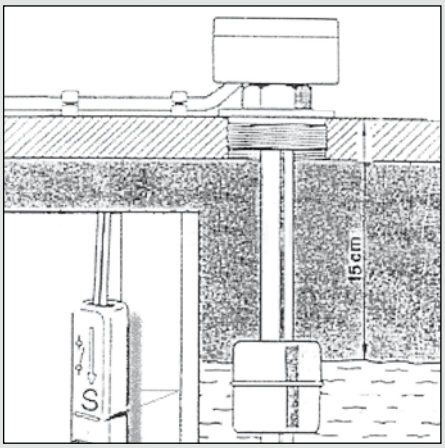
These miniature float switches have been specially developed for small tanks/reservoirs as used in the automotive industry, drinks vending machines, air conditioning systems etc.

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

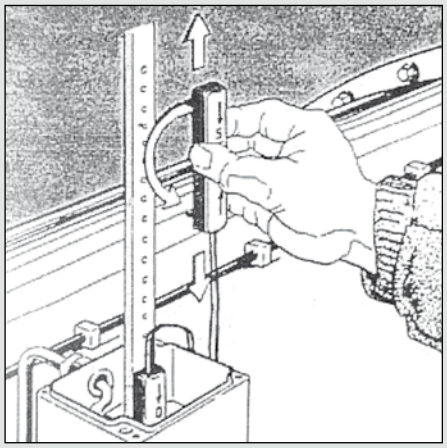
Up to four encapsulated magnetic sensor elements can be placed in any position at 10 mm intervals in the immersion tube of BERNSTEIN adjustable float switches.



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.

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.

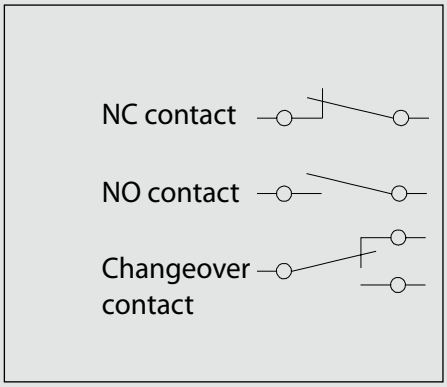
Maximum making current
From 0.5 A – 5 A depending on type of sensor used.

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).



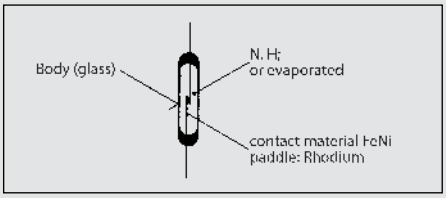
Contact function

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.

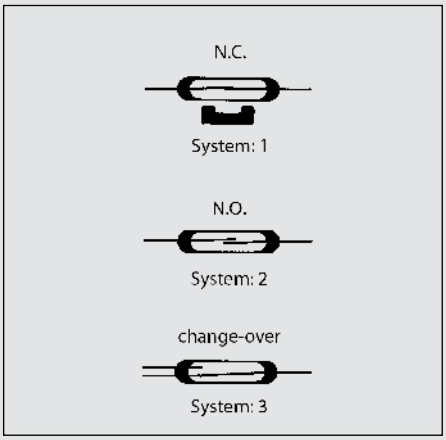
Mechanical wear
Thanks to the contactless operating principle, mechanical wear is not an issue.

Reed contact
A reed contact is a magnetically or electromagnetically 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).

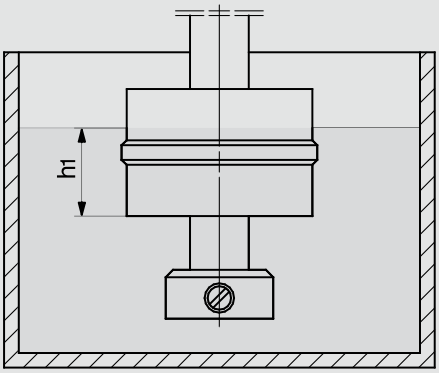
Immersion tube
Available in PVC, MS63, stainless 1.4571.

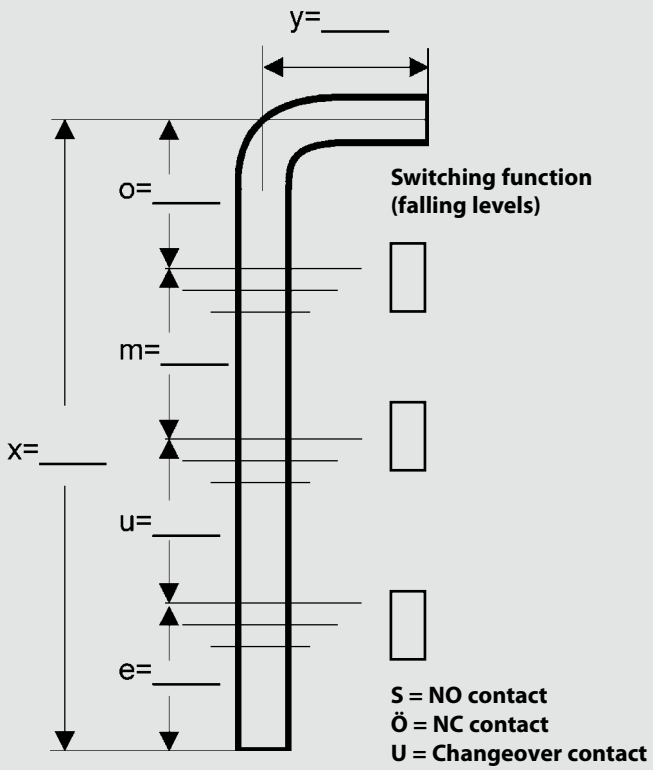
Maximum switching voltage
100 V – 250 V depending on type of reed contact (please refer to Page 130).

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).





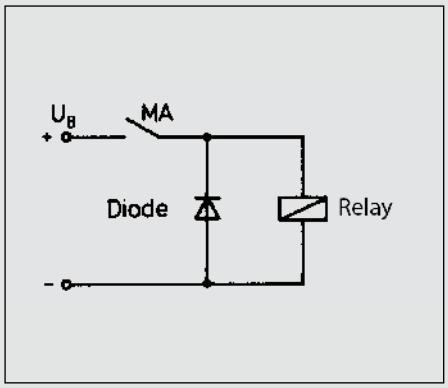
Guidelines for reed contact protection

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.

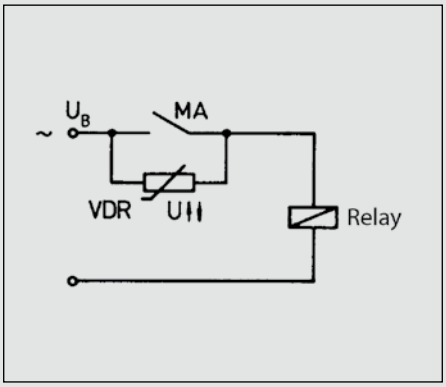
1. Inductive loads

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).

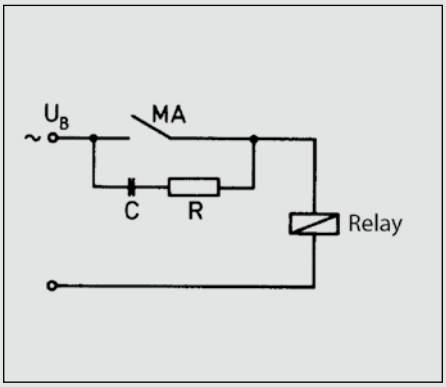
This can amount to a multiple of the operating voltage and initially cause a switching spark between the opening contact studs.



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).

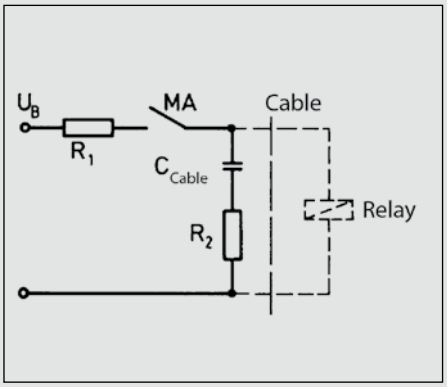
Generally, the RC element is connected in parallel to the contact and therefore in series to the load (vice versa is also possible).

2. Capacitive loads

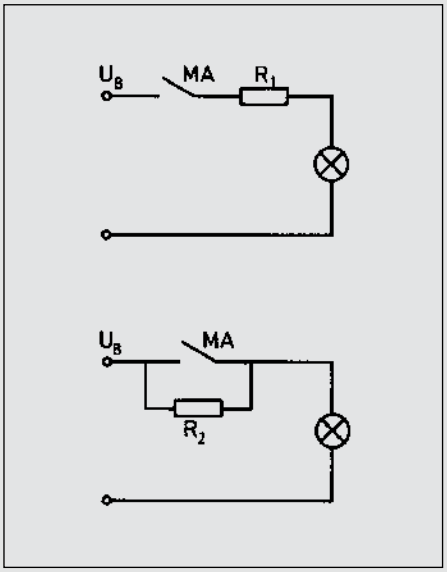
In contrast to inductive loads, increase making currents can occur in connection with capacitive loads and lamp loads that can damage and even weld contacts closed. When capacitors are switched (e.g. cable capacitance) a very high peak current occurs with its intensity depending on the capacitance and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

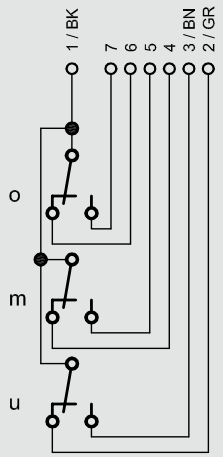
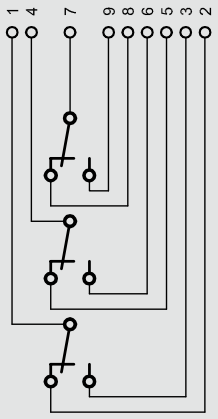
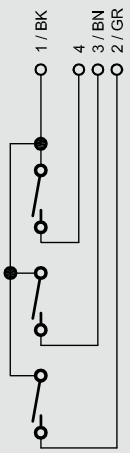
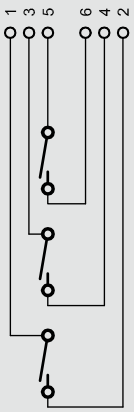


1) Capacitive load



2) Lam load

Wiring diagram

Switching points	Changeover contact		NC or NO contact	
	Up to 3 switching points	Separate contacts	Up to 3 switching points	Separate contacts
3				
2				
1				

The letters o, m and u identify the position of the contact.
o = top, m = middle, u = bottom

Standard float switches

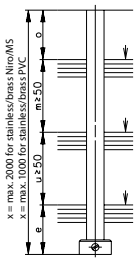
Ordering example:
See Page 118

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

Min./max. dimensions

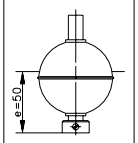
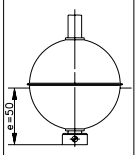
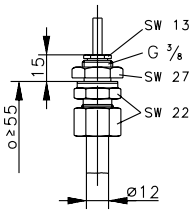
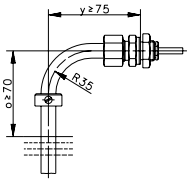
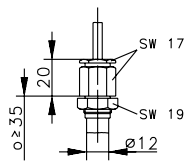
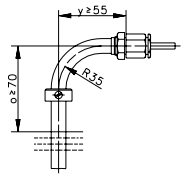
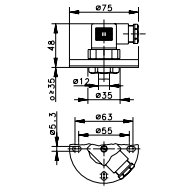
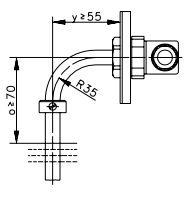
Float switch – float combination

Switching distance for falling levels



Float material		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**						
Half cable gland R3/8"							
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	—	—
Cable gland PG9							
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	—	—
ø 75 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	—	—

5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching power	Connection head	Standard range		Special features (see Page 119)
7	□	□		□	□	**S**		□

		Number of switching points	Switching function	Switching power		Connection head			
1.4571 ø 62 	**1.4571 ø 84** 	**1 Switching point 2 Switching points 3 Switching points**	**1 NC contact 2 NO contact 3 Changeover contact 4 Mixed version (CO, NC, NO)**	**max. 0.5 A - 30 VA - 250 V**	**max. 1 A - 60 VA - 250 V min. switching power = 3 VA**	**ID letter for connection head**	**Straight type** Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC and brass versions.	**ID letter for connection head**	**Elbow version** Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC versions.
B	**G**	**1/2/3**	**1/2/3/4**	**K**	**L**	**A**		**C**	
O	**H**	**1/2/3**	**1/2/3/4**	**K**	**L**	**A**		**—**	
—	**—**	**1/2/3**	**1/2/3/4**	**K**	**L**	**A**		**C**	
B	**G**	**1/2/3**	**1/2/3/4**	**K**	**L**	**V**		**H**	
O	**H**	**1/2/3**	**1/2/3/4**	**K**	**L**	**V**		**—**	
—	**—**	**1/2/3**	**1/2/3/4**	**K**	**L**	**V**		**H**	
B	**G**	**1/2/—**	**1/2/3/4**	**K**	**L**	**T**		**W**	
O	**H**	**1/2/—**	**1/2/3/4**	**K**	**L**	**T**		**—**	
—	**—**	**1/2/—**	**1/2/3/4**	**K**	**L**	**T**		**W**	

Standard float switches

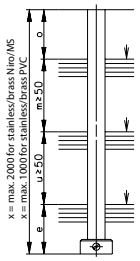
Ordering example:
See Page 118

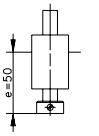
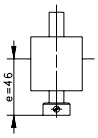
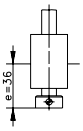
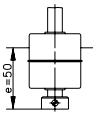
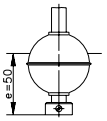
Position	1	2	3	4
Version	Magnetic float switch	Output type reed contact	Float switch – float combination	
Type	**M**	**A**	☐	**-**

Min./max. dimensions

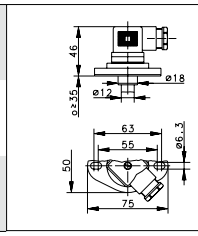
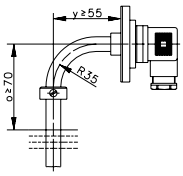
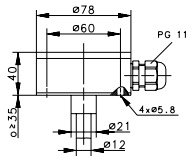
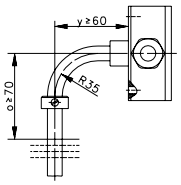
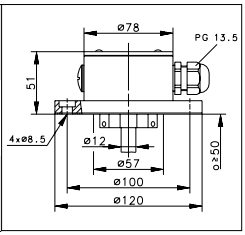
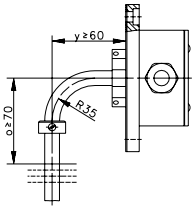
Float switch – float combination

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-Al Si 12	1.4571	A	V	T	R	N	E
G-Al Si 12	MS63	M	L	C	S	P	F
G-Al Si 12	PVC	K	D	I	U	—	—
Flange enclosure ø 120							
G-Al Si 12	1.4571	A	V	T	R	N	E
G-Al Si 12	MS63	M	L	C	S	P	F
G-Al Si 12	PVC	K	D	I	U	—	—

5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching power	Connection head	Standard range		Special features (see Page 119)
7	□	□		□	□	**S**		□

		Number of switching points	Switching function	Switching power		Connection head			
1.4571 ø 62	**1.4571 ø 84**	**1 Switching point 2 Switching points 3 Switching points**	**1 NC contact 2 NO contact 3 Changeover contact 4 Mixed version (CO, NC, NO)**	**max. 0.5 A - 30 VA - 250 V**	**max. 1 A - 60 VA - 250 V min. switching power = 3 VA**	**ID letter for connection head**	**Straight type** Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC and brass versions.	**ID letter for connection head**	**Elbow version** Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC versions.
B	**G**	**1/2**	**1/2/3/4**	**K**	**L**	**TO**		**TW**	
O	**H**	**1/2**	**1/2/3/4**	**K**	**L**	**TO**		**—**	
—	**—**	**1/2**	**1/2/3/4**	**K**	**L**	**TO**		**TW**	
B	**G**	**1/2/3**	**1/2/3/4**	**K**	**L**	**S**		**B**	
O	**H**	**1/2/3**	**1/2/3/4**	**K**	**L**	**S**		**—**	
—	**—**	**1/2/3**	**1/2/3/4**	**K**	**L**	**S**		**B**	
B	**G**	**1/2/3**	**1/2/3/4**	**K**	**L**	**FL 120**		**WFL 120**	
O	**H**	**1/2/3**	**1/2/3/4**	**K**	**L**	**FL 120**		**—**	
—	**—**	**1/2/3**	**1/2/3/4**	**K**	**L**	**FL 120**		**WFL 120**	

Standard float switches

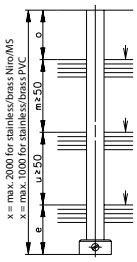
Ordering example:
See Page 118

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

Min./max. dimensions

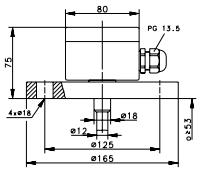
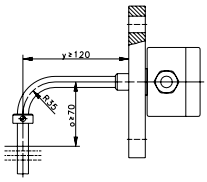
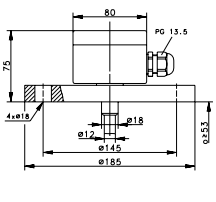
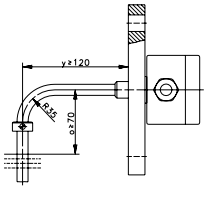
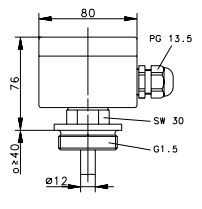
Float switch – float combination

Switching distance for falling levels



Float material		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						
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	—	—

5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching power	Connection head	Standard range		Special features (see Page 119)
7	□	□		□	□	**S**		□

		Number of switching points	Switching function	Switching power		Connection head	
1.4571 ø 62	**1.4571 ø 84**	**1 Switching point 2 Switching points 3 Switching points**	**1 NC contact 2 NO contact 3 Changeover contact 4 Mixed version (CO, NC, NO)**	**max. 0.5 A - 30 VA - 250 V max. 1 A - 60 VA - 250 V min. switching power = 3 VA**	**ID letter for connection head**	**Straight type** Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC and brass versions.	**ID letter for connection head**	**Elbow version** Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC versions.
B	**G**	**1/2/3**	**1/2/3/4**	**K**	**L**	**DN 50**		**WDN 50**  **—** **WDN 50**
—	**—**	**1/2/3**	**1/2/3/4**	**K**	**L**	**DN 50**		
B	**G**	**1/2/3**	**1/2/3/4**	**K**	**L**	**DN 65**		**WDN 65**  **—** **WDN 65**
—	**—**	**1/2/3**	**1/2/3/4**	**K**	**L**	**DN 65**		
B	**G**	**1/2/3**	**1/2/3/4**	**K**	**L**	**R 1,5**		
—	**—**	**1/2/3**	**1/2/3/4**	**K**	**L**	**R 1,5**		

Standard float switches

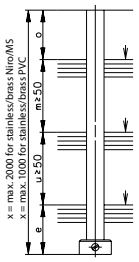
Ordering example: Ⓚ
MAK-721 KR2S

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

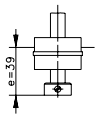
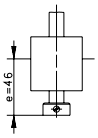
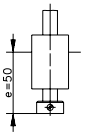
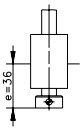
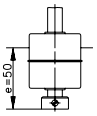
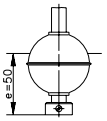
Switching distance for falling levels



Float material

Connection head material

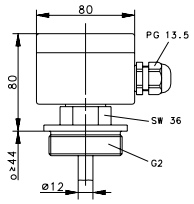
Float switch material

	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
						
Tank cable gland R2” 						
1.4571/ G-Al Si 12	**1.4571**	**A**	**V**	**T**	**R**	**N**	**E**
PVC/ Polyester	**PVC**	**Ⓚ**	**D**	**I**	**U**	**—**	**—**

With specification o = _____ ; u = _____ (see Order form on Page 134)

5	6	7	8	9	10	11	12	13
General design	Number of switching points	Switching function		Switching power	Connection head	Standard range		Special features (see below)
7	②	①		Ⓚ	R2	S		

		Number of switching points	Switching function	Switching power		Connection head	
1.4571 ø 62	1.4571 ø 84	1 Switching point 2 Switching points 3 Switching points	1 NC contact 2 NO contact 3 Changeover contact 4 Mixed version (CO, NC, NO)	max. 0.5 A - 30 VA - 250 V	max. 1 A - 60 VA - 250 V min. switching power = 3 VA	ID letter for connection head	**Straight type** Type in illustration in 1.4571 material. Slight dimensional variations may occur in PVC and brass versions.
B	G	1 /②/ 3	①/ 2 / 3 / 4	Ⓚ	L	R2	
—	—	1/2/3	1/2/3/4	K	L	R2	



Special features

- Temperature monitoring PT100 (P1)/ PT1000 (P10)
- Bi-metal switch

We can produce tailor-made designs for specific applications to suit individual customer requirements.

Miniature float switches

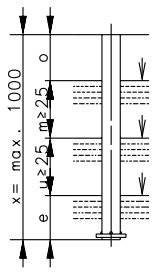
Ordering example:
See Page 118

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

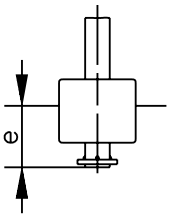
Min./max. dimensions

Float

Switching distance for falling levels

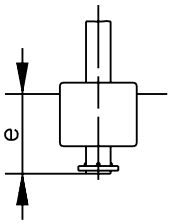


PP
ø 25 x 21



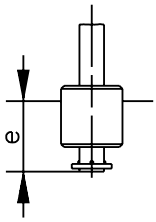
e = 20 (NC contact)
e = 17 (NO contact)

PVC
ø 25 x 21



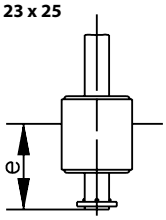
e = 26 (NC contact)
e = 23 (NO contact)

NBR
ø 20 x 20



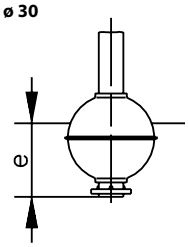
e = 23 (NC contact)
e = 23 (NO contact)

NBR
ø 23 x 25



e = 28 (NC contact)
e = 22 (NO contact)

1.4571
ø 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	—

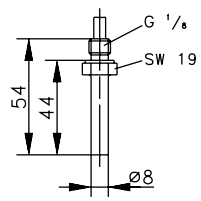
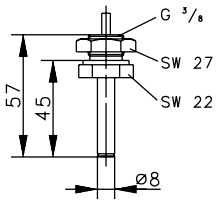
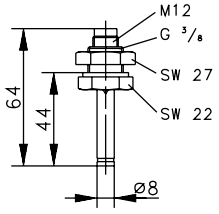
Connection thread R3/8" with connector



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	**R 1/8** 	**S**	**O**	**U**	**1000**	**3**	**1**
MS		**S**	**O**	**U**	**1000**	**3**	**1**
PP		**S**	**O**	**U**	**40,5**	**1**	**1**
PVC		**S**	**O**	**U**	**500**	**3**	**1**
Ni	**R 3/8** 	**S**	**O**	**U**	**1000**	**3**	**1**
MS		**S**	**O**	**U**	**1000**	**3**	**1**
PP		**S**	**O**	**U**	**40,5**	**1**	**1**
PVC		**S**	**O**	**U**	**500**	**3**	**1**
Ni	**R 3/8ST** 	**S**	**O**	**U**	**1000**	**3**	**—**
MS		**S**	**O**	**U**	**1000**	**3**	**—**
PP		**PP**			**40,5**	**1**	**—**
PVC		**PVC**			**500**	**3**	**—**

Miniature float switches

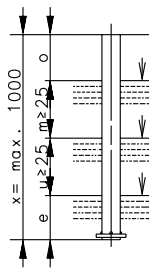
Ordering example:
See Page 118

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

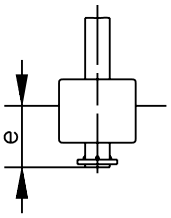
Min./max. dimensions

Float

Switching distance for falling levels

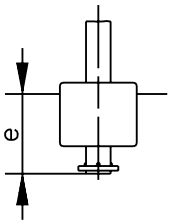


PP
ø 25 x 21



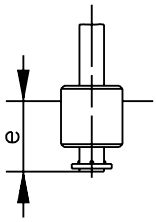
e = 20 (NC contact)
e = 17 (NO contact)

PVC
ø 25 x 21



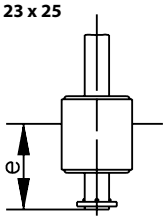
e = 26 (NC contact)
e = 23 (NO contact)

NBR
ø 20 x 20



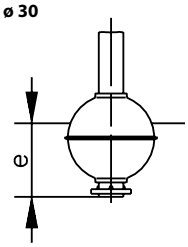
e = 23 (NC contact)
e = 23 (NO contact)

NBR
ø 23 x 25



e = 28 (NC contact)
e = 22 (NO contact)

1.4571
ø 30



e = 24 (NC contact)
e = 23 (NO contact)

Connection thread PG7



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

MSKS-PA-FL36-OS



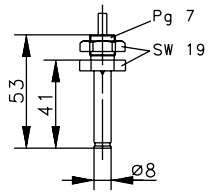
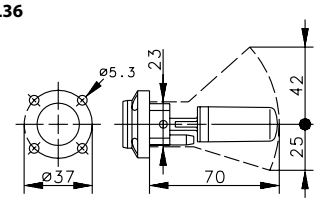
–	–	–	–	–

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

Enclosure material ⬇

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

Connection head ⬇

Version
PG7 
FL36 

Switching function ⬇

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)
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
S (with 1 m cable)	O	—	For lateral mounting		

PA12 (Enclosure & float)

Adjustable float switches

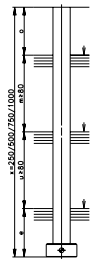
Ordering example:
See Page 118

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

Min./max. dimensions

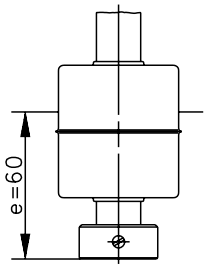
Float switch – float combination

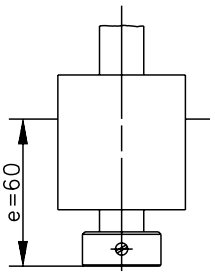
Switching distance for falling levels



Float material

Connection head material	Float switch material	1.4571 ø 52 x 55	PVC ø 52 x 55
Flange enclosure DN50 ø 165 			
1.4571/ G-Al Si 12	1.4571	N	V
PVC/ Polyester	PVC	—	D
Flange enclosure DN65 ø 185 			
1.4571/ G-Al Si 12	1.4571	N	V
PVC/ Polyester	PVC	—	D
Tank cable gland R1,5" 			
G-Al Si 12	1.4571	N	V
PVC/ Polyester	PVC	—	D

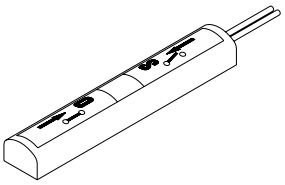
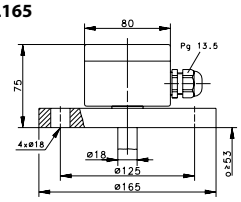
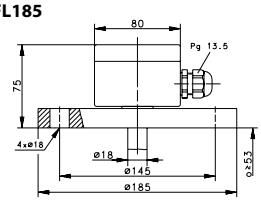
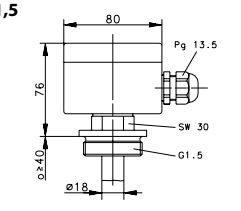




5	6	7	8
Adjustable	Connection head		Length
VST	□	/	□

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**

Adjustable float switches

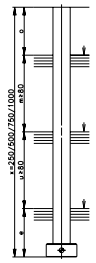
Ordering example:
See Page 118

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



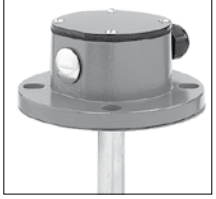
Float material		1.4571 ø 52 x 55	PVC ø 52 x 55
Connection head material	Float switch material		
1.4571/ G-Al Si 12	1.4571	N	V
PVC/ Polyester	PVC	—	D

Tank cable gland R2"



1.4571/ G-Al Si 12	1.4571	N	V
PVC/ Polyester	PVC	—	D

Flange enclosure ø 120



G-Al Si 12	1.4571	N	V
G-Al Si 12	PVC	—	D

Flange enclosure ø 120 with gush water protection

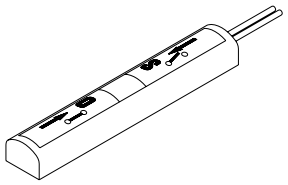
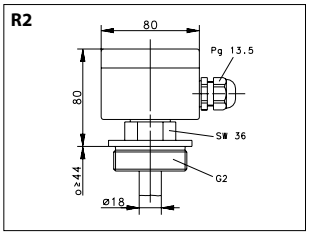
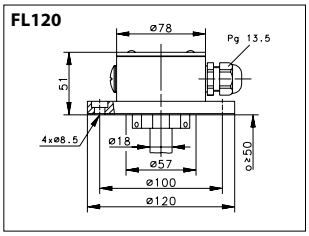
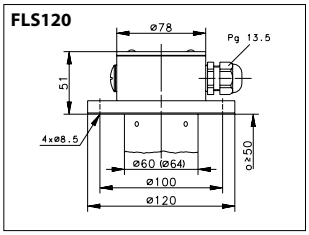


G-Al Si 12	1.4571	—	—
G-Al Si 12	PVC	—	—

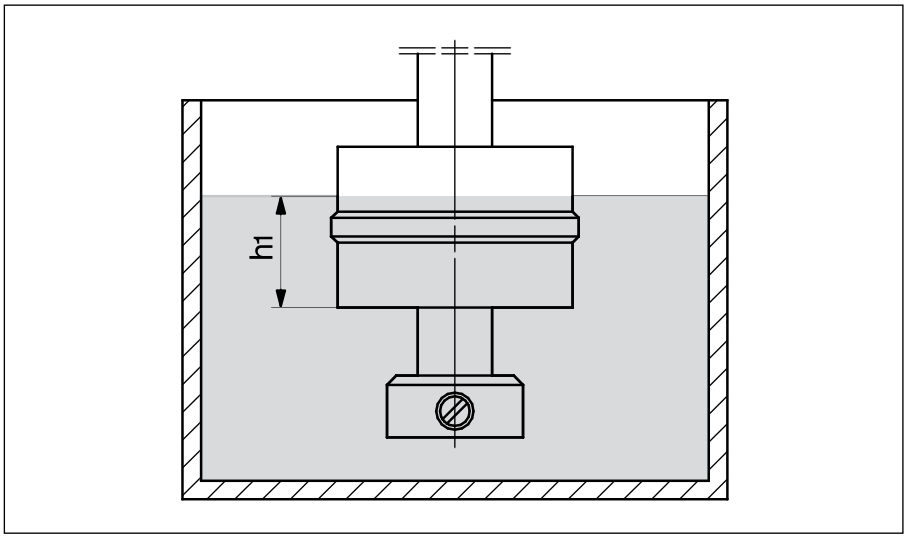
5	6	7	8
Adjustable	Connection head		Length
VST	☐	/	☐

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	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
FL120 	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
FLS120 	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

Floats
Standard Float Switches



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

Immersion depth h1 (mm)	Density y (g/cm³)
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/cm³)
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/cm³)
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/cm³)
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/cm³)
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/cm³)
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/cm³)
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/cm³)
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	**Changeover**/NC/NO contacts	**Changeover**/NC/NO contacts
Contact ID letter	**K**	**L (min. Switching power 3 VA)**
Switching voltage (max)	250 V AC/DC	250 V AC/DC
Switching current (max)	0.5 A	1 A
Switching power (max)	30 VA	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)	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 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	Flange enclosure RD 120 mm
	(also available with gush water tube)	(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**

❑ **Order**

Date: _____

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

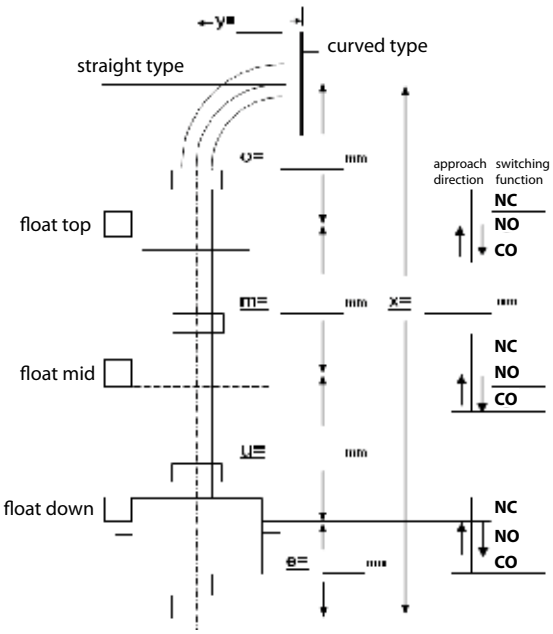
Power: min. _____ VA max. _____ VA

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

Notes

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 determine 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 pacemakers. 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

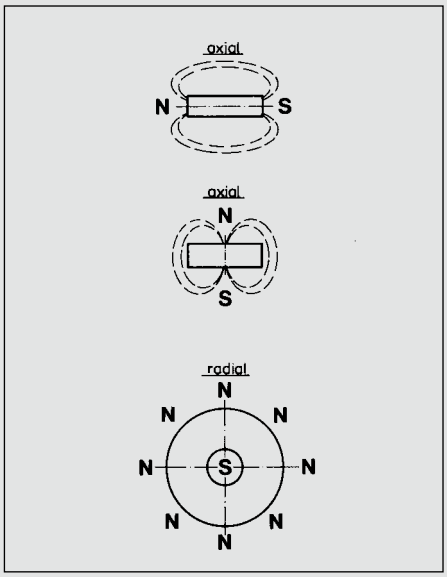
There are no known side-effects caused by touching magnet materials.

Magnet shapes

Rectangular, circular and cylindrical mag-nets 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.

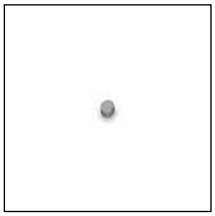
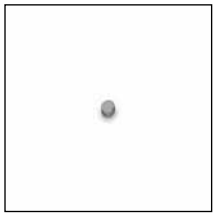
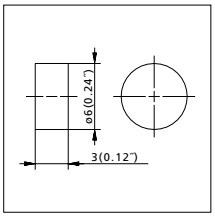
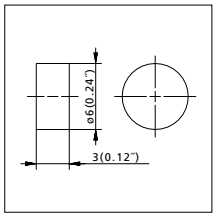
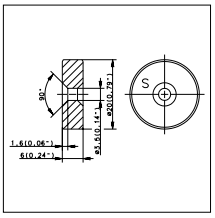
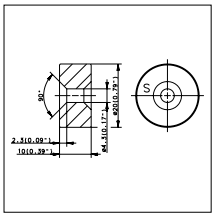
Mounting a magnetic switch system on ferromagnetic materials

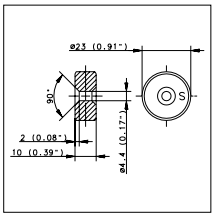
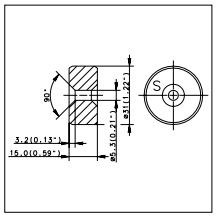
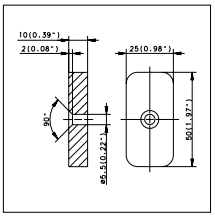
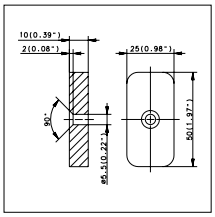
The nominal distance may be reduced when magnetic limit switches and their actuating magnets are mounted on mag-netisable material (Fe, etc.). To ensure trouble-free operation, a minimum gap of 15 mm between the magnetic switch and any material that can be magnetised should be maintained as a reference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

Applications

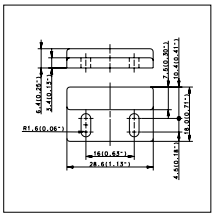
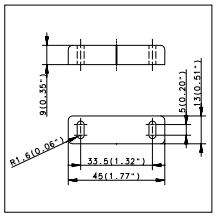
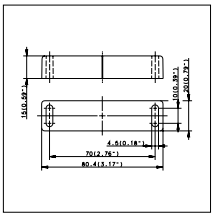
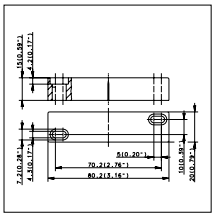
- Counting
- Position indication in lifts
- End position switches in pneumatic and hydraulic installations
- Position indication on butterfly valves, slide valves and valves in general
- Conveyors in high-bay shelving
- Position detection in textile, packaging and meat cutting machines
- Machine runtime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

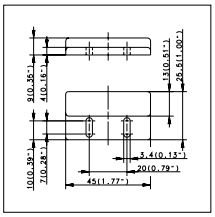
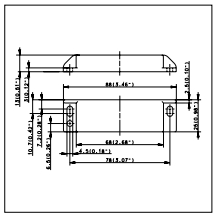
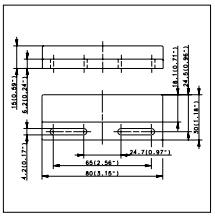
Actuating Magnets without Encapsulation

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		

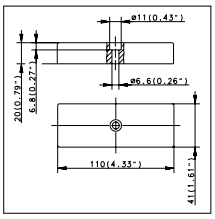
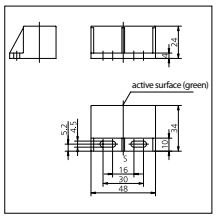
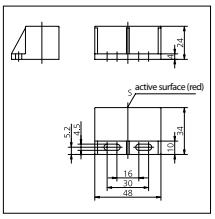
Actuating magnets without encapsulation	T-62N/S	T-69N/S	T-68N	T-68S
				
Magnet material	Barium ferrite	Barium ferrite	Barium ferrite	Barium ferrite
Temperature range (magnetic switch operation)	-40 °C ... +150 °C -40 °F ... +302 °F	-40 °C ... +150 °C -40 °F ... +302 °F	-40 °C ... +150 °C -40 °F ... +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

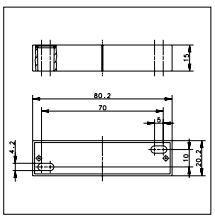
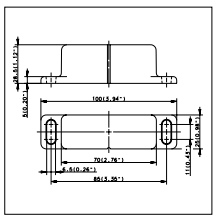
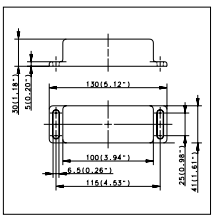
Actuating Magnets in Plastic Enclosure

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			

Mounting Brackets

Mounting brackets	BWN-M06NI/40 x 47	BWN-M06NI/27 x 38	BWN-M36NI
			
Material	Niro 1.4301	Niro 1.4301	Niro 1.4301
For series	MA-06, MA-16, MA-26, MA-15	MA-06, MA-16, MA-26, MA-15	MA-06, MA-16, MA-26, MA-15
Article number	**4102802001**	**4102802002**	**4904700035**
Dimensioned drawing			

Miniature Snap-In Connectors

Miniature snap-in connectors		Ø 6.5 mm	Ø 6.5 mm
Contact assignments **1 = Brown** **2 = Black** **3 = Blue**			
Cable material		PUR	PUR
Coupler material		PA 12	PA 12
Coupling ring material		POM	POM
Temperature range		-25 °C … +90 °C -13 °F … +194 °F	-25 °C … +90 °C -13 °F … +194 °F
Switching function		Universal	Universal
Cable structure		3 x 0.25 mm^2	3 x 0.25 mm^2
Protection class		IP67/NEMA 4	IP67/NEMA 4
Article number	**2,5 m**	**4139100219**	**4139100221**
	5 m	**4139100220**	**4139100222**
	10 m		

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 mm²	3 x 0.25 mm²	3 x 0.25 mm²
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 mm²	3 x 0.34 mm²	4 x 0.25 mm²	4 x 0.25 mm²
Protection class		IP68	IP68	IP68	IP67
Article number	**2.5 m**	**4139100801**	**4139100804**		**4139100244**
	5 m	**4139100802**	**4139100468**	**4139100903**	**4139100245**
	10 m	**4139100803**	**4139100805**	**4139100467**	**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 mm²	3 x 0.34 mm²	–	–
Protection class		IP68	IP68	IP67	IP67
Article number	**2.5 m**	**4139100899**	**4139100906**	**4139100102**	**4139100101**
	5 m				
	10 m				

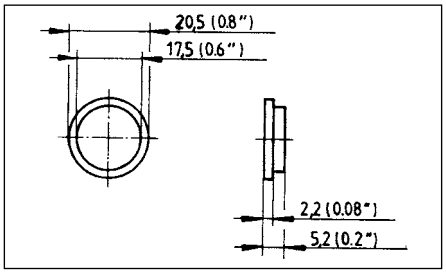
Cable connector M12 x 1		M12 3-wire	M12 5-wire
Contact assignments **1 = Brown** **2 = White** **3 = Blue** **4 = Black**			
Cable material		PVC	PUR
Coupler material		TPU	PUR
Coupling ring material		CuZn39Pb3	CuZn39Pb3
Temperature range		-25/+90 °C	-25/+90 °C
Switching function		PNP/LED	Universal
Cable structure		3 x 0.4 mm²	5 x 0.34 mm²
Protection class		IP68	IP68
Article number	**2.5 m**	**4139100553**	**4139100956**
	5 m	**4139100554**	
	10 m		

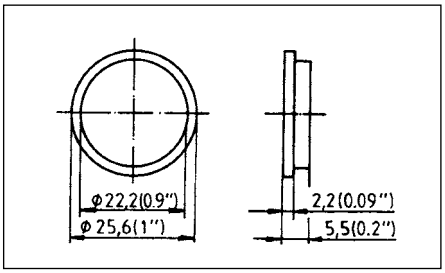
Reflectors

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.

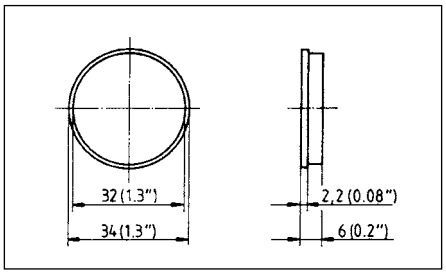
A reflective film can also be tilted or displaced. In this case, in contrast to the triple reflector, the degree of reflection diminishes considerably as such films use small mirrors together with micro glass pearls to reflect light. An advantage of reflective film, however, is its flexibility in installation. 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).

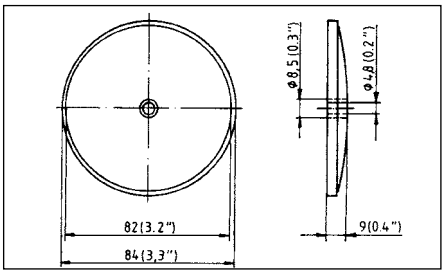
The specified ranges of the reflection light barriers refer to the RTS-083 KK and RTS-060 KK reflector. Essentially, the size of the reflector should be selected according to the sensing range and the size of the object to be detected. The object should ideally be larger than the reflector so that it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



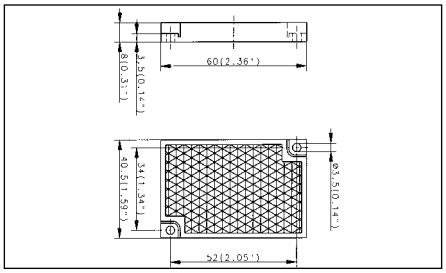


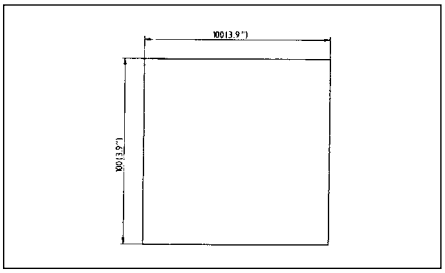
Type designation	RTS-D17 KK	RTS-D22 KK
Article number	**6572108008**	**6572109009**
Diameter	17.5 mm	22 mm





Type designation	RTS-D32 KK	RTS-D83 KK
Article number	**6572110010**	**6572107003**
Diameter	32 mm	83 mm



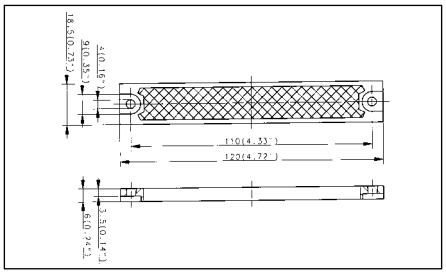


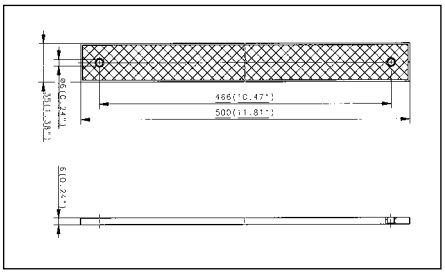
Type designation	RTS-60 KK	RFS-100 KK
Article number	**6572100007**	**6572300001**
Structure	60 x 41 mm	100 x 100 mm Self-adhesive film

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.

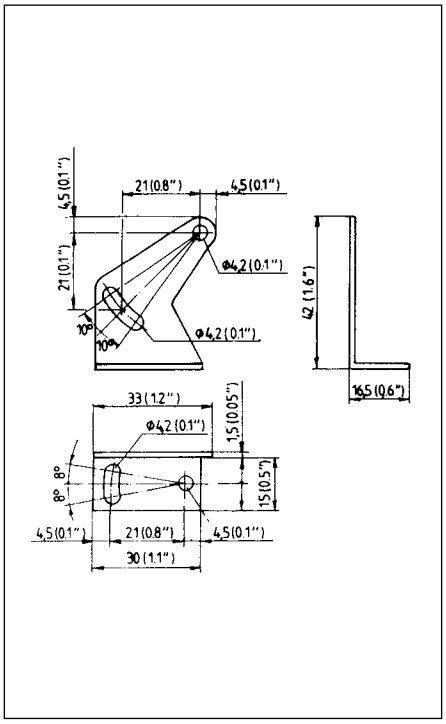


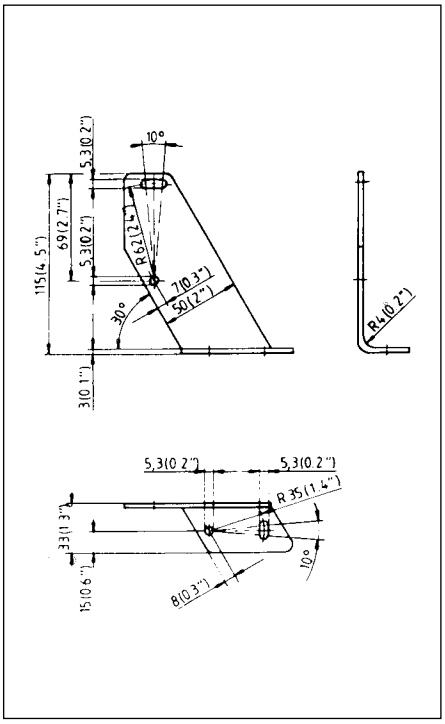


Type designation	RTS-120 KK	RTS-500 KK
Article number	**6572100006**	**6572100002**
Structure	120 x 18 mm	500 x 35 mm Plastic

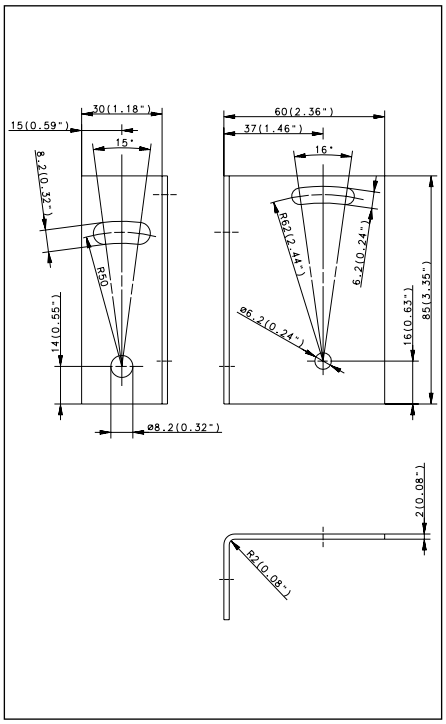
Mounting Material

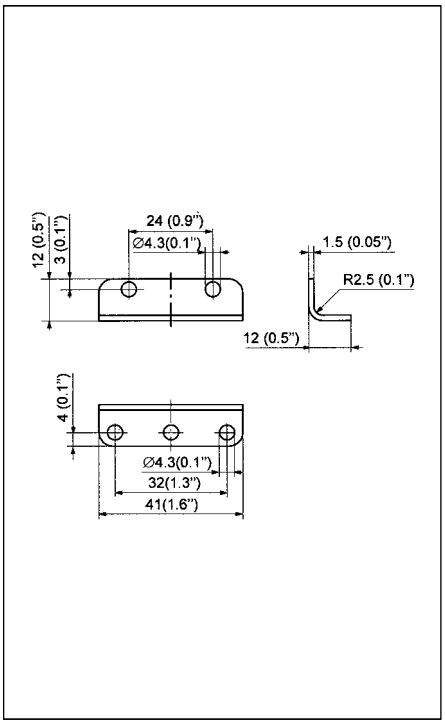
Other mounting brackets available on request.





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



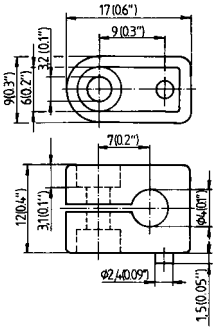


Type designation	BWN-L20NI KPL	BWN-L12AL KPL
Article number	**6571200007**	**6571500006**

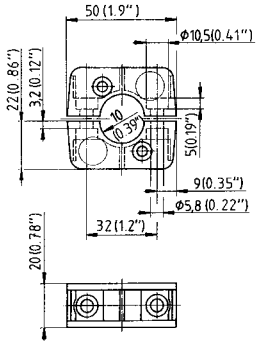
Mounting Brackets



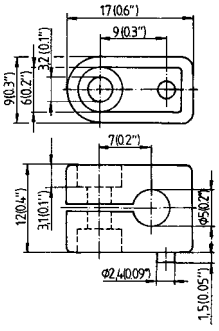




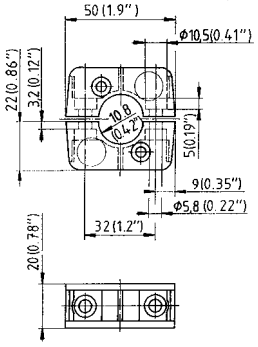
Type BKB-D04PA
Art. No. 5960223069



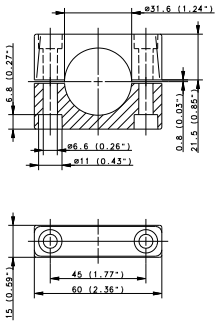
Type BKS-D20PA
Art. No. 5960223085



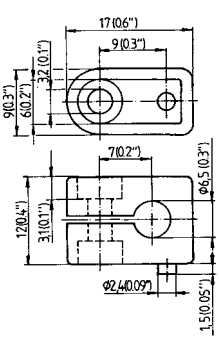
Type BKB-D05PA
Art. No. 5960223070



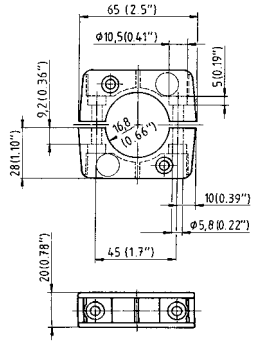
Type BKS-D22PA
Art. No. 5960223040



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.

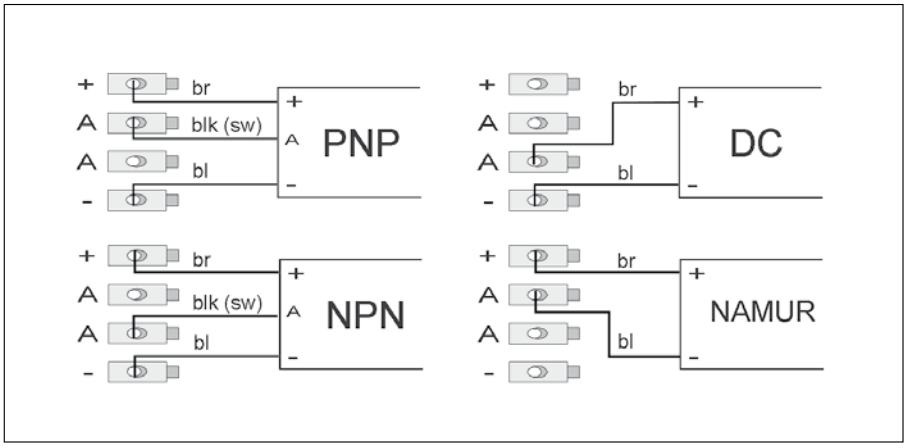
Green LED: Operating voltage

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



Type Code

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
KIB-D03PÖ/0,6-KL2PU	**6502799007**	14
KIB-D03PS/0,6-KL2PU	**6502999019**	14
KIB-D04NS/0,8-KL2PU	**6502399004**	14
KIB-D04PÖ/0,8-KL2PU	**6502799002**	14
KIB-D04PS/0,8-KL2PU	**6502999004**	14
KIB-D06NS/1,5-KL2	**6502399009**	14
KIB-D06PÖ/1,5-KL2	**6502799011**	14
KIB-D06PS/1,5-K2VPU	**6502999034**	15
KIB-D06PS/1,5-KL2	**6502999010**	14
KIB-D06PS/1,5-KL5V	**6602999460**	15
KIB-D06PS/1,5-KLSM8	**6502999012**	14
KIB-E16PS/1,5-K2PU	**6502985002**	33
KIB-E27NS/1,5-KL2PU	**6502393001**	33
KIB-E27PS/1,5-KL2PU	**6502993001**	33
KIB-E28PÖ/002-KL2	**6502773002**	33
KIB-E28PÖ/002-KLSM8	**6502773001**	33
KIB-E28PS/002-KL2	**6502973001**	33
KIB-E28PS/002-KLSM8	**6502973002**	33
KIB-E40AÖ/002-L2	**6503484003**	34
KIB-E40AS/002-L2	**6503584004**	34
KIB-E40PÖ/002-KL2	**6502784006**	34
KIB-E40PS/002-KL2	**6502984023**	34
KIB-E40PS/002-KLSM8	**6502984025**	34
KIB-E50NS/005-KL2	**6502390001**	35
KIB-E50PS/005-KL2	**6502990001**	35
KIB-E50PS/005-KLSM8	**6502990005**	35
KIB-M04PÖ/0,6-KL2PU	**6502799008**	15
KIB-M04PS/0,6-KL2PU	**6502999020**	15
KIB-M05EA/001-2	**6501699008**	15
KIB-M05NS/001-KL2PU	**6502399003**	15
KIB-M05PÖ/001-KL2PU	**6502799001**	15
KIB-M05PÖ/001-KLSM8	**6502799019**	15
KIB-M05PS/001-KL2PU	**6502999003**	15
KIB-M05PS/001-KLSM8	**6502999018**	15
KIB-M08EA/1,5-2	**6501601003**	17
KIB-M08NS/1,5-KL2	**6932301001**	16
KIB-M08NS/1,5-KL2T	**6502301006**	17
KIB-M08NS/1,5-KLSM8	**6932342001**	16
KIB-M08PÖ/1,5-KL2	**6502701001**	16
KIB-M08PÖ/1,5-KLSM8	**6502742001**	16
KIB-M08PS/1,5-KL2	**6932901001**	16
KIB-M08PS/1,5-KL2T	**6502901008**	17
KIB-M08PS/1,5-KL6	**6502901004**	16
KIB-M08PS/1,5-KLSM8	**6932942001**	16
KIB-M08PS/1,5-KLSM8T	**6502942013**	17
KIB-M08PS/1,5-KS12	**6502942007**	16
KIB-M12AÖ/002-L2	**6503403001**	18
KIB-M12AS/002-L2	**6503503001**	18
KIB-M12EA/002-2	**6501624760**	19
KIB-M12NÖ/002-KL2V	**6502103003**	18
KIB-M12NS/002-KL2	**6932303001**	18
KIB-M12NS/002-KL2V	**6502303007**	18
KIB-M12NS/002-KLS12	**6932343001**	18
KIB-M12NS/002-KLS12U	**6502343009**	19
KIB-M12PÖ/002-KL2V	**6502703005**	18
KIB-M12PÖ/002-KLS12	**6602743112**	18
KIB-M12PÖ/002-KS12V	**6502743005**	19
KIB-M12PS/002-KL2	**6932903001**	18
KIB-M12PS/002-KL2F	**6502903012**	19
KIB-M12PS/002-KL2T	**6502903026**	19
KIB-M12PS/002-KL2V	**6502903016**	18
KIB-M12PS/002-KLS12	**6932943001**	18
KIB-M12PS/002-KLS12U	**6502943017**	19
KIB-M12PS/002-KLSM8V	**6502943008**	19
KIB-M12PS/002-KS12V	**6502943006**	19
KIB-M12PS/004-KL2E	**6502903025**	20
KIB-M12PS/004-KL2VE	**6502903023**	20
KIB-M12PS/004-KLS12E	**6502943015**	20
KIB-M18AÖ/005-L2	**6503405001**	22
KIB-M18AS/005-L2	**6503505004**	22
KIB-M18EA/005-2	**6501626762**	24
KIB-M18NÖ/005-KL2	**6932105001**	22
KIB-M18NS/005-KLS12	**6932305004**	23
KIB-M18NS/005-KLS12U	**6502305013**	24
KIB-M18PÖ/005-KL2	**6932705001**	22
KIB-M18PÖ/005-KLSD	**6502705001**	23
KIB-M18PÖ/005-KS12V	**6502705007**	23
KIB-M18PS/005-KL2	**6932905001**	22
KIB-M18PS/005-KL2PUT	**6502905023**	24
KIB-M18PS/005-KL6V	**6502905013**	23
KIB-M18PS/005-KLS12	**6932905004**	23
KIB-M18PS/005-KLS12T	**6502940006**	24
KIB-M18PS/005-KLS12U	**6502905026**	24
KIB-M18PS/005-KLSD	**6602905662**	23
KIB-M18PS/005-KLSDV	**6502940001**	23
KIB-M18PS/005-KS12V	**6502905012**	23
KIB-M18PS/008-KL2E	**6502905022**	25
KIB-M18PS/008-KL2VE	**6502905010**	25
KIB-M18PS/008-KLS12E	**6502940005**	25
KIB-M18PS/008-KS12V	**6502906009**	25
KIB-M18PU/005-KSDV	**6502840002**	23
KIB-M18PU/008-KSDVE	**6602840128**	25
KIB-M30AÖ/010-L2	**6503407240**	28
KIB-M30AÖ/010-LSD	**6503435959**	29
KIB-M30AS/010-L2	**6503507378**	28
KIB-M30AS/010-LSD	**6503535960**	29
KIB-M30EA/010-2	**6501699012**	30
KIB-M30PÖ/010-KL2V	**6502707001**	28
KIB-M30PS/010-KL2	**6932907001**	28
KIB-M30PS/010-KL2PUT	**6502907013**	29
KIB-M30PS/010-KL2V	**6502907003**	28
KIB-M30PS/010-KLS12	**6932907002**	28
KIB-M30PS/010-KLS12T	**6502939006**	29
KIB-M30PS/010-KLS12U	**6502907014**	29
KIB-M30PS/010-KLSD	**6502939001**	29
KIB-N40PS/015-KLS12	**6502988001**	36
KIB-Q08NS/1,5-K2	**6502380001**	32
KIB-Q08PÖ/1,5-K2	**6502780001**	32
KIB-Q08PÖ/1,5-KLSM8	**6502780002**	32
KIB-Q08PS/1,5-K2	**6502980004**	32
KIB-Q08PS/1,5-K2T	**6602980087**	32
KIB-Q08PS/1,5-KLSM8	**6502980002**	32
KIB-Q12NS/004-KLSM8E	**6502399021**	33
KIB-Q12PS/004-KL2E	**6502999028**	33
KIB-Q12PS/004-KLSM8E	**6502999030**	33
KIB-T18AS/005-L2	**6503520697**	23
KIB-T18PS/005-KL2	**6502920990**	23
KIB-T30PÖ/010-KL2	**6502722708**	29
KIB-T30PP/010-KLSD	**6502822862**	29
KIN-E40AÖ/004-L2	**6503484004**	35
KIN-E40AS/004-L2	**6503584005**	35
KIN-E40PÖ/004-KL2	**6502784007**	34
KIN-E40PÖ/004-KLSM8	**6502784008**	35
KIN-E40PS/004-KL2	**6502984024**	34
KIN-E40PS/004-KLSM8	**6502984026**	35
KIN-E50NS/008-KL2	**6502390002**	35
KIN-E50PÖ/008-KL2	**6502790002**	35
KIN-E50PS/008-KL2	**6502990003**	35
KIN-E50PS/008-KLSM8	**6502990006**	35
KIN-E60PÖ/008-KLSM8	**6602799048**	35
KIN-E68NÖ/007-KL6	**6502156058**	36
KIN-E68PS/007-KL2	**6502956076**	36
KIN-M08EA/002-2	**6501601005**	18
KIN-M08PS/002-KL2	**6502916003**	17
KIN-M08PS/002-KLSM8	**6502942006**	17
KIN-M08PS/002-KS12	**6502942008**	17
KIN-M12AÖ/004-L2	**6503404001**	20
KIN-M12AS/004-L2	**6503504001**	20
KIN-M12EA/004-2	**6501625761**	22
KIN-M12NÖ/004-KL2	**6932104001**	20
KIN-M12NS/004-KL2	**6932304001**	20
KIN-M12NS/004-KL2V	**6502304007**	21
KIN-M12NS/004-KLS12	**6932344001**	21
KIN-M12NS/004-KLS12U	**6502344010**	21
KIN-M12NS/008-KLS12E	**6602344458**	22
KIN-M12PÖ/004-KL2	**6932704001**	20
KIN-M12PÖ/004-KLS12	**6502744003**	21
KIN-M12PS/004-KL2	**6932904001**	20
KIN-M12PS/004-KL2F	**6502904010**	21
KIN-M12PS/004-KL2V	**6502904014**	21
KIN-M12PS/004-KLS12	**6932944001**	21
KIN-M12PS/004-KLS12U	**6502944015**	21
KIN-M12PS/004-KS12V	**6502944006**	21
KIN-M12PS/008-KL2E	**6502904021**	22
KIN-M12PS/008-KLS12E	**6502944013**	22
KIN-M12ZS/004-L2	**6501304001**	21
KIN-M18AÖ/008-L2	**6503406001**	25
KIN-M18AS/008-L2	**6503506002**	25
KIN-M18EA/008-2	**6501627763**	27
KIN-M18NS/008-KL2	**6932306001**	25
KIN-M18NS/008-KL2V	**6502306004**	26
KIN-M18NS/008-KLS12	**6932306004**	26
KIN-M18NS/008-KLS12U	**6502306011**	27
KIN-M18PA/008-2	**6502006001**	27
KIN-M18PA/008-S12	**6602006111**	27
KIN-M18PÖ/008-KL2	**6932706001**	25
KIN-M18PÖ/008-KL2V	**6502706002**	26
KIN-M18PÖ/008-KLS12	**6932706002**	26
KIN-M18PÖ/008-KLSD	**6502741001**	27
KIN-M18PS/008-KL2	**6932906001**	25
KIN-M18PS/008-KL2V	**6502906006**	26
KIN-M18PS/008-KLS12	**6932906004**	26
KIN-M18PS/008-KLS12U	**6502906021**	27
KIN-M18PS/008-KLSD	**6502941001**	27
KIN-M18PS/016-KL2E	**6502906018**	28
KIN-M18PS/016-KLS12E	**6502941004**	28
KIN-M18PU/008-KSD	**6602841421**	27
KIN-M18ZS/008-L2	**6501306001**	26
KIN-M30AS/015-L2,5	**6503508246**	30
KIN-M30NS/015-KL2	**6502308001**	30
KIN-M30NS/015-KLS12	**6602308459**	30
KIN-M30PA/015-2	**6502008001**	31
KIN-M30PS/015-KL2	**6932908001**	30
KIN-M30PS/015-KL2	**6502908002**	30
KIN-M30PS/015-KLS12	**6932908002**	30
KIN-M30PS/015-KLS12U	**6502908008**	31
KIN-M30PS/015-KLSD	**6502935001**	31
KIN-M30PS/040-KL2E	**6502908009**	31
KIN-M30PU/015-KL2	**6502808001**	30

Inductive Sensors (sort by type designation)

Type	Art. No.	Page
KIN-N40PP/015-KLSD	**6502982001**	36
KIN-N40PS/020-KLS12	**6502982003**	36
KIN-R34PÖ/020-KL2	**6502715001**	32
KIN-R34PP/020-KLSD	**6502915001**	32
KIN-R34PS/020-KL2	**6502915002**	32
KIN-T12PS/004-KL2	**6502919001**	21
KIN-T18AÖ/008-L2	**6503421704**	26
KIN-T18AS/008-L2	**6503521705**	26
KIN-T18PS/008-KL2	**6502921975**	26
KIN-T30AÖ/015-L2	**6503423955**	31
KIN-T30AS/015-L2,5	**6503523956**	31
KIN-T30PP/015-KLSD	**6502836860**	31
KIN-T30PS/015-KL2	**6502923981**	31
KIR-N40PS/000-KL6	**6502999036**	36

Inductive Sensors (sort by article number)

Art. No.	Type	Page
6501304001	KIN-M12ZS/004-L2	21
6501306001	KIN-M18ZS/008-L2	26
6501601003	KIB-M08EA/1,5-2	17
6501601005	KIN-M08EA/002-2	18
6501624760	KIB-M12EA/002-2	19
6501625761	KIN-M12EA/004-2	22
6501626762	KIB-M18EA/005-2	24
6501627763	KIN-M18EA/008-2	27
6501699008	KIB-M05EA/001-2	15
6501699012	KIB-M30EA/010-2	30
6502006001	KIN-M18PA/008-2	27
6502008001	KIN-M30PA/015-2	31
6502103003	KIB-M12NÖ/002-KL2V	18
6502156058	KIN-E68NÖ/007-KL6	36
6502301006	KIB-M08NS/1,5-KL2T	17
6502303007	KIB-M12NS/002-KL2V	18
6502304007	KIN-M12NS/004-KL2V	21
6502305013	KIB-M18NS/005-KLS12U	24
6502306004	KIN-M18NS/008-KL2V	26
6502306011	KIN-M18NS/008-KLS12U	27
6502308001	KIN-M30NS/015-KL2	30
6502343009	KIB-M12NS/002-KLS12U	19
6502344010	KIN-M12NS/004-KLS12U	21
6502380001	KIB-Q08NS/1,5-K2	32
6502390001	KIB-E50NS/005-KL2	35
6502390002	KIN-E50NS/008-KL2	35
6502393001	KIB-E27NS/1,5-KL2PU	33
6502399003	KIB-M05NS/001-KL2PU	15
6502399004	KIB-D04NS/0,8-KL2PU	14
6502399009	KIB-D06NS/1,5-KL2	14
6502399021	KIB-Q12NS/004-KLSM8E	33
6502701001	KIB-M08PÖ/1,5-KL2	16
6502703005	KIB-M12PÖ/002-KL2V	18
6502705001	KIB-M18PÖ/005-KLSD	23
6502705007	KIB-M18PÖ/005-KS12V	23
6502706002	KIN-M18PÖ/008-KL2V	26
6502707001	KIB-M30PÖ/010-KL2V	28
6502722708	KIB-T30PÖ/010-KL2	29
6502741001	KIN-M18PÖ/008-KLSD	27
6502742001	KIB-M08PÖ/1,5-KLSM8	16
6502743005	KIB-M12PÖ/002-KS12V	19
6502744003	KIN-M12PÖ/004-KLS12	21
6502773001	KIB-E28PÖ/002-KLSM8	33
6502773002	KIB-E28PÖ/002-KL2	33
6502780001	KIB-Q08PÖ/1,5-K2	32
6502780002	KIB-Q08PÖ/1,5-KLSM8	32
6502784006	KIB-E40PÖ/002-KL2	34
6502784007	KIN-E40PÖ/004-KL2	34
6502784008	KIN-E40PÖ/004-KLSM8	35
6502790002	KIN-E50PÖ/008-KL2	35
6502799001	KIB-M05PÖ/001-KL2PU	15
6502799002	KIB-D04PÖ/0,8-KL2PU	14
6502799007	KIB-D03PÖ/0,6-KL2PU	14
6502799008	KIB-M04PÖ/0,6-KL2PU	15
6502799011	KIB-D06PÖ/1,5-KL2	14
6502799019	KIB-M05PÖ/001-KLSM8	15
6502808001	KIN-M30PU/015-KL2	30
6502822862	KIB-T30PP/010-KLSD	29
6502836860	KIN-T30PP/015-KLSD	31
6502840002	KIB-M18PU/005-KSDV	23
6502901004	KIB-M08PS/1,5-KL6	16
6502901008	KIB-M08PS/1,5-KL2T	17
6502903012	KIB-M12PS/002-KL2F	19

Art. No.	Type	Page
6502903016	KIB-M12PS/002-KL2V	18
6502903023	KIB-M12PS/004-KL2VE	20
6502903025	KIB-M12PS/004-KL2E	20
6502903026	KIB-M12PS/002-KL2T	19
6502904010	KIN-M12PS/004-KL2F	21
6502904014	KIN-M12PS/004-KL2V	21
6502904021	KIN-M12PS/008-KL2E	22
6502905010	KIB-M18PS/008-KL2VE	25
6502905012	KIB-M18PS/005-KS12V	23
6502905013	KIB-M18PS/005-KL6V	23
6502905022	KIB-M18PS/008-KL2E	25
6502905023	KIB-M18PS/005-KL2PUT	24
6502905026	KIB-M18PS/005-KLS12U	24
6502906006	KIN-M18PS/008-KL2V	26
6502906009	KIB-M18PS/008-KS12V	25
6502906018	KIN-M18PS/016-KL2E	28
6502906021	KIN-M18PS/008-KLS12U	27
6502907003	KIB-M30PS/010-KL2V	28
6502907013	KIB-M30PS/010-KL2PUT	29
6502907014	KIB-M30PS/010-KLS12U	29
6502908002	KIN-M30PS/015-KL2	30
6502908008	KIN-M30PS/015-KLS12U	31
6502908009	KIN-M30PS/040-KL2E	31
6502915001	KIN-R34PP/020-KLSD	32
6502916003	KIN-M08PS/002-KL2	17
6502919001	KIN-T12PS/004-KL2	21
6502920990	KIB-T18PS/005-KL2	23
6502921975	KIN-T18PS/008-KL2	26
6502923981	KIN-T30PS/015-KL2	31
6502935001	KIN-M30PS/015-KLSD	31
6502939001	KIB-M30PS/010-KLSD	29
6502939006	KIB-M30PS/010-KLS12T	29
6502940001	KIB-M18PS/005-KLSDV	23
6502940005	KIB-M18PS/008-KLS12E	25
6502940006	KIB-M18PS/005-KLS12T	24
6502941001	KIN-M18PS/008-KLSD	27
6502941004	KIN-M18PS/016-KLS12E	28
6502942006	KIN-M08PS/002-KLSM8	17
6502942007	KIB-M08PS/1,5-KS12	16
6502942008	KIN-M08PS/002-KS12	17
6502942013	KIB-M08PS/1,5-KLSM8T	17
6502943006	KIB-M12PS/002-KS12V	19
6502943008	KIB-M12PS/002-KLSM8V	19
6502943015	KIB-M12PS/004-KLS12E	20
6502943017	KIB-M12PS/002-KLS12U	19
6502944006	KIN-M12PS/004-KS12V	21
6502944013	KIN-M12PS/008-KLS12E	22
6502944015	KIN-M12PS/004-KLS12U	21
6502956076	KIN-E68PS/007-KL2	36
6502973001	KIB-E28PS/002-KL2	33
6502973002	KIB-E28PS/002-KLSM8	33
6502980002	KIB-Q08PS/1,5-KLSM8	32
6502980004	KIB-Q08PS/1,5-K2	32
6502982001	KIN-N40PP/015-KLSD	36
6502982003	KIN-N40PS/020-KLS12	36
6502984023	KIB-E40PS/002-KL2	34
6502984024	KIN-E40PS/004-KL2	34
6502984025	KIB-E40PS/002-KLSM8	34
6502984026	KIN-E40PS/004-KLSM8	35
6502985002	KIB-E16PS/1,5-K2PU	33
6502988001	KIB-N40PS/015-KLS12	36
6502990001	KIB-E50PS/005-KL2	35
6502990003	KIN-E50PS/008-KL2	35

Art. No.	Type	Page
6502990005	KIB-E50PS/005-KLSM8	35
6502990006	KIN-E50PS/008-KLSM8	35
6502993001	KIB-E27PS/1,5-KL2PU	33
6502999003	KIB-M05PS/001-KL2PU	15
6502999004	KIB-D04PS/0,8-KL2PU	14
6502999010	KIB-D06PS/1,5-KL2	14
6502999012	KIB-D06PS/1,5-KLSM8	14
6502999018	KIB-M05PS/001-KLSM8	15
6502999019	KIB-D03PS/0,6-KL2PU	14
6502999020	KIB-M04PS/0,6-KL2PU	15
6502999028	KIB-Q12PS/004-KL2E	33
6502999030	KIB-Q12PS/004-KLSM8E	33
6502999034	KIB-D06PS/1,5-K2VPU	15
6502999036	KIR-N40PS/000-KL6	36
6503403001	KIB-M12AÖ/002-L2	18
6503404001	KIN-M12AÖ/004-L2	20
6503405001	KIB-M18AÖ/005-L2	22
6503406001	KIN-M18AÖ/008-L2	25
6503407240	KIB-M30AÖ/010-L2	28
6503421704	KIN-T18AÖ/008-L2	26
6503423955	KIN-T30AÖ/015-L2	31
6503435959	KIB-M30AÖ/010-LSD	29
6503484003	KIB-E40AÖ/002-L2	34
6503484004	KIN-E40AÖ/004-L2	35
6503503001	KIB-M12AS/002-L2	18
6503504001	KIN-M12AS/004-L2	20
6503505004	KIB-M18AS/005-L2	22
6503506002	KIN-M18AS/008-L2	25
6503507378	KIB-M30AS/010-L2	28
6503508246	KIN-M30AS/015-L2,5	30
6503520697	KIB-T18AS/005-L2	23
6503521705	KIN-T18AS/008-L2	26
6503523956	KIN-T30AS/015-L2,5	31
6503535960	KIB-M30AS/010-LSD	29
6503584004	KIB-E40AS/002-L2	34
6503584005	KIN-E40AS/004-L2	35
6602006111	KIN-M18PA/008-S12	27
6602308459	KIN-M30NS/015-KLS12	30
6602344458	KIN-M12NS/008-KLS12E	22
6602743112	KIB-M12PÖ/002-KLS12	18
6602799048	KIN-E60PÖ/008-KLSM8	35
6602840128	KIB-M18PU/008-KSDVE	25
6602841421	KIN-M18PU/008-KSD	27
6602905662	KIB-M18PS/005-KLSD	23
6602980087	KIB-Q08PS/1,5-K2T	32
6602999460	KIB-D06PS/1,5-KL5V	15
6932104001	KIN-M12NÖ/004-KL2	20
6932105001	KIB-M18NÖ/005-KL2	22
6932301001	KIB-M08NS/1,5-KL2	16
6932303001	KIB-M12NS/002-KL2	18
6932304001	KIN-M12NS/004-KL2	20
6932305004	KIB-M18NS/005-KLS12	23
6932306001	KIN-M18NS/008-KL2	25
6932306004	KIN-M18NS/008-KLS12	26
6932342001	KIB-M08NS/1,5-KLSM8	16
6932343001	KIB-M12NS/002-KLS12	18
6932344001	KIN-M12NS/004-KLS12	21
6932704001	KIN-M12PÖ/004-KL2	20
6932705001	KIB-M18PÖ/005-KL2	22
6932706001	KIN-M18PÖ/008-KL2	25
6932706002	KIN-M18PÖ/008-KLS12	26
6932901001	KIB-M08PS/1,5-KL2	16
6932903001	KIB-M12PS/002-KL2	18

Inductive Sensors (sort by article number)

Art. No.	Type	Page
6932904001	KIN-M12PS/004-KL2	20
6932905001	KIB-M18PS/005-KL2	22
6932905004	KIB-M18PS/005-KLS12	23
6932906001	KIN-M18PS/008-KL2	25
6932906004	KIN-M18PS/008-KLS12	26
6932907001	KIB-M30PS/010-KL2	28
6932907002	KIB-M30PS/010-KLS12	28
6932908001	KIN-M30PS/015-KL2	30
6932908002	KIN-M30PS/015-KLS12	30
6932942001	KIB-M08PS/1,5-KLSM8	16
6932943001	KIB-M12PS/002-KLS12	18
6932944001	KIN-M12PS/004-KLS12	21

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)

Capacitive Sensors (sort by type designation)

Type	Art. No.	Page
KCB-D34PS/020-KLPS12	**6507915006**	46
KCB-E50NS/008-KLP2	**6507390001**	47
KCB-E50PS/008-KLP2	**6507990001**	47
KCB-E68NS/010-KLP2	**6507356001**	47
KCB-E68PS/010-KLP2	**6507956001**	47
KCB-M12NS/002-KLP2	**6507303001**	42
KCB-M12PÖ/002-KLP2	**6507703001**	42
KCB-M12PS/002-KLP2	**6507903001**	42
KCB-M12PS/002-KLSM8	**6507903004**	42
KCB-M18NS/005-KLP2	**6507305001**	43
KCB-M18PS/005-KLP2	**6507905001**	43
KCB-M18PS/005-KLPSM8	**6507905004**	43
KCB-M30PÖ/010-KLP2	**6507707001**	44
KCB-M30PS/010-KLP2	**6507907001**	44
KCB-M30PS/010-KLPS12	**6507907004**	44
KCB-M32DP/015-KLP6	**6507013013**	45
KCB-M32DP/015-KLPS12	**6507013015**	45
KCB-M32GP/015-KLP2	**6507013012**	45
KCN-R20AÖ/015-LP2	**6508410001**	46
KCN-R20AS/015-LP2	**6508510001**	46
KCN-R20NS/015-KLP2	**6507310002**	46
KCN-R20NS/015-KLPSM8	**6507310004**	46
KCN-R20PS/015-KLP2	**6507910001**	46
KCN-R20PS/015-KLPSM8	**6507910004**	46
KCN-R34AÖ/030-LP2	**6508415001**	47
KCN-R34AS/030-LP2	**6508515001**	47
KCN-R34NS/030-KLP2	**6507315001**	46
KCN-R34PS/030-KLP2	**6507915001**	46
KCN-R34PS/030-KLPS12	**6507915004**	47
KCN-T12NS/004-KLP2	**6507319001**	42
KCN-T12PS/004-KLP2	**6507919001**	42
KCN-T12PS/004-KLSM8	**6507919004**	42
KCN-T12PS/006-KLP2E	**6607919110**	42
KCN-T18AÖ/008-LP2	**6508421001**	43
KCN-T18AS/008-LP2	**6508521001**	43
KCN-T18NS/008-KLP2	**6507321723**	43
KCN-T18PS/008-KLP2	**6507921724**	43
KCN-T18PS/008-KLPSM8	**6507921002**	43
KCN-T18PS/013-KLPS12V	**6507921004**	43
KCN-T18PU/008-KLP2V	**6507821001**	43
KCN-T30AÖ/020-LP2	**6508423001**	44
KCN-T30AS/020-LP2	**6508523001**	44
KCN-T30NS/020-KLP2	**6507323001**	44
KCN-T30NS/020-KLPS12	**6507323004**	44
KCN-T30PS/020-KLP2	**6507923727**	44
KCN-T30PS/020-KLPS12	**6507923004**	44
KCN-T30PS/020-KLPS12V	**6507923006**	44
KCN-T32DP/030-KLP2	**6507013001**	45
KCN-T32DP/030-KLPS12	**6507013004**	45
KCN-T32RU/030-LP2	**6508613001**	45

Capacitive Sensors (sort by article number)

Art. No.	Type	Page
6507013001	KCN-T32DP/030-KLP2	45
6507013004	KCN-T32DP/030-KLPS12	45
6507013012	KCB-M32GP/015-KLP2	45
6507013013	KCB-M32DP/015-KLP6	45
6507013015	KCB-M32DP/015-KLPS12	45
6507303001	KCB-M12NS/002-KLP2	42
6507305001	KCB-M18NS/005-KLP2	43
6507310002	KCN-R20NS/015-KLP2	46
6507310004	KCN-R20NS/015-KLPSM8	46
6507315001	KCN-R34NS/030-KLP2	46
6507319001	KCN-T12NS/004-KLP2	42
6507321723	KCN-T18NS/008-KLP2	43
6507323001	KCN-T30NS/020-KLP2	44
6507323004	KCN-T30NS/020-KLPS12	44
6507356001	KCB-E68NS/010-KLP2	47
6507390001	KCB-E50NS/008-KLP2	47
6507703001	KCB-M12PÖ/002-KLP2	42
6507707001	KCB-M30PÖ/010-KLP2	44
6507821001	KCN-T18PU/008-KLP2V	43
6507903001	KCB-M12PS/002-KLP2	42
6507903004	KCB-M12PS/002-KLSM8	42
6507905001	KCB-M18PS/005-KLP2	43
6507905004	KCB-M18PS/005-KLPSM8	43
6507907001	KCB-M30PS/010-KLP2	44
6507907004	KCB-M30PS/010-KLPS12	44
6507910001	KCN-R20PS/015-KLP2	46
6507910004	KCN-R20PS/015-KLPSM8	46
6507915001	KCN-R34PS/030-KLP2	46
6507915004	KCN-R34PS/030-KLPS12	47
6507915006	KCB-D34PS/020-KLPS12	46
6507919001	KCN-T12PS/004-KLP2	42
6507919004	KCN-T12PS/004-KLSM8	42
6507921002	KCN-T18PS/008-KLPSM8	43
6507921004	KCN-T18PS/013-KLPS12V	43
6507921724	KCN-T18PS/008-KLP2	43
6507923004	KCN-T30PS/020-KLPS12	44
6507923006	KCN-T30PS/020-KLPS12V	44
6507923727	KCN-T30PS/020-KLP2	44
6507956001	KCB-E68PS/010-KLP2	47
6507990001	KCB-E50PS/008-KLP2	47
6508410001	KCN-R20AÖ/015-LP2	46
6508415001	KCN-R34AÖ/030-LP2	47
6508421001	KCN-T18AÖ/008-LP2	43
6508423001	KCN-T30AÖ/020-LP2	44
6508510001	KCN-R20AS/015-LP2	46
6508515001	KCN-R34AS/030-LP2	47
6508521001	KCN-T18AS/008-LP2	43
6508523001	KCN-T30AS/020-LP2	44
6508613001	KCN-T32RU/030-LP2	45
6607919110	KCN-T12PS/006-KLP2E	42

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
OM12EE-DDTP-06.0-CL	**6551728001**	51
OM12RT-DDTP-0060-CL	**6557728001**	50
OM12RT-DHTP-0060-CL	**6557928002**	50
OM12RT-DHTP-0060-S	**6557927001**	50
OM12RT-DHTP-0200-CL	**6557928004**	50
OM12RT-DHTP-0200-CLE	**6557928003**	50
OM12RT-DHTP-0200-SL	**6557927004**	51
OM18EE-DPTP-08.0-CL	**6551817001**	58
OM18EE-DPTP-08.0-SL	**6551816001**	58
OM18ES-DPTP-08.0-SL	**6551816101**	58
OM18FF-DPTP-0040-CL	**6558817001**	51
OM18FF-DPTP-0040-SL	**6558816001**	51
OM18PS-DPTN-02.5-SLE	**6555216001**	56
OM18PS-DPTP-02.5-CLE	**6555817001**	56
OM18PS-DPTP-02.5-SLE	**6555816001**	56
OM18PS-DPTP-0800-CLE	**6555817002**	56
OM18RH-DHTP-0120-SDE	**6558916001**	53
OM18RH-DHTP-0120-SDEW	**6558916002**	53
OM18RS-DPTP-03.0-SL	**6554816001**	58
OM18RT-DPAP-0200-SE	**6557016002**	53
OM18RT-DPTN-0100-SL	**6557216001**	53
OM18RT-DPTN-0300-SLE	**6557216003**	54
OM18RT-DPTN-0500-CLE	**6557217003**	55
OM18RT-DPTN-0500-SLE	**6557216004**	55
OM18RT-DPTP-0100-CL	**6557817002**	53
OM18RT-DPTP-0100-SL	**6557816001**	53
OM18RT-DPTP-0300-CLE	**6557817003**	54
OM18RT-DPTP-0300-SLE	**6557816002**	54
OM18RT-DPTP-0500-CLE	**6557817004**	55
OM18RT-DPTP-0500-SLE	**6557816006**	55
ON18EE-DPTP-08.0-SL	**6551821001**	58
ON18PS-DPTP-02.5-SLE	**6555821001**	56
ON18RT-DPTN-0500-CLE	**6557222003**	55
ON18RT-DPTP-0300-SLE	**6557821002**	54
ON18SE-DOOS-08.0-SCV	**6551021001**	58
OR05EE-DATP-12.0-3DE	**6551875003**	62
OR05EE-DATP-12.0-SDE	**6551875004**	62
OR05PS-DATP-04.0-3DE	**6555875001**	62
OR05PS-DHTP-04.0-3LFE	**6555975002**	62
OR05PS-DHTP-04.0-SLFE	**6555975001**	62
OR05RT-DATP-01.2-3DE	**6557875003**	61
OR05RT-DHTP-01.2-3LFE	**6557975004**	61
OR05RT-DHTP-01.2-SLFE	**6557975003**	62
OR05SE-DOOS-12.0-3C	**6551075003**	62
OR05SE-DOOS-12.O-SC	**6551075004**	62
OR12EE-DDTN-06.0-SL	**6551155001**	60
OR12EE-DDTP-01.0-SL	**6551755002**	60
OR12EE-DDTP-01.0-SLE	**6551755004**	60
OR12EE-DDTP-06.0-SL	**6551755001**	60
OR12EE-DDTP-06.0-SLE	**6551755003**	60
OR12EE-DHTN-06.0-SL	**6551355001**	60
OR12EE-DHTP-01.0-SL	**6551955002**	60
OR12EE-DHTP-06.0-SL	**6551955001**	60
OR12EE-DHTP-10.0-SL	**6551955005**	60
OR12FF-DHTP-0050-SL	**6558955001**	61
OR12RS-DDTP-04.0-SL	**6554755001**	61
OR12RS-DHTP-04.0-SL	**6554955001**	61
OR12RT-DDTP-01.2-SLE	**6557755002**	61
OR12RT-DDTP-0200-SLE	**6557755001**	61
OR12RT-DHTP-01.2-SLE	**6557955002**	61
OR12RT-DHTP-0200-SLE	**6557955001**	61
OR12SE-DOOS-01.0-SVC	**6551055003**	60
OR12SE-DOOS-06.0-SVC	**6551055002**	60

Type	Art. No.	Page
OR15RT-DHTP-0040-SL	**6557950006**	63
OR20EE-DPTP-20.0-ALET	**6551886003**	66
OR20EE-MAR5-20.0-ALET	**6551686004**	66
OR20EE-MAR5-20.0-ALET	**6551686003**	66
OR20PS-DPTP-06.0-ALET	**6555886001**	65
OR20PS-MAR5-06.0-ALET	**6555686002**	65
OR20RH-MAR5-0400-ALET	**6558686002**	64
OR20RS-DPTP-08.0-ALET	**6554886001**	65
OR20RS-MAR5-08.0-ALET	**6554686002**	66
OR20RT-DPTP-01.5-ALET	**6557886003**	65
OR20RT-DPTP-0600-ALET	**6557886001**	64
OR20RT-MAR5-01.5-ALET	**6557686004**	65
OR20RT-MAR5-0600-ALET	**6557686001**	65
OR20SE-DOOS-20.0-AV	**6551086003**	66
OR20SE-MOOS-20.0-AV	**6551086002**	66
OR20SE-MOOS-20.0-AV	**6551086001**	66
OR50EE-DATP-20.0-CEG	**6551866001**	64
OR50EE-DATP-20.0-SEG	**6551865001**	64
OR50PS-DATP-08.0-CDE	**6555866001**	64
OR50PS-DATP-08.0-SDE	**6555865001**	64
OR50RH-DATP-0200-CDE	**6558866001**	63
OR50RH-DATP-0200-SDE	**6558865001**	63
OR50RT-DATP-01.0-CDE	**6557866001**	63
OR50RT-DATP-01.0-SDE	**6557865001**	63
OR50RT-DATP-02.0-CDE	**6557866002**	63
OR50RT-DATP-02.0-SDE	**6557865002**	63
OR50SE-DOOS-20.0-CCV	**6551066001**	64
OR50SE-DOOS-20.0-SCV	**6551065001**	64
OT12EE-DDTP-06.0-S	**6551729001**	51
OT12PE-DHTP-0000-C	**6550930001**	66
OT12RT-DHTP-0060-CL	**6557930002**	50
OT12RT-DHTP-0060-S	**6557929002**	50
OT12RT-DHTP-0200-CL	**6557930001**	51
OT12RT-DHTP-0200-S	**6557929001**	51
OT12SE-DOOS-06.0-CL	**6551028001**	51
OT12SE-DOOS-06.0-S	**6551029001**	51
OT18EE-DPRP-15.0-CLW	**6551819004**	59
OT18EE-DPTP-08.0-CL	**6551819001**	58
OT18EE-DPTP-08.0-SL	**6551818001**	59
OT18EE-DPTP-15.0-SLW	**6551818003**	59
OT18EE-DPTP-18.0-CL	**6551819003**	59
OT18EE-DPTP-18.0-SL	**6551818002**	59
OT18ES-DPTP-08.0-SL	**6551818101**	59
OT18FF-DPTP-0040-CL	**6558819001**	52
OT18FF-DPTP-0040-SL	**6558818002**	52
OT18PS-DPTN-02.5-CLE	**6555219001**	57
OT18PS-DPTN-0800-SLE	**6555218002**	56
OT18PS-DPTP-02.5-CELW	**6555819006**	57
OT18PS-DPTP-02.5-CLE	**6555819003**	57
OT18PS-DPTP-02.5-SELW	**6555818004**	57
OT18PS-DPTP-02.5-SLE	**6555818001**	57
OT18PS-DPTP-03.0-CEL	**6555819005**	57
OT18PS-DPTP-03.0-SEL	**6555818003**	57
OT18PS-DPTP-0800-CLE	**6555819004**	56
OT18PS-DPTP-0800-SLE	**6555818002**	56
OT18RS-DPTN-03.0-CL	**6554219002**	57
OT18RS-DPTN-03.0-SL	**6554218001**	57
OT18RS-DPTP-03.0-CL	**6554819003**	57
OT18RS-DPTP-03.0-SL	**6554818001**	57
OT18RT-DATN-0200-CEL	**6557219002**	53
OT18RT-DATP-0200-CEL	**6557819001**	53
OT18RT-DPTN-0100-CL	**6557219004**	53
OT18RT-DPTN-0300-CLE	**6557219005**	54

Type	Art. No.	Page
OT18RT-DPTN-0300-SLE	**6557218005**	54
OT18RT-DPTN-0500-CLE	**6557219006**	55
OT18RT-DPTN-0500-SLE	**6557218006**	55
OT18RT-DPTP-0080-CLW	**6557819010**	52
OT18RT-DPTP-0080-SLW	**6557818010**	52
OT18RT-DPTP-0100-CL	**6557819008**	52
OT18RT-DPTP-0100-CL	**6557819004**	53
OT18RT-DPTP-0100-SL	**6557818008**	52
OT18RT-DPTP-0100-SL	**6557818002**	53
OT18RT-DPTP-0300-CELW	**6557819009**	54
OT18RT-DPTP-0300-CLE	**6557819005**	54
OT18RT-DPTP-0300-SELW	**6557818009**	55
OT18RT-DPTP-0300-SLE	**6557818003**	54
OT18RT-DPTP-0400-CEL	**6557819007**	55
OT18RT-DPTP-0400-SEL	**6557818007**	55
OT18RT-DPTP-0500-CLE	**6557819006**	55
OT18RT-DPTP-0500-SLE	**6557818006**	55
OT18SE-DOOS-08.0-CCV	**6551019001**	58
OT18SE-DOOS-08.0-SCV	**6551018001**	59
OT18SE-DOOS-15.0-CCVW	**6551019004**	59
OT18SE-DOOS-15.0-SCVW	**6551018003**	59
OT18SE-DOOS-18.0-CCV	**6551019003**	59
OT18SE-DOOS-18.0-SCV	**6551018002**	59
OT30RT-DDAP-0500-CE	**6557005006**	59
OT30RT-DHTP-0200-6LE	**6557905008**	59
OZ20RT-DPAP-0200-SE	**6557000002**	67
OZ20RT-DPAP-0200-SE	**6557000001**	67
OZ20RT-DPTP-0500-CLE	**6557800005**	67
OZ20RT-DPTP-0500-SLE	**6557800006**	67

Optoelectronic Sensors (sort by article number)

Art. No.	Type	Page
6551018001	OT18SE-DOOS-08.0-SCV	59
6551018002	OT18SE-DOOS-18.0-SCV	59
6551018003	OT18SE-DOOS-15.0-SCVW	59
6551019001	OT18SE-DOOS-08.0-CCV	58
6551019003	OT18SE-DOOS-18.0-CCV	59
6551019004	OT18SE-DOOS-15.0-CCVW	59
6551021001	ON18SE-DOOS-08.0-SCV	58
6551028001	OT12SE-DOOS-06.0-CL	51
6551029001	OT12SE-DOOS-06.0-S	51
6551055002	OR12SE-DOOS-06.0-SVC	60
6551055003	OR12SE-DOOS-01.0-SVC	60
6551065001	OR50SE-DOOS-20.0-SCV	64
6551066001	OR50SE-DOOS-20.0-CCV	64
6551075003	OR05SE-DOOS-12.0-3C	62
6551075004	OR05SE-DOOS-12.O-SC	62
6551086001	OR20SE-MOOS-20.0-AV	66
6551086002	OR20SE-MOOS-20.0-AV	66
6551086003	OR20SE-DOOS-20.0-AV	66
6551155001	OR12EE-DDTN-06.0-SL	60
6551355001	OR12EE-DHTN-06.0-SL	60
6551686003	OR20EE-MAR5-20.0-ALET	66
6551686004	OR20EE-MAR5-20.0-ALET	66
6551728001	OM12EE-DDTP-06.0-CL	51
6551729001	OT12EE-DDTP-06.0-S	51
6551755001	OR12EE-DDTP-06.0-SL	60
6551755002	OR12EE-DDTP-01.0-SL	60
6551755003	OR12EE-DDTP-06.0-SLE	60
6551755004	OR12EE-DDTP-01.0-SLE	60
6551816001	OM18EE-DPTP-08.0-SL	58
6551816101	OM18ES-DPTP-08.0-SL	58
6551817001	OM18EE-DPTP-08.0-CL	58
6551818001	OT18EE-DPTP-08.0-SL	59
6551818002	OT18EE-DPTP-18.0-SL	59
6551818003	OT18EE-DPTP-15.0-SLW	59
6551818101	OT18ES-DPTP-08.0-SL	59
6551819001	OT18EE-DPTP-08.0-CL	58
6551819003	OT18EE-DPTP-18.0-CL	59
6551819004	OT18EE-DPRP-15.0-CLW	59
6551821001	ON18EE-DPTP-08.0-SL	58
6551865001	OR50EE-DATP-20.0-SEG	64
6551866001	OR50EE-DATP-20.0-CEG	64
6551875003	OR05EE-DATP-12.0-3DE	62
6551875004	OR05EE-DATP-12.0-SDE	62
6551886003	OR20EE-DPTP-20.0-ALET	66
6551955001	OR12EE-DHTP-06.0-SL	60
6551955002	OR12EE-DHTP-01.0-SL	60
6551955005	OR12EE-DHTP-10.0-SL	60
6554218001	OT18RS-DPTN-03.0-SL	57
6554219002	OT18RS-DPTN-03.0-CL	57
6554686002	OR20RS-MAR5-08.0-ALET	66
6554755001	OR12RS-DDTP-04.0-SL	61
6554816001	OM18RS-DPTP-03.0-SL	58
6554818001	OT18RS-DPTP-03.0-SL	57
6554819003	OT18RS-DPTP-03.0-CL	57
6554886001	OR20RS-DPTP-08.0-ALET	65
6554955001	OR12RS-DHTP-04.0-SL	61
6555216001	OM18PS-DPTN-02.5-SLE	56
6555218002	OT18PS-DPTN-0800-SLE	56
6555219001	OT18PS-DPTN-02.5-CLE	57
6555686002	OR20PS-MAR5-06.0-ALET	65
6555816001	OM18PS-DPTP-02.5-SLE	56
6555817001	OM18PS-DPTP-02.5-CLE	56
6555817002	OM18PS-DPTP-0800-CLE	56
6555818001	OT18PS-DPTP-02.5-SLE	57
6555818002	OT18PS-DPTP-0800-SLE	56
6555818003	OT18PS-DPTP-03.0-SEL	57
6555818004	OT18PS-DPTP-02.5-SELW	57
6555819003	OT18PS-DPTP-02.5-CLE	57
6555819004	OT18PS-DPTP-0800-CLE	56
6555819005	OT18PS-DPTP-03.0-CEL	57
6555819006	OT18PS-DPTP-02.5-CELW	57
6555821001	ON18PS-DPTP-02.5-SLE	56
6555865001	OR50PS-DATP-08.0-SDE	64
6555866001	OR50PS-DATP-08.0-CDE	64
6555875001	OR05PS-DATP-04.0-3DE	62
6555886001	OR20PS-DPTP-06.0-ALET	65
6555975001	OR05PS-DHTP-04.0-SLFE	62
6555975002	OR05PS-DHTP-04.0-3LFE	62
6557000001	OZ20RT-DPAP-0200-SE	67
6557000002	OZ20RT-DPAP-0200-SE	67
6557005006	OT30RT-DDAP-0500-CE	59
6557016002	OM18RT-DPAP-0200-SE	53
6557216001	OM18RT-DPTN-0100-SL	53
6557216003	OM18RT-DPTN-0300-SLE	54
6557216004	OM18RT-DPTN-0500-SLE	55
6557217003	OM18RT-DPTN-0500-CLE	55
6557218005	OT18RT-DPTN-0300-SLE	54
6557218006	OT18RT-DPTN-0500-SLE	55
6557219002	OT18RT-DATN-0200-CEL	53
6557219004	OT18RT-DPTN-0100-CL	53
6557219005	OT18RT-DPTN-0300-CLE	54
6557219006	OT18RT-DPTN-0500-CLE	55
6557222003	ON18RT-DPTN-0500-CLE	55
6557686001	OR20RT-MAR5-0600-ALET	65
6557686004	OR20RT-MAR5-01.5-ALET	65
6557728001	OM12RT-DDTP-0060-CL	50
6557755001	OR12RT-DDTP-0200-SLE	61
6557755002	OR12RT-DDTP-01.2-SLE	61
6557800005	OZ20RT-DPTP-0500-CLE	67
6557800006	OZ20RT-DPTP-0500-SLE	67
6557816001	OM18RT-DPTP-0100-SL	53
6557816002	OM18RT-DPTP-0300-SLE	54
6557816006	OM18RT-DPTP-0500-SLE	55
6557817002	OM18RT-DPTP-0100-CL	53
6557817003	OM18RT-DPTP-0300-CLE	54
6557817004	OM18RT-DPTP-0500-CLE	55
6557818002	OT18RT-DPTP-0100-SL	53
6557818003	OT18RT-DPTP-0300-SLE	54
6557818006	OT18RT-DPTP-0500-SLE	55
6557818007	OT18RT-DPTP-0400-SEL	55
6557818008	OT18RT-DPTP-0100-SL	52
6557818009	OT18RT-DPTP-0300-SELW	55
6557818010	OT18RT-DPTP-0080-SLW	52
6557819001	OT18RT-DATP-0200-CEL	53
6557819004	OT18RT-DPTP-0100-CL	53
6557819005	OT18RT-DPTP-0300-CLE	54
6557819006	OT18RT-DPTP-0500-CLE	55
6557819007	OT18RT-DPTP-0400-CEL	55
6557819008	OT18RT-DPTP-0100-CL	52
6557819009	OT18RT-DPTP-0300-CELW	54
6557819010	OT18RT-DPTP-0080-CLW	52
6557821002	ON18RT-DPTP-0300-SLE	54
6557865001	OR50RT-DATP-01.0-SDE	63
6557865002	OR50RT-DATP-02.0-SDE	63
6557866001	OR50RT-DATP-01.0-CDE	63
6557866002	OR50RT-DATP-02.0-CDE	63
6557875003	OR05RT-DATP-01.2-3DE	61
6557886001	OR20RT-DPTP-0600-ALET	64
6557886003	OR20RT-DPTP-01.5-ALET	65
6557905008	OT30RT-DHTP-0200-6LE	59
6557927001	OM12RT-DHTP-0060-S	50
6557927004	OM12RT-DHTP-0200-SL	51
6557928002	OM12RT-DHTP-0060-CL	50
6557928003	OM12RT-DHTP-0200-CLE	50
6557928004	OM12RT-DHTP-0200-CL	50
6557929001	OT12RT-DHTP-0200-S	51
6557929002	OT12RT-DHTP-0060-S	50
6557930001	OT12RT-DHTP-0200-CL	51
6557930002	OT12RT-DHTP-0060-CL	50
6557950006	OR15RT-DHTP-0040-SL	63
6557955001	OR12RT-DHTP-0200-SLE	61
6557955002	OR12RT-DHTP-01.2-SLE	61
6557975003	OR05RT-DHTP-01.2-SLFE	62
6557975004	OR05RT-DHTP-01.2-3LFE	61
6558686002	OR20RH-MAR5-0400-ALET	64
6558816001	OM18FF-DPTP-0040-SL	51
6558817001	OM18FF-DPTP-0040-CL	51
6558818002	OT18FF-DPTP-0040-SL	52
6558819001	OT18FF-DPTP-0040-CL	52
6558865001	OR50RH-DATP-0200-SDE	63
6558866001	OR50RH-DATP-0200-CDE	63
6558916001	OM18RH-DHTP-0120-SDE	53
6558916002	OM18RH-DHTP-0120-SDEW	53
6558955001	OR12FF-DHTP-0050-SL	61

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

Type Code

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 9th position:	
	10	110 Volt
	20	120 Volt
	30	130 Volt
	The following applies when there is a "2" in the 9th 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
MAA-0213-LT-1	**6316302389**	78
MAA-0213-STK	**6310302636**	78
MAA-0214-FT-3	**6314402566**	77
MAA-0312-F	**6314203232**	79
MAA-0313-M	**6317303312**	79
MAA-0314-P	**6319403532**	79
MAA-0612-D-1	**6312206321**	72
MAA-0612-F-1	**6314206246**	72
MAA-0612-NT-4	**6410206399**	73
MAA-0613-K-1	**6315306314**	72
MAA-0613-L-1	**6316306248**	73
MAA-0613-LT-1	**6316306004**	73
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-S	**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

Type	Art. No.	Page
MAM-1811-2	**6310118626**	75
MAM-1812-B-1	**6311218294**	74
MAM-1813-L-1	**6316318002**	74
MAM-2312-F-1	**6314223268**	74
MAM-3114-2-LED	**6310431569**	75
MAM-4313-L-2	**6316343544**	75
MAN-0812-B-1	**6311208596**	74
MAN-0813-STK	**6310308595**	74
MAN-0813-Y-1	**6310308597**	74
MAN-1612-F-3	**6314216476**	72
MAN-1612-FT-8	**6314216585**	72
MAN-1613-L-1	**6316316259**	72

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

Art. No.	Type	Page
6310118626	MAM-1811-2	75
6310136616	MAK-3611-P-1	73
6310246500	MAK-4612-A-2	72
6310281656	MAK-8112-2	93
6310281657	MAK-8112-0,3/S	93
6310281658	MAK-8112-2	93
6310281659	MAK-8112-0,3/S	93
6310299652	MAK-9912-STK	76
6310299660	MAA-9912-2	93
6310299661	MAA-9912-0,3/S	93
6310302636	MAA-0213-STK	78
6310308595	MAN-0813-STK	74
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

Art. No.	Type	Page
6317303312	MAA-0313-M	79
6317304313	MAK-0413-M-S	74
6317306315	MAA-0613-M-1	72
6317342535	MAK-4213-M-1	78
6317344538	MAK-4413-M-1	78
6319403532	MAA-0314-P	79
6410206399	MAA-0612-NT-4	73
6410311368	MAK-1113-1,5	75
6410412143	MAK-1214-L-2	77
6410433350	MAK-3314-P-2	75
6416228260	MAK-2812-L-3	74
6419402397	MAK-0214-P-3	77

Type Code

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	Magnetoresistive
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
MEA-E30PS/HP-KL0,3S	**6370299143**	91
MEA-E30PS/HP-KL2	**6370299136**	91
MEK-E22PS/HP-KL0,3S	**6370281110**	91
MEK-E22PS/HP-KL0,3S	**6370281145**	91
MEK-E22PS/HP-KL0,3S	**6372281147**	92
MEK-E22PS/HP-KL0,3S	**6372281149**	92
MEK-E22PS/HP-KL0,3S	**6372299151**	92
MEK-E22PS/HP-KL0,3S-EX	**6370281153**	91
MEK-E22PS/HP-KL2	**6370281109**	91
MEK-E22PS/HP-KL2	**6370281144**	91
MEK-E22PS/HP-KL2	**6372281146**	92
MEK-E22PS/HP-KL2	**6372281148**	92
MEK-E22PS/HP-KL2	**6372299150**	92
MEK-E22PS/HP-KL2-EX	**6370281152**	91
MEK-E27NB/H02-K2	**6363893031**	87
MEK-E27NB/H11-K2	**6363893041**	87
MEK-E27NS/H10-K2	**6362693010**	87
MEK-E29NB/H11-K2	**6363811039**	87
MEK-E29NS/H10-K2	**6362611008**	87
MEK-E45NB/H11-K2	**6363845040**	88
MEK-E45NS/H10-K2	**6362645009**	88
MEK-E45PB/H11-KL2	**6373445129**	88
MEK-E45PÖ/H10-KL2	**6372145080**	88
MEK-E45PS/H10-KL2	**6372245079**	88
MEK-E50NB/H11-K2	**6363890042**	88
MEK-E50NS/H10-K2	**6362690011**	88
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

Type	Art. No.	Page
MEM-M12PÖ/M01-KL2	**6373162096**	84
MEM-M12PS/H10-KL10	**6472262077**	84
MEM-M12PS/H10-KL2	**6372262090**	84
MEM-M12PS/M01-KL2	**6373262094**	84
MEM-M12PS/M01-KL5	**6373262123**	84
MEM-M18NB/H11-K2	**6363863037**	85
MEM-M18NS/H10-K2	**6362663006**	85
MEM-M18PB/H11-KL2	**6373463128**	85
MEM-M18PD/H-KL2	**6379263122**	86
MEM-M18PÖ/H10-KL2	**6372163100**	85
MEM-M18PÖ/M01-KL2	**6373163104**	86
MEM-M18PS/H10-KL2	**6372263098**	85
MEM-M18PS/M01-KL2	**6373263102**	86
MEM-Q05PS/M03-K2	**6373299134**	86
MEM-Q08NB/H11-K2	**6363880043**	87
MEM-Q08NS/H10-K2	**6362680012**	87
MEM-Q08PS/M02-K2	**6373280106**	87
MEM-Q12NB/H11-K2	**6363855044**	87
MEM-Q12NS/H10-K2	**6362655013**	87
MEM-Q12PB/H11-KL2	**6373455131**	87
MEM-Q12PÖ/H10-KL2	**6372155084**	87
MEM-Q12PS/H10-KL2	**6372255083**	87
MEN-D04PS/M03-K2	**6373299132**	82
MEN-D06NB/H11-K2	**6363870032**	82
MEN-D06NS/H10-K2	**6362670001**	82
MEN-D06PS/M02-K2	**6373270105**	82

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

Art. No.	Type	Page
6362611008	MEK-E29NS/H10-K2	87
6362645009	MEK-E45NS/H10-K2	88
6362655013	MEM-Q12NS/H10-K2	87
6362660002	MEM-M08NS/H10-K2	83
6362661003	MEM-M10NS/H10-K2	83
6362662004	MEM-M12NS/H10-K2	83
6362662005	MEK-M12NS/H10-K2	83
6362663006	MEM-M18NS/H10-K2	85
6362663007	MEK-M18NS/H10-K2	85
6362670001	MEN-D06NS/H10-K2	82
6362680012	MEM-Q08NS/H10-K2	87
6362690011	MEK-E50NS/H10-K2	88
6362693010	MEK-E27NS/H10-K2	87
6363811039	MEK-E29NB/H11-K2	87
6363845040	MEK-E45NB/H11-K2	88
6363855044	MEM-Q12NB/H11-K2	87
6363860033	MEM-M08NB/H11-K2	83
6363861034	MEM-M10NB/H11-K2	83
6363862035	MEM-M12NB/H11-K2	83
6363862036	MEK-M12NB/H11-K2	83
6363863037	MEM-M18NB/H11-K2	85
6363863038	MEK-M18NB/H11-K2	85
6363870032	MEN-D06NB/H11-K2	82
6363880043	MEM-Q08NB/H11-K2	87
6363890042	MEK-E50NB/H11-K2	88
6363893031	MEK-E27NB/H02-K2	87
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

Art. No.	Type	Page
6373163104	MEM-M18PÖ/M01-KL2	86
6373260107	MEM-M08PS/M02-K2	83
6373261087	MEM-M10PS/M01-KL2	83
6373262093	MEK-M12PS/M01-KL2	84
6373262094	MEM-M12PS/M01-KL2	84
6373262123	MEM-M12PS/M01-KL5	84
6373263101	MEK-M18PS/M01-KL2	86
6373263102	MEM-M18PS/M01-KL2	86
6373270105	MEN-D06PS/M02-K2	82
6373280106	MEM-Q08PS/M02-K2	87
6373299132	MEN-D04PS/M03-K2	82
6373299133	MEM-M05PS/M03-K2	82
6373299134	MEM-Q05PS/M03-K2	86
6373445129	MEK-E45PB/H11-KL2	88
6373455131	MEM-Q12PB/H11-KL2	87
6373461124	MEM-M10PB/H11-KL2	83
6373462125	MEK-M12PB/H11-KL2	84
6373462126	MEM-M12PB/H11-KL2	84
6373463127	MEK-M18PB/H11-KL2	85
6373463128	MEM-M18PB/H11-KL2	85
6373490130	MEK-E50PB/H11-KL2	88
6379262119	MEK-M12PD/H-KL2	85
6379262120	MEM-M12PD/H-KL2	85
6379263121	MEK-M18PD/H-KL2	86
6379263122	MEM-M18PD/H-KL2	86
6472262077	MEM-M12PS/H10-KL10	84

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		Instal-lation/ use		Type of voltage	Output				Range					Type of connec-tion	Teach-in	Inter-face	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 on-wards	e.g.	Preset switching points
	...	etc.

Ultrasonic Sensors (sort by type designation)

Type	Art. No.	Page
UN12I-DNE0-0200-S30	**6712201001**	100
UN12I-DPE0-0200-S30	**6712101001**	100
UT18I-D00I-01.6-C30	**6711302002**	101
UT18I-D00I-01.6-S30	**6712302002**	101
UT18I-D00I-02.0-C30	**6711302001**	102
UT18I-D00I-02.0-S30	**6712302001**	103
UT18I-D00I-0400-C30	**6711302005**	100
UT18I-D00I-0400-S30	**6712302005**	100
UT18I-D00I-0500-C30	**6711302004**	101
UT18I-D00I-0500-S30	**6712302004**	101
UT18I-D00I-0800-C30	**6711302003**	102
UT18I-D00I-0800-S30	**6712302003**	102
UT18I-D00U-01.6-C30	**6711402002**	101
UT18I-D00U-01.6-S30	**6712402002**	101
UT18I-D00U-02.0-C30	**6711402001**	102
UT18I-D00U-02.0-S30	**6712402001**	103
UT18I-D00U-0400-C30	**6711402005**	100
UT18I-D00U-0400-S30	**6712402005**	100
UT18I-D00U-0500-C30	**6711402004**	101
UT18I-D00U-0500-S30	**6712402004**	101
UT18I-D00U-0800-C30	**6711402003**	102
UT18I-D00U-0800-S30	**6712402003**	102
UT18I-DNE0-01.6-C30	**6711202002**	101
UT18I-DNE0-01.6-S30	**6712202002**	101
UT18I-DNE0-02.0-C30	**6711202001**	102
UT18I-DNE0-02.0-S30	**6712202001**	103
UT18I-DNE0-0400-C30	**6711202005**	100
UT18I-DNE0-0400-S30	**6712202005**	100
UT18I-DNE0-0500-C30	**6711202004**	101
UT18I-DNE0-0500-S30	**6712202004**	101
UT18I-DNE0-0800-C30	**6711202003**	102
UT18I-DNE0-0800-S30	**6712202003**	102
UT18I-DPE0-01.6-C30	**6711102002**	101
UT18I-DPE0-01.6-S30	**6712102002**	101
UT18I-DPE0-02.0-C30	**6711102001**	102
UT18I-DPE0-02.0-S30	**6712102001**	103
UT18I-DPE0-0400-C30	**6711102005**	100
UT18I-DPE0-0400-S30	**6712102005**	100
UT18I-DPE0-0500-C30	**6711102004**	101
UT18I-DPE0-0500-S30	**6712102004**	101
UT18I-DPE0-0800-C30	**6711102003**	102
UT18I-DPE0-0800-S30	**6712102003**	102
UT25I-D00U-0250-V30	**6713411001**	104
UT25I-DNE0-0250-V30	**6713211001**	104
UT25I-DPE0-0250-V30	**6713111001**	104
UT30I-D00I-03.5-C30	**6711303001**	103
UT30I-D00I-03.5-S30	**6712303001**	103
UT30I-D00U-03.5-C30	**6711403001**	103
UT30I-D00U-03.5-S30	**6712403001**	103
UT30I-DNE0-03.5-C30	**6711203001**	103
UT30I-DNE0-03.5-S30	**6712203001**	103
UT30I-DPE0-03.5-C30	**6711103001**	103
UT30I-DPE0-03.5-S30	**6712103001**	103
UT80I-D00I-06.0-S30	**6712312001**	104
UT80I-D00U-06.0-S30	**6712412001**	104
UT80I-DNE0-06.0-S30	**6712212001**	104
UT80I-DPE0-06.0-S30	**6712112001**	104

Ultrasonic Sensors (sort by article number)

Art. No.	Type	Page
6711102001	UT18I-DPE0-02.0-C30	102
6711102002	UT18I-DPE0-01.6-C30	101
6711102003	UT18I-DPE0-0800-C30	102
6711102004	UT18I-DPE0-0500-C30	101
6711102005	UT18I-DPE0-0400-C30	100
6711103001	UT30I-DPE0-03.5-C30	103
6711202001	UT18I-DNE0-02.0-C30	102
6711202002	UT18I-DNE0-01.6-C30	101
6711202003	UT18I-DNE0-0800-C30	102
6711202004	UT18I-DNE0-0500-C30	101
6711202005	UT18I-DNE0-0400-C30	100
6711203001	UT30I-DNE0-03.5-C30	103
6711302001	UT18I-D00I-02.0-C30	102
6711302002	UT18I-D00I-01.6-C30	101
6711302003	UT18I-D00I-0800-C30	102
6711302004	UT18I-D00I-0500-C30	101
6711302005	UT18I-D00I-0400-C30	100
6711303001	UT30I-D00I-03.5-C30	103
6711402001	UT18I-D00U-02.0-C30	102
6711402002	UT18I-D00U-01.6-C30	101
6711402003	UT18I-D00U-0800-C30	102
6711402004	UT18I-D00U-0500-C30	101
6711402005	UT18I-D00U-0400-C30	100
6711403001	UT30I-D00U-03.5-C30	103
6712101001	UN12I-DPE0-0200-S30	100
6712102001	UT18I-DPE0-02.0-S30	103
6712102002	UT18I-DPE0-01.6-S30	101
6712102003	UT18I-DPE0-0800-S30	102
6712102004	UT18I-DPE0-0500-S30	101
6712102005	UT18I-DPE0-0400-S30	100
6712103001	UT30I-DPE0-03.5-S30	103
6712112001	UT80I-DPE0-06.0-S30	104
6712201001	UN12I-DNE0-0200-S30	100
6712202001	UT18I-DNE0-02.0-S30	103
6712202002	UT18I-DNE0-01.6-S30	101
6712202003	UT18I-DNE0-0800-S30	102
6712202004	UT18I-DNE0-0500-S30	101
6712202005	UT18I-DNE0-0400-S30	100
6712203001	UT30I-DNE0-03.5-S30	103
6712212001	UT80I-DNE0-06.0-S30	104
6712302001	UT18I-D00I-02.0-S30	103
6712302002	UT18I-D00I-01.6-S30	101
6712302003	UT18I-D00I-0800-S30	102
6712302004	UT18I-D00I-0500-S30	101
6712302005	UT18I-D00I-0400-S30	100
6712303001	UT30I-D00I-03.5-S30	103
6712312001	UT80I-D00I-06.0-S30	104
6712402001	UT18I-D00U-02.0-S30	103
6712402002	UT18I-D00U-01.6-S30	101
6712402003	UT18I-D00U-0800-S30	102
6712402004	UT18I-D00U-0500-S30	101
6712402005	UT18I-D00U-0400-S30	100
6712403001	UT30I-D00U-03.5-S30	103
6712412001	UT80I-D00U-06.0-S30	104
6713111001	UT25I-DPE0-0250-V30	104
6713211001	UT25I-DNE0-0250-V30	104
6713411001	UT25I-D00U-0250-V30	104

Type Code

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

Type Code

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

Cable Connectors (sort by type designation)

Type	Art. No.	Page
GDA-M12UA/LO	**4139100102**	143
GDK-M08US/WO0-10	**4139100797**	142
GDK-M08US/WO0-2	**4139100795**	142
GDK-M08US/WO0-5	**4139100796**	142
GDK-M12US/WO0-10	**4139100803**	142
GDK-M12US/WO0-2	**4139100801**	142
GDK-M12US/WO0-5	**4139100802**	142
GDK-M12UU/HO-2PU	**4139100956**	143
GDK-R06US/SO0-2,5PU	**4139100219**	141
GDK-R06US/SO0-5PU	**4139100220**	141
GDK-R12US/WO0-2	**4139100899**	143
WDA-M12UA/LO	**4139100101**	143
WDK-M08PS/LL2-2	**4139100213**	142
WDK-M08PS/LL2-5	**4139100216**	142
WDK-M08US/WO0-10	**4139100800**	142
WDK-M08US/WO0-2	**4139100798**	142
WDK-M08US/WO0-5	**4139100799**	142
WDK-M12PA/SL2-10PU	**4139100254**	142
WDK-M12PA/SL2-2PU	**4139100244**	142
WDK-M12PA/SL2-5PU	**4139100245**	142
WDK-M12PS/LL2-2	**4139100553**	143
WDK-M12PS/LL2-6	**4139100554**	143
WDK-M12UA/WO0-10	**4139100467**	142
WDK-M12UA/WO0-5	**4139100903**	142
WDK-M12US/WO0-10	**4139100805**	142
WDK-M12US/WO0-2	**4139100804**	142
WDK-M12US/WO0-5	**4139100468**	142
WDK-R06US/SO0-2,5PU	**4139100221**	141
WDK-R06US/SO0-5PU	**4139100222**	141
WDK-R12US/WO0-2	**4139100906**	143

Cable Connectors (sort by article number)

Art. No.	Type	Page
4139100101	WDA-M12UA/LO	143
4139100102	GDA-M12UA/LO	143
4139100213	WDK-M08PS/LL2-2	142
4139100216	WDK-M08PS/LL2-5	142
4139100219	GDK-R06US/SO0-2,5PU	141
4139100220	GDK-R06US/SO0-5PU	141
4139100221	WDK-R06US/SO0-2,5PU	141
4139100222	WDK-R06US/SO0-5PU	141
4139100244	WDK-M12PA/SL2-2PU	142
4139100245	WDK-M12PA/SL2-5PU	142
4139100254	WDK-M12PA/SL2-10PU	142
4139100467	WDK-M12UA/WO0-10	142
4139100468	WDK-M12US/WO0-5	142
4139100553	WDK-M12PS/LL2-2	143
4139100554	WDK-M12PS/LL2-6	143
4139100795	GDK-M08US/WO0-2	142
4139100796	GDK-M08US/WO0-5	142
4139100797	GDK-M08US/WO0-10	142
4139100798	WDK-M08US/WO0-2	142
4139100799	WDK-M08US/WO0-5	142
4139100800	WDK-M08US/WO0-10	142
4139100801	GDK-M12US/WO0-2	142
4139100802	GDK-M12US/WO0-5	142
4139100803	GDK-M12US/WO0-0	142
4139100804	WDK-M12US/WO0-2	142
4139100805	WDK-M12US/WO0-10	142
4139100899	GDK-R12US/WO0-2	143
4139100903	WDK-M12UA/WO0-5	142
4139100906	WDK-R12US/WO0-2	143
4139100956	GDK-M12UU/HO-2PU	143

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)

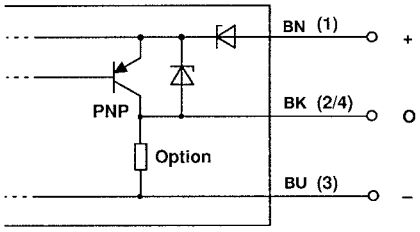
Type group		
5 – 7		**For clips:**
		Diameter in mm corresponding to matching sensor
		For elbows: Type group
	e.g. L05	Light barrier OR05
	e.g. M06	Magnetic switch M06
Material		
8 – 9		Material
	ST	Steel
	NI	Stainless steel
	AL	Aluminium
	PA	Polyamide
	PP	Polypropylene

Ausgangsarten DC 1

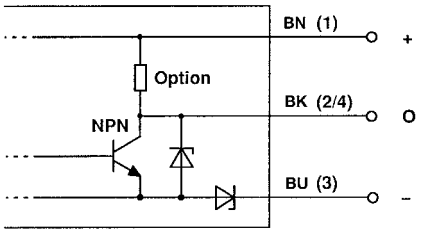
Cable colour abbreviations

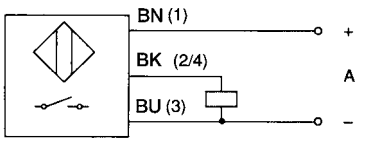
BN = Brown
BU = Blue
BK = Black (switch output)

PNP output
(circuit schematic)

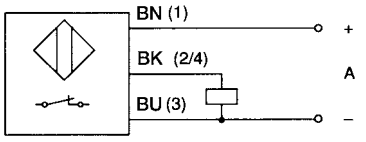


NPN output
(circuit schematic)

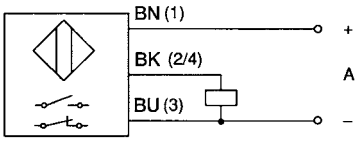




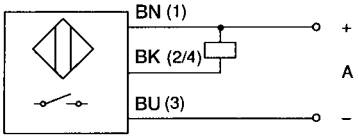
1) PNP normally-open contact
When actuated, a PNP transistor applies the output to positive.



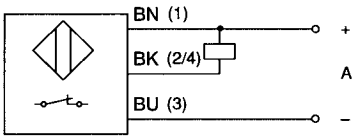
2) PNP normally-closed contact
When actuated, a PNP transistor disconnects the output from positive.



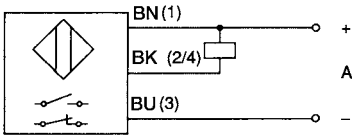
3) PNP programmable
The PNP NO contact 1) or PNP NC contact 2) function can be selected by means of a built-in changeover switch.



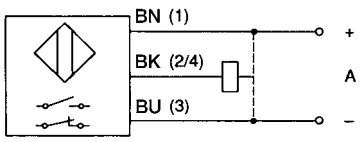
4) NPN normally-open contact
When actuated, a NPN transistor applies the output to negative.



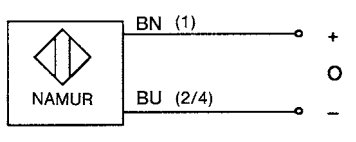
5) NPN normally-closed contact
When actuated, an NPN transistor disconnects the output from negative.



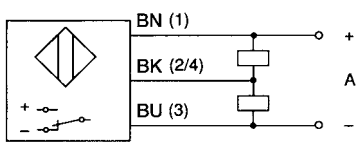
6) NPN programmable
The NPN NO contact 4) or NPN NC contact 5) function can be selected by means of a built-in changeover switch.



7) PNP/NPN programmable
Two built-in changeover switches are used to select between PNP or NPN switching and between NC or NO function.



8) NAMUR
Current change to DIN EN 60947-5-6



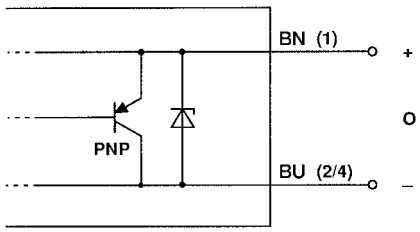
9) Push-pull programmable
When actuated, the output changes from negative to positive or, selectable with a built-in changeover switch, from positive to negative.

Types of Output DC 2

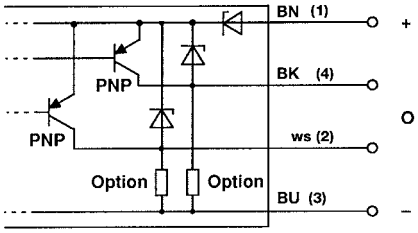
Cable colour abbreviations

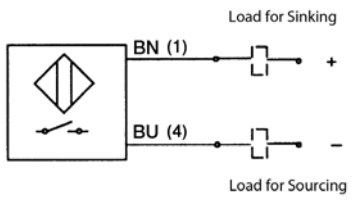
BN = Brown
BU = Blue
BK = Black (switch output)
WH = White (switch output)

DC 2-wire
(circuit schematic)

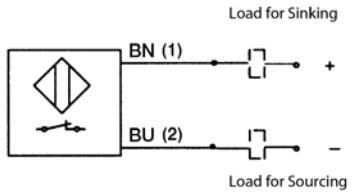


DC 4-wire
(circuit schematic)

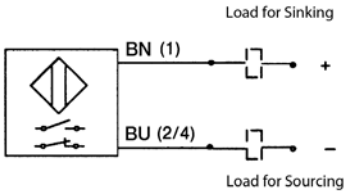




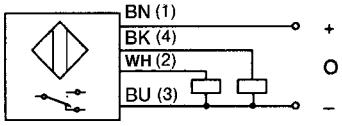
1) NO contact DC 2-wire
When actuated, the contacts are bridged.



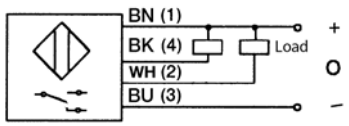
2) NC contact DC 2-wire
When actuated, the contacts are disconnected.



3) NC/NO contact programmable DC 2-wire
The NO contact 1) or NC contact 2) function can be selected by means of a built-in changeover switch.



4) Changeover output DC (antivalent) PNP 4-wire
When actuated, the positive operating voltage is alternatively applied to one of the two outputs.



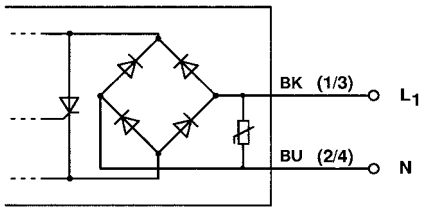
5) Changeover output DC (antivalent) NPN 4-wire
When actuated, the negative operating voltage is alternatively applied to one of the two outputs.

Types of Output AC 1

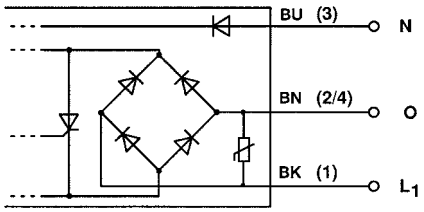
Cable colour abbreviations

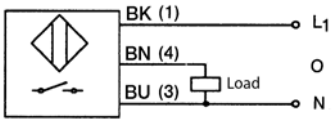
BN = Brown
BU = Blue
BK = Black

AC 2-wire
(circuit schematic)

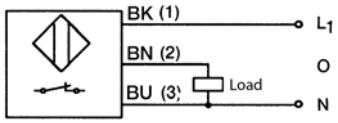


AC 3-wire
(circuit schematic)

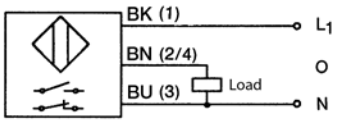




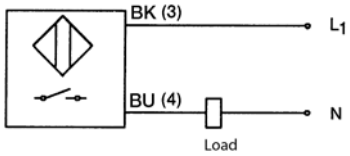
1) NO contact AC 3-wire
When actuated, a thyristor connected across a rectifier bridge applies the operating voltage to the output.



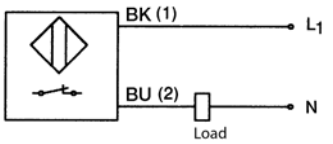
2) NC contact AC 3-wire
When actuated, a thyristor connected across a rectifier bridge disconnects the operating oltage from the output.



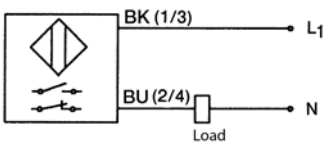
3) NC/NO contact programmable AC 3-wire
The AC NO contact 1) or AC NC contact 2) function can be selected by means of a built-in changeover switch.



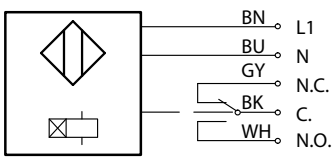
4) NO contact AC 2-wire
When actuated, a thyristor connected across a rectifier bridge applies the load to the operating voltage.



5) NC contact AC 2-wire
When actuated, a thyristor connected across a rectifier bridge disconnects the load from the operating voltage.

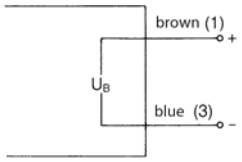


6) NC/NO contact programmable AC 2-wire
The AC NO contact 4) or AC NC contact 5) function can be selected by means of a built-in changeover switch.

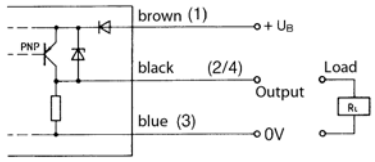


7) AC relay output
With adjustable pickup delay

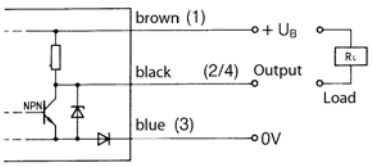
Optoelectronic Sensors 1



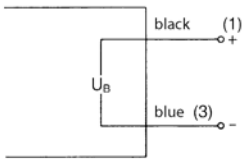
① **Transmitter**



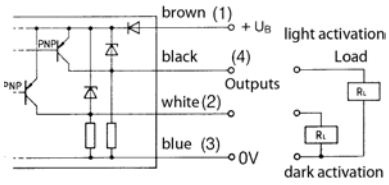
④ **PNP**
Light activated or dark activated



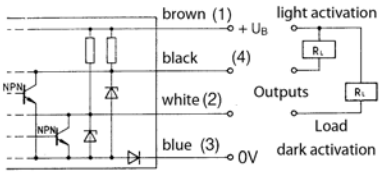
⑦ **NPN**
Light activated or dark activated



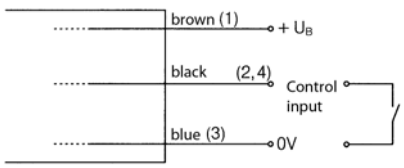
② **Transmitter**



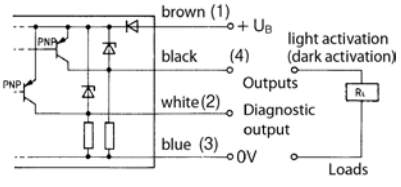
⑤ **PNP antivalent**
Light activated and dark activated



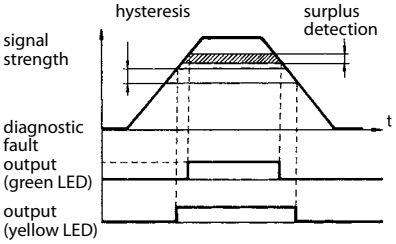
⑧ **NPN antivalent**
Light activated and dark activated



③ **Transmitter**

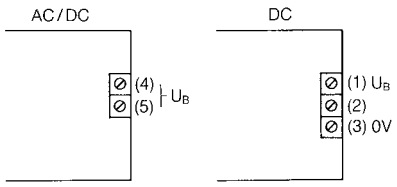


Funktionsreserve

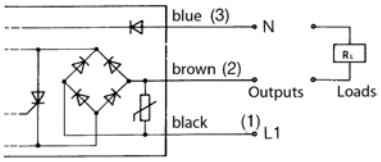


⑥ **PNP**
Light activated and operating reserve output

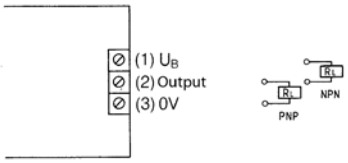
Optoelectronic Sensors 2



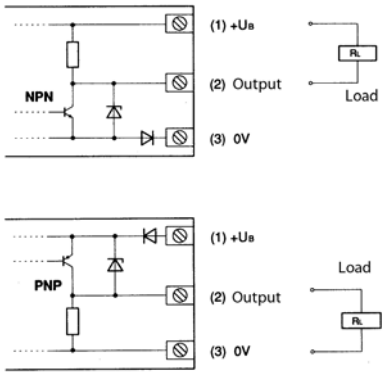
Transmitter



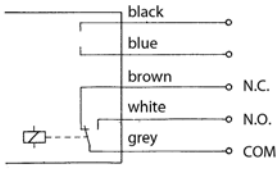
AC 3-wire



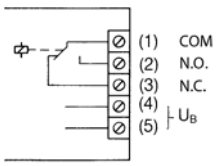
NPN or PNP



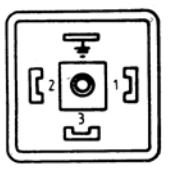
NPN or PNP



Relay output



Relay output



	DC	AC
(1)	U_B	L1
(2)	0V	Output
(3)	Output	N

DIN connector

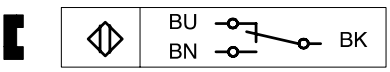
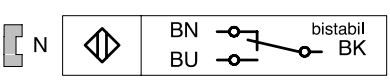
Type of Contact

Electric Loading Capacity of Reed Contacts AC/DC

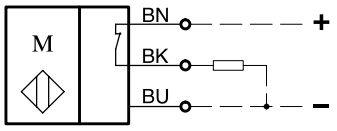
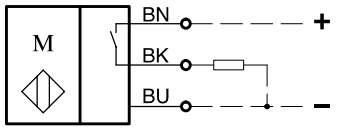
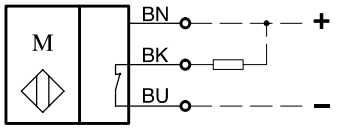
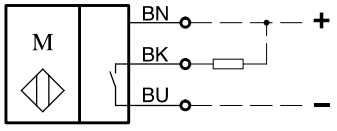
Contact type ID	Power	Voltage	Current
R	3 VA	28 V	0.25 A
X	5 VA	100 V	0.25 A
B	10 VA	250 V	0.5 A
Y	10 VA	100 V	0.5 A
A	20 VA	250 V	0.5 A
K	30 VA	250 V	0.5 A
H	60 VA	250 V	1.0 A
L	60 VA	250 V	1.0 A
M	80 VA	250 V	1.0 A
F	100 VA	250 V	3.0 A
G	250 VA*	250 V	5.0 A*
P	250 VA*	250 V	5.0 A*

* 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	

BERNSTEIN



Switch systems –
Economy meets safety



Sensor systems –
Compact intelligence



Enclosure systems –
Function and design

www.bernstein.eu

700 0000 898 . 02.2010 . We reserve the right to make changes

Contact

International Headquarters
BERNSTEIN AG
Tieloser Weg 6
32457 Porta Westfalica
Tel. +49 571 793-0
Fax +49 571 793-555
info@de.bernstein.eu
www.bernstein.eu

Denmark
BERNSTEIN A/S
Tel. +45 7020 0522
Fax +45 7020 0177
info@dk.bernstein.eu

France
BERNSTEIN S.A.R.L.
Tel. +33 1 64 66 32 50
Fax +33 1 64 66 10 02
info@fr.bernstein.eu

Netherlands
BERNSTEIN BV
Tel. +31 314 366088
Fax +31 314 361256
info@nl.bernstein.eu

Italy
BERNSTEIN S.r.l.
Tel. +39 035 4549037
Fax +39 035 4549647
info@it.bernstein.eu

United Kingdom
BERNSTEIN Ltd.
Tel. +44 1922 744999
Fax +44 1922 457555
info@uk.bernstein.eu

Austria
BERNSTEIN GmbH
Tel. +43 2256 62070-0
Fax +43 2256 62618
info@at.bernstein.eu

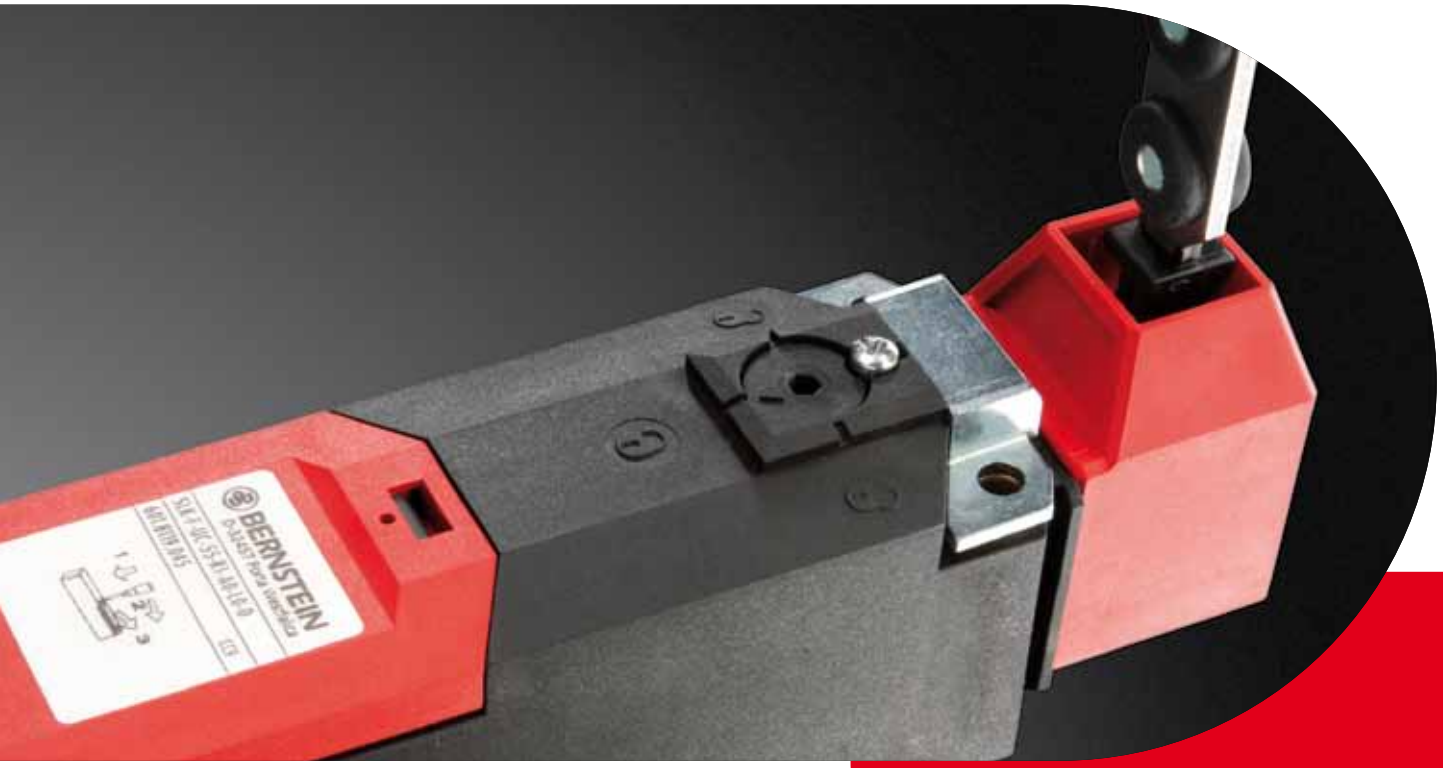
Switzerland
BERNSTEIN (Schweiz) AG
Tel. +41 44 775 71-71
Fax +41 44 775 71-72
info@ch.bernstein.eu

China
BERNSTEIN Safe Solutions
(Taicang) Co., Ltd.
Tel. +86 512 81608180
Fax +86 512 81608181
info@bernstein-safesolutions.cn

Hungary
BERNSTEIN Kft.
Tel. +36 1 4342295
Fax +36 1 4342299
info@hu.bernstein.eu

Service Hotlines:
For products: +49 571 793-3000
For orders: +49 571 793-3010

BERNSTEIN



Complete Range
Switch Systems

BERNSTEIN







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 level 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
Switch Systems



Switch systems – Economy meets safety

BERNSTEIN AG is an established manufacturer of high quality electromechanical low voltage switching devices. 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.

In addition to functional reliability and high quality, BERNSTEIN switch systems also efficiently safe time in terms of installation and maintenance.These advantages further underscore the benefits for the end product as they drastically reduce downtimes for servicing and maintenance purposes. This is achieved through such features as the quick-connect head for time-saving installation at cable pull switches or the AS interface components which, in addition to shortening installation times, also reduce the number of hardware components and the space requirements in machines.

Switches are an integral part of modern processes

The primary purpose of a switch is to convert mechanical movement into electrical signals that are processed in machine and process control systems. However, switches directly connected to bus systems are being used to an ever greater extent in modern applications where mechanical movement is converted into digital information.

Besides reducing costs, our AS interface switch components also offer advantages such as the diagnostic features and uncomplicated system expansion in process applications.

BERNSTEIN switches are configured by combining different types of enclosure, switch system and actuator. Corresponding to the environmental and operating conditions, the switches are available in a metal or plastic enclosures.



The switching system is selected based on the function (slow-action or snap-action contact) and the required floating contacts. The actuator is also selected corresponding to the type and direction of actuation. Thanks to the large number of possible combinations, the scope of application is virtually unlimited.

The applications in which limit switches are used have changed in line with increasing automation. While not too long ago limit switches were mainly used for monitoring position, today they often additionally assume a safety function.

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 completely preassembled wiring harnesses
- Component supplied with M12 connector
- Customised adaptation of products

Safety and Standard Switches

General 12

Safety and Standard Position Switches

Insulation-enclosed limit switches (plastic)

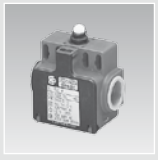

• C2 18


• Ti2 22


• IF 26


• I88 32


• SGS 38


• Bi2 40


• ENK 44

Metal-enclosed limit switches


• GC 50


• SN2 56


• ENM2 62


• D 68

Overview of actuators 72

Accessories 74

Electrical data 76

Safety Switches with Separate Actuator

Plastic


• SKT 80


• SKI 81


• SKC 82


• SK 83


Plastic/metal various types 86
• VTW
• VTU

Safety Switches with Separate Actuator and Latching Device


Plastic
• SLK 90


Metal
• SLM 94

Safety Switches for Hinged Protective Equipment



• SHS3 98



• SHS 102

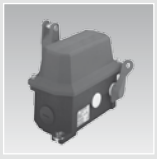


• I88 VKS, -VKW, -AHDB
GC VKS, -VKW
Ti2 AHDB 106

Safety Command Devices



Safety cable pull switches **112**
• SRM
• SR



Cable pull switches spanned on both ends **118**
• SiRK
• Si1
• Si2

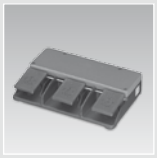


Standard cable pull switches **122**

Accessories for cable pull switches **128**



Belt alignment switches **130**



Foot switches **132**
1–3 pedal

Safety Evaluation Devices



SCR Safety relays **142**

Bus-Compatible Safety Switches – AS Interface



AS-Interface Safety at Work **142**



AS-Interface Accessories **150**

ATEX

General **152**



ATEX Products **154**

Common Features of Electromechanical Switches

Switching systems

Switching elements lie at the heart of all electromechanical switching devices and must correspond to the respective application. Essentially there are two basic types of switching system that differ in terms of their mechanical design and consequently their scope of application:

- Slow-action contacts
- Snap-action contacts

Slow-action contacts

- On actuation, the normally-closed and normally-open contact functions correspond to the movement of the impact pin
- The approach speed controls the contact opening (closing) time
- Large distance/actuating travel between normally-closed and normally-open contact function
- The switching points are identical in forward and reverse travel

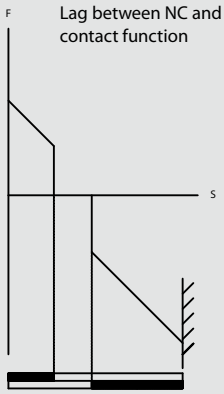


Fig. 1 shows the contact force during the switching cycle of a slow-action contact.

Overlap

- The switching principle of slap-action contacts makes overlapping of the NC/NO contact function possible. The term overlap refers to the area, in which both the normally-closed contact as well as the normally-open contact are closed in connection with a changeover switch with delay.

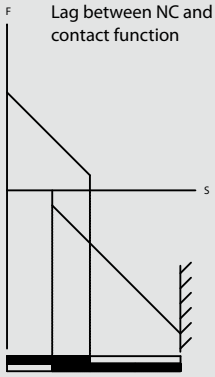


Fig. 2 shows the contact force during the switching cycle of a slow-action contact with overlap.

Snap-action contact

- On actuation, the normally-closed contact function is immediately followed by the normally-open contact function
- In this configuration there is no overlap of the NC/NO contacts. The switch provides a distinct OR-function.
- The changeover accuracy is not dependent on the approach speed
- Consistently effective suppression of DC arc
- Reliable contact-making also for extremely slow approach speeds
- The snap mechanism triggers the full opening width of the contact on reaching the changeover point
- Due to the force reversal in the mechanical system, a different switching point occurs in forward and reverse travel. The lag is referred to as hysteresis.

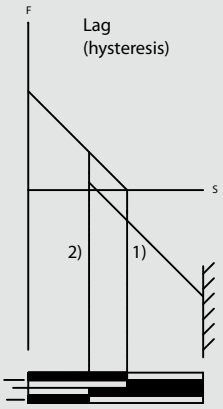


Fig. 3 shows the contact force during the switching cycle of a snap-action contact.

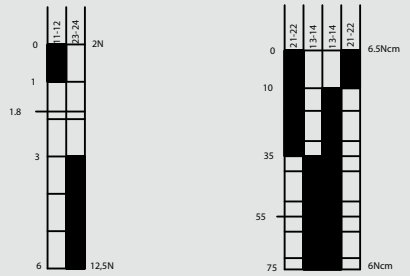
[1] Changeover point in forward travel
[2] Changeover point in reverse travel

Switching diagram

The switching diagram describes the function of the switching device in detail.

It combines the mechanical input variables that act on the contact system via the actuator with the electrical output variables. The user can deduct the following information from the switching diagram:

- Mechanical input variables (force, travel, torque, angle)
- Electrical contact-making in forward and reverse travel
- Terminal designation
- Point at which positive opening is achieved
- Type of contact system



Slow-action contact Snap-action contact

■ Contact closed
□ Contact open

Contact designation

In accordance with DIN 50013 and DIN 50005 the terminal designations of the contact elements are always make up of two digits.

The contact rows are numbered consecutively with the allocating digit (1st digit) in actuation direction. Contacts of a switching element that belong together have the same allocating digit.

The second digit is the function digit that denotes the type of contact element.

1–2 Normally-closed contact
3–4 Normally-open contact
5–6 Normally-closed contact with delayed opening
7–8 Normally-open contact with delayed closing

Protection class

The protection class of an enclosed device denotes the degree of protection. The degree of protection includes the protection of persons against contact with parts under voltage and the protection of equipment against the infiltration of foreign bodies and water. BERNSTEIN standard enclosures mainly correspond to protection classes IP65 and IP67. Higher protection ratings are also available for individual customer solutions. In accordance with DIN EN 60521 (IEC 529), the numerals used in the protection rating denote the following:

1st digit Degree of protection against contact and infiltration of foreign bodies

2nd digit Degree of protection against infiltration of water

Example IP65:

6 = ● Complete protection against contact with components under voltage or with internal moving parts
● Protection against dust infiltration

5 = ● A water jet directed from all directions at the device must not have damaging effects
● Protection against hose water

Enclosures

Limit switches are supplied either in a moulded enclosure or a metal enclosure. Which material is to be selected for a specific application depends on the ambient conditions, the location as well as several other factors.

Moulded limit switches provide protective insulation and are resistant to many aggressive chemicals and liquids. The formation of condensation water in moist environments with extreme temperature fluctuations is significantly reduced on moulded enclosures.

In insulation-enclosed switches the switching elements are integrated directly in the moulded enclosure and are therefore not replaceable (complete switching devices).

Metal-enclosed limit switches are able to withstand high mechanical loads, they can also be used wherever hot metal chips and sparks occur and are resistant to many solvents and detergents. The switching elements in metal-enclosed switches are often integrated in the metal enclosure as modular built-in switches. The enclosure has a VDE-compliant connection for the PE conductor.

Safety switches

The scope of application for limit switches has changed over time. Whereas limit switches were previously used for the purpose of detecting end positions, today they are increasingly assuming functions designed to protect persons and products in machine, equipment and plant construction.

The BERNSTEIN range of safety switches offers the right solution for the most diverse applications in many branches of industry. Particularly when it comes to safety, users appreciate the fact that they are able to procure all required safety switches and receive professional advice from one source.

The decisive factors governing the selection of safety equipment include the ambient conditions, installation situation and risk analysis.

A switching device that can be used for safety functions is identified by the standardised symbol conforming to EN 65000-41 and EN 65000-42. The switches can, of course, also be used for pure position monitoring purposes.

Safety switches are divided into two categories, Type 1 and Type 2. The difference is in the actuating elements which are completely integrated in the enclosure in Type 1 and separated from the switching element in Type 2.



Type 1



Type 2

Common Features of Electromechanical Switches

Designation

The designation of BERNSTEIN switching devices comprises:

- The enclosure designation of the switching device
- The switching function
- The type of actuator

Type code of position and safety switches

I88	**A2Z**[1]	**AH**	**M12**
Switch group	Switching system[2]	Actuator	Special features
● C2 ● Ti2 ● IF ● I88 ● Bi2 ● ENK ● GC ● SN2 ● ENM2 ● D	● U1 ● SU1 ● A2 ● SA2 ● E2 ● SE2	See Pages 72-73	● M12 connection ● Actuator turned 90°, 180°, 270° ● Special switching forces ● Special temperature ranges ● Other special features on request

[1] The letter Z suffix to the designation of the switching function denotes the mechanical positive opening action of the normally-closed contacts. In technical data sheets, the positive opening point is identified by the international symbol ⊖.

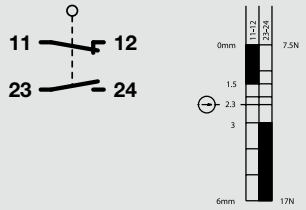
[2] Please refer to the following pages in the catalogue to establish which switching system can be used in the switch groups.

Switching function example

NC = Normally-closed contact
NO = Normally-open contact

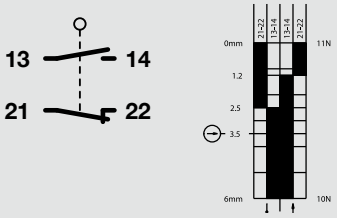
U1Z

Slow-action contact, 1 NC, 1 NO



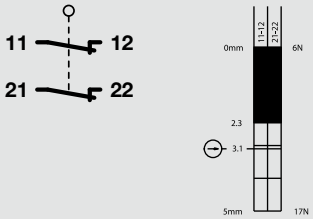
SU1Z

Snap-action contact, 1 NC, 1 NO



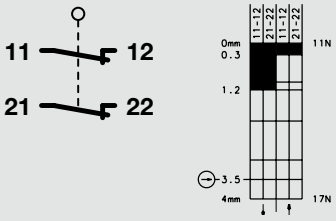
A2Z

Slow-action contact, 2 NC



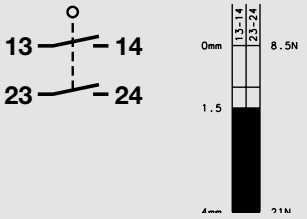
SA2Z

Snap-action contact, 2 NC



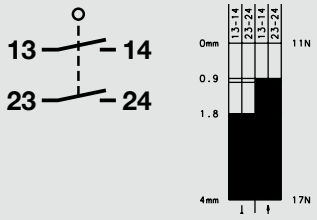
E2

Slow-action contact, 2 NO



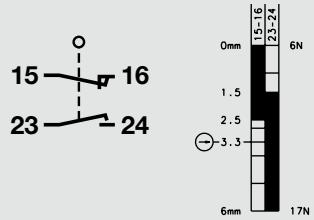
SE2

Slow-action contact, 2 NO



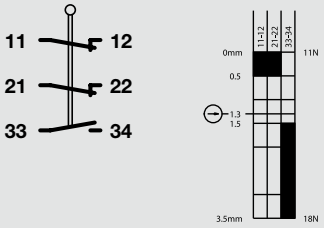
UV1Z

Slow-action contact,
with overlapping contacts,
1 NC, 1 NO



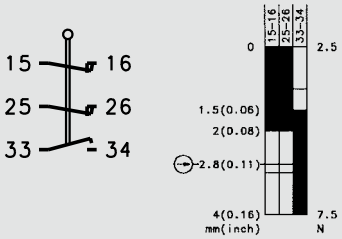
U15Z

Slow-action contact, 2 NC, 1 NO



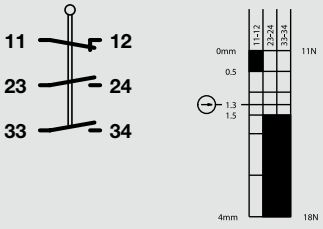
UV15Z

Slow-action contact,
with overlapping contacts,
2 NC, 1 NO



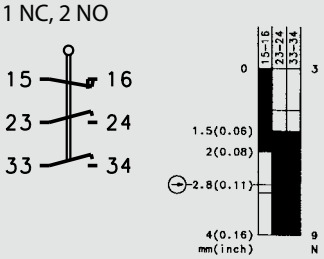
U16Z

Slow-action contact, 1 NC, 2 NO



UV16Z

Slow-action contact,
with overlapping contacts,
1 NC, 2 NO



The actuating forces and travel distances are subject to tolerances. These tolerances are listed in Table 1.
In Type 1 and Type 2 position switches, the tolerances are independent of the switching system and switching function.

Function	Tolerance
Switching travel	± 0.25 mm
Switching angle	± 3.5°
Switching force in N	± 10%
Actuating torque in	± 10%

Table 1

Common Features of Electromechanical Switches

⊖ = Mechanical positive opening action

The term positive opening action refers to contact separation as the direct result of defined movement of the switch actuator by means of non-sprung parts. All parts involved in contact separation must be form-fit connected. The positive opening distance describes the minimum travel distance from the start of actuation of the operating element up to the point where positive opening action of the opening contacts is completed.

DIN EN 60947-5-1 defines two types of positive opening action contacts with 4 connections and double break.

Type Za

- Positively opening contacts not galvanically isolated

Type Zb

- Positively opening contacts galvanically isolated

Galvanic isolation describes the isolation of electrically conducted parts by insulating material or by air gaps.

In switching devices with several contact elements, galvanically isolated contact elements make it possible to switch voltages with different potential (e.g. normally-closed contact in safety circuit, normally-open contact for indicator).

In accordance with applicable health and safety requirements, protective devices (guards) must be mounted on machines, devices and systems that perform hazardous movements. Safety switches in the form of electromechanical switching devices are predominantly used for this purpose as they offer the following advantages:

- High degree of safety
- Non-susceptibility to interference
- Safety status easily checked on site
- Rational solutions

Form-fit, mechanical drives or coupling elements in the form of levers, rods, gearwheels etc. are necessary to ensure optimum operation of these safety components.

Switching devices that are used for safety functions must be identified with the symbol ⊖ internationally standardised in accordance with DIN EN 60947-5-1.
In defining the class of switching devices, this symbol denotes two important properties that must be met for personal protection applications:

- Mechanical positive opening action
- Disruptive breakdown voltage > 2.5 kV

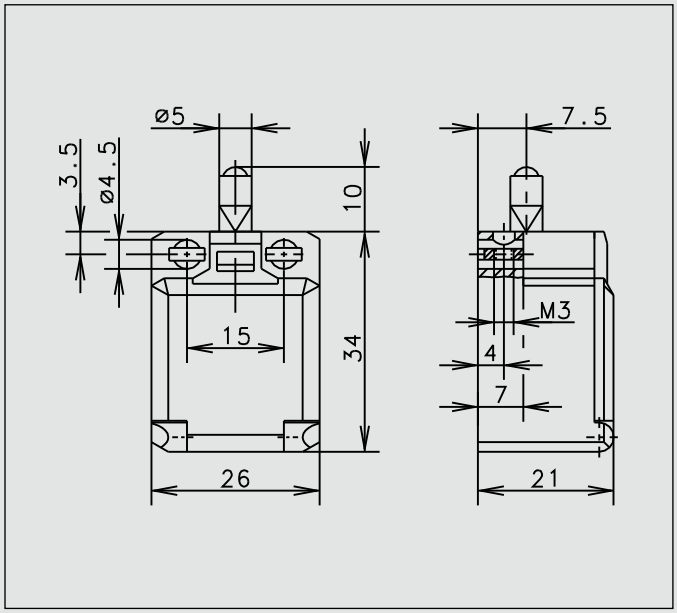
Disruptive breakdown voltage

In accordance with DIN EN 60947-5-1, the open contacts must be able to maintain a minimum surge voltage of 2.5 kV without disruptive breakdown.

Notes

C2





Recommended use

Ideal for safety applications and position monitoring in confined spaces.

Product advantages

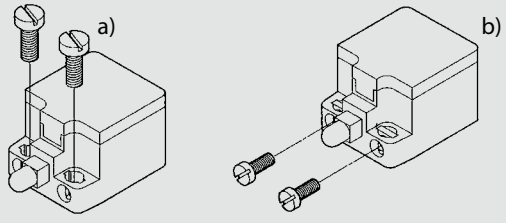
- Miniature switch for safety applications
- Two-channel safety monitoring possible
- With captive snap-on cover
- Small hysteresis in snap action system

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 2 NO
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

Mounting

- Also suitable for front mounting (depending on type)



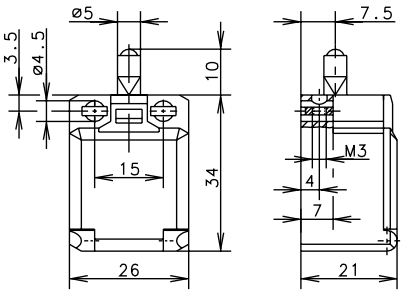
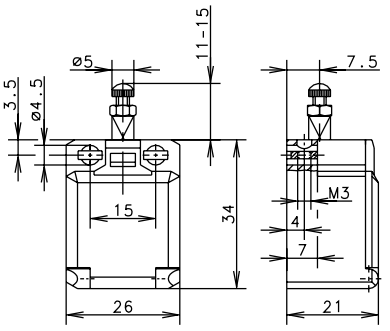
- a) 2 round holes for M4 screws
- b) 2 Integrated nuts for front mounting for M3 screws (depending on type)

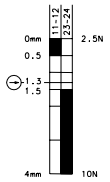
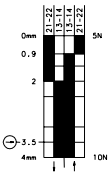
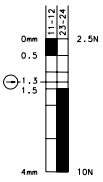
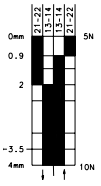
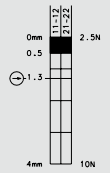
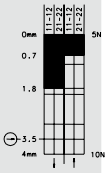
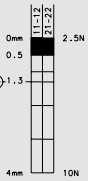
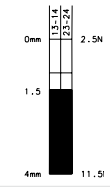
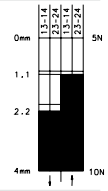
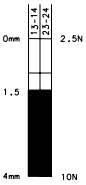
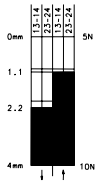
Installation advantages

- Snap-on cover can be released with screwdriver
- Cover opening range 180° (cover can also be detached from hinge)
- Cover protects switching element during installation
- Screw connections with self-lifting clamping plates
- Cover transparent for adjustment and visual inspection
- Easy-action cover lock (close and press)

Technical data

Electrical data		
Rated insulation voltage	U_i max.	240 V AC
Conventional thermal current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category	U_e/I_e	AC-15, U_e/I_e 240 V/3 A
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced (UL 94-V0)
Ambient temperature		-30 °C to +80 °C
Mechanical service life		3 x 10^6 switching cycles
B10d		6 Mio.
Switching frequency		≤ 100/min
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		Rectangle 8.5 x 3.5 mm
Protection class		IP20 conforming to EN 60529; DIN VDE 0470 T1
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

	W	ST
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6008101001** C2-U1Z 	**6008351002** C2-SU1Z 	**6008104025** C2-U1Z ST 	**6008354026** C2-SU1Z ST 
2 NC contacts	**6008801003** C2-A2Z 	**6008851004** C2-SA2Z 	**6008804027** C2-A2Z ST 	
2 NO contacts	**6008801005** C2-E2 	**6008851006** C2-SE2 	**6008804029** C2-E2 ST 	**6008854030** C2-SE2 ST 
1 NC / 1 NO contact Overlapping				
Approvals				

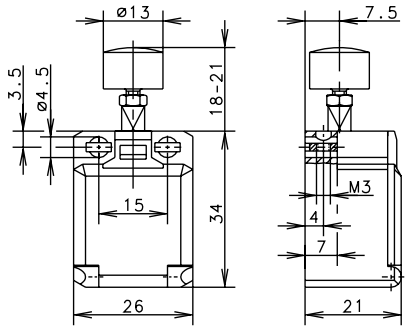
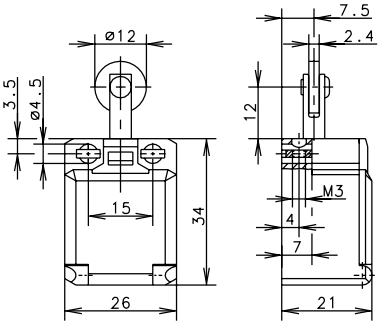
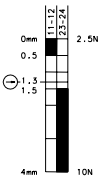
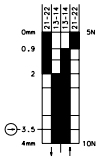
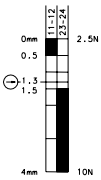
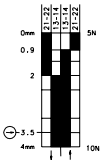
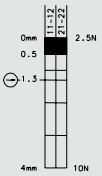
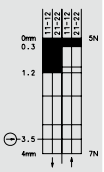
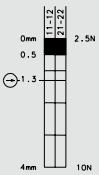
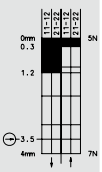
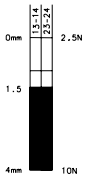
Replacement actuator: -

Special features/variants
(on request)

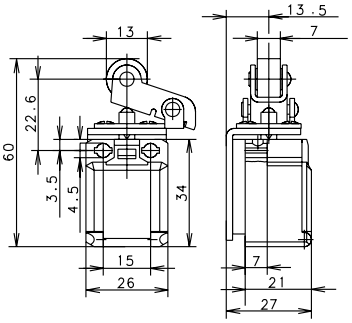
Replacement actuator: -

Special features/variants

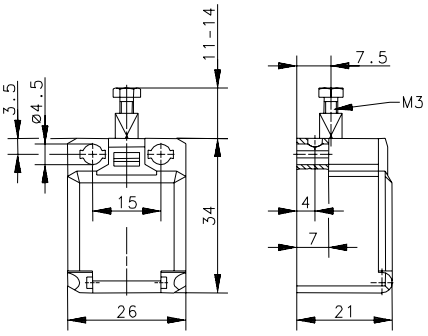
- Actuator length adjustable with adjusting screw

	K	R
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6008107019** C2-U1Z K  **6008357020** C2-SU1Z K 	**6008116013** C2-U1Z R  **6008366014** C2-SU1Z R 
2 NC contacts	**6008807021** C2-A2Z K  **6008857022** C2-SA2Z K 	**6008816015** C2-A2Z R  **6008866016** C2-SA2Z R 
2 NO contacts		**6008816017** C2-E2 R 
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants ● Button actuator, for manual operation	**Special features/variants** (on request) ● Also available with roller turned by 90°

O.M.



BISTABLE O.M.



Slow-action	Snap-action
6008101007 + 3910190259 C2-U1Z O.M.	**6008351008 +** 3910190259 C2-SU1Z O.M.
6008801009 + 3910190259 C2-A2Z O.M.	

Slow-action	Snap-action
	6108351008 C2-SU1Z BISTABLE O.M.

Replacement actuator: 3910190259

Replacement actuator: -

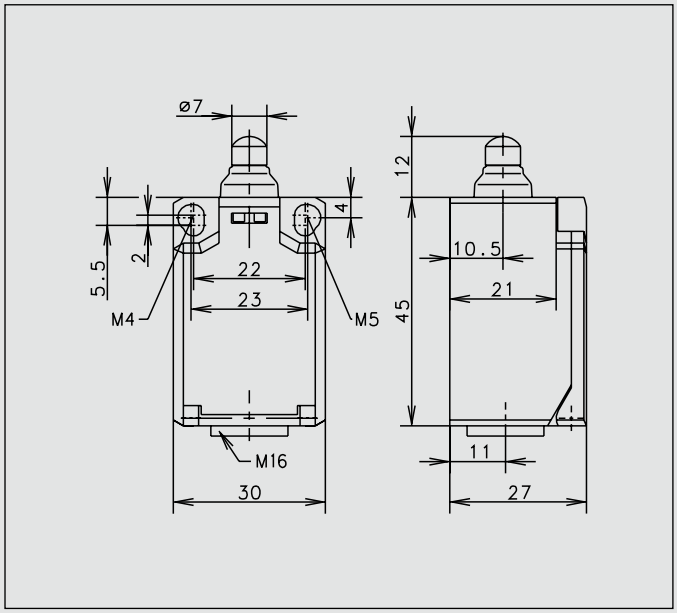
Special features/variants
(on request)

Special features/variants

- Bistable characteristics, actuator must be returned to initial position by external actuation (pulling)
- Actuator length adjustable with M3 adjusting screw

Ti2





Recommended use

Ideal for safety applications and position monitoring in confined spaces with high protection class IP65.

Product advantages

- Compact IP65 switch for safety applications
- Optimised size while retaining tried-and-tested connection system
- Two-channel safety monitoring possible
- With captive snap-on cover
- 2 mm contact opening width of slow-action system conforming to EN 81-1 for lift construction
- mall hysteresis in snap action system
- Actuator can be repositioned by 4 x 90°

Options

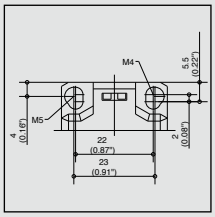
- Available with M12 connector
- AS interface variants available
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 2 NO
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated change-over contact)

Mounting

- Mounting dimensions conforming to DIN EN 50047
- 2 slots for adjustment with M4 screws (distance between centres 22 mm)



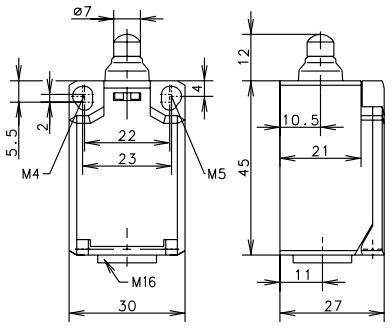
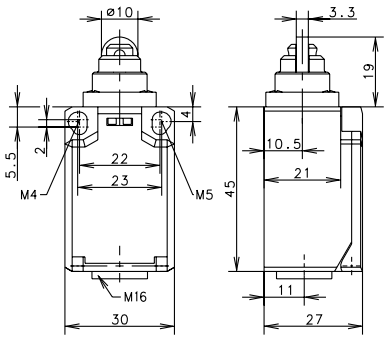
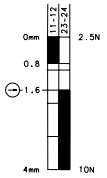
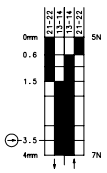
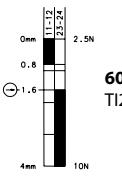
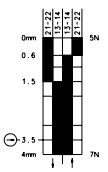
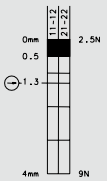
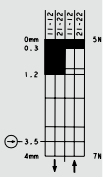
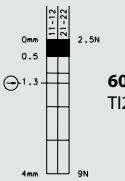
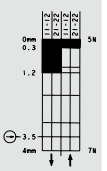
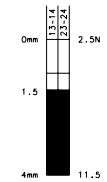
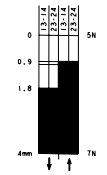
- Fixed positioning for safety applications with two M5 screws (distance between centres 23 mm)

Installation advantages

- Snap-on cover can be released with screwdriver
- Cover protects switching element during installation
- Screw connections with self-lifting clamping plates
- Cover transparent for adjustment and visual inspection
- Easy-action cover lock (close and press)

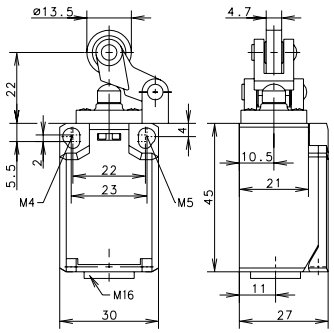
Technical data

Electrical data		
Rated insulation voltage	U_i max.	240 V AC
Conventional thermal current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category	U_e/I_e	AC-15, U_e/I_e 240 V/3 A; DC-13, U_e/I_e 240 V/0,27 A
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced (UL 94-V0)
Ambient temperature		-30 °C to +80 °C
Mechanical service life		3 x 10^6 switching cycles
B10d		6 Mio.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Cable entry		1 x M16 x 1,5
Protection class		IP65 conforming to EN 60529; DIN VDE 0470 T1
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

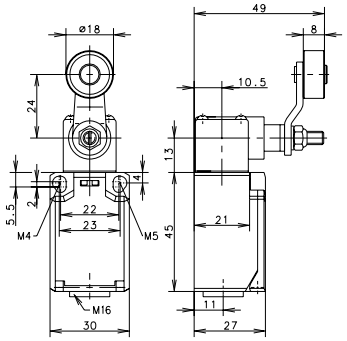
	W (Form B)	RIW (Form C)
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6088103001** TI2-U1Z W  **6088153002** TI2-SU1Z W 	**6088117007** TI2-U1Z RIW  **6088167008** TI2-SU1Z RIW 
2 NC contacts	**6088803003** TI2-A2Z W  **6088853004** TI2-SA2Z W 	**6088817009** TI2-A2Z RIW  **6088867010** TI2-SA2Z RIW 
2 NO contacts	**6088803005** TI2-E2 W 	**6088867012** TI2-SE2 RIW 
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request) ● Available with increased switching force	**Special features/variants** (on request) ● Available with increased switching force ● Available with different actuating directions ● Cannot be turned by user

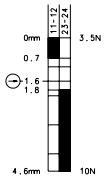
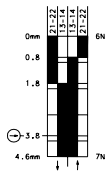
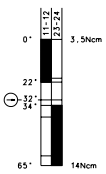
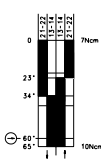
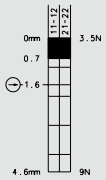
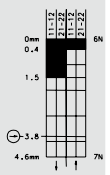
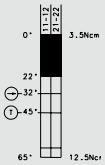
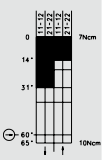
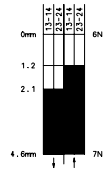
Ti2

HW (Form E)



AH (Form A)



Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6088121015** TI2-U1Z HW 	**6088171016** TI2-SU1Z HW 	**6088135021** TI2-U1Z AH 	**6088185022** TI2-SU1Z AH 
2 NC contacts	**6088821017** TI2-A2Z HW 	**6088871018** TI2-SA2Z HW 	**6088835023** TI2-A2Z AH 	**6088885024** TI2-SA2Z AH 
2 NO contacts		**6088871020** TI2-SE2 HW 		
1 NC / 1 NO contact Overlapping				
Approvals				

Replacement actuator: 3918191547

Replacement actuator: 3918351166

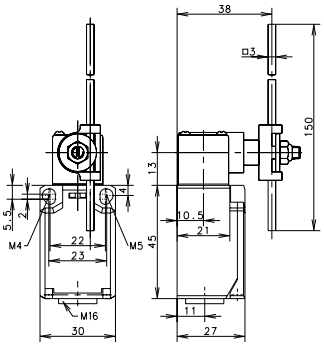
Special features/variants
(on request)

- Available with different actuating directions
- With steel roller
- Various roller diameters

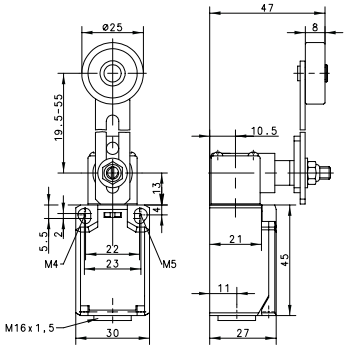
Special features/variants
(on request)

- Available with different actuating directions
- With steel roller
- Various roller diameters
- Cranked or straight lever
- Various lever lengths
- With roller over switch

AD



AV



Slow-action	Snap-action
6088137027 TI2-U1 AD	**6088187028** TI2-SU1 AD
6088837029 TI2-A2 AD	**6088887030** TI2-SA2 AD
	6088887032 TI2-SE2 AD

Slow-action	Snap-action
6088136033 TI2-U1 AV	**6088186034** TI2-SU1 AV
	6088886036 TI2-SA2 AV
6088836037 TI2-E2 AV	**6088886038** TI2-SE2 AV

Replacement actuator: 3918370986

Special features/variants
(on request)

- Available with different actuating directions
- With various actuator lengths
- Available with increased switching force

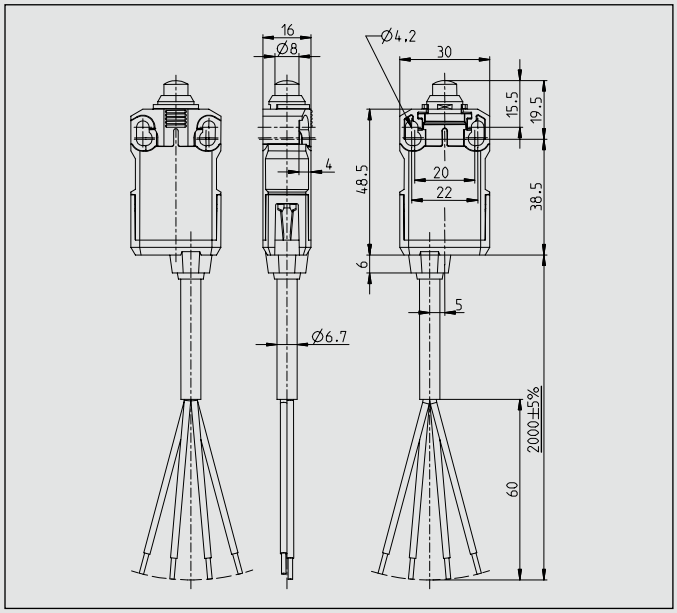
Replacement actuator: -

Special features/variants
(on request)

- Available with different actuating directions
- Various roller diameters
- Various lever lengths
- With roller over switch

IF





Recommended use

Most limit switches soon come up against their limits in applications involving confined spaces and wherever high protection classes are required. Not so the IF switch from BERNSTEIN. With its slim design and full IP67 protection they are simply ideal for position monitoring and end position shutdown in safety applications.

Product advantages

- Slim line design
- With 2 m fixed cable or AMP4 connector
- High quality plastic enclosure
- Metal actuator and mounting clip
- Small hysteresis in snap action system
- Actuator can be repositioned by 4 x 90°
- Compact IP67 switch for safety applications
- Two-channel safety monitoring possible
- Other cable lengths available on request

Installation advantages

Flexibility is key in practical applications: And it is precisely here that IF switches from BERNSTEIN are a real asset. They have a modular design that makes them extremely flexible in installation and use Minimum stockkeeping: The approach direction can be quickly and easily changed by installation technician.



Options

- Various cable lengths available on request
- Can be preassembled with customised connectors on request

Design layout

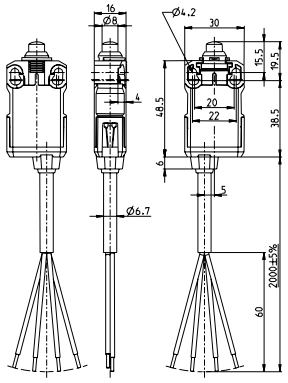
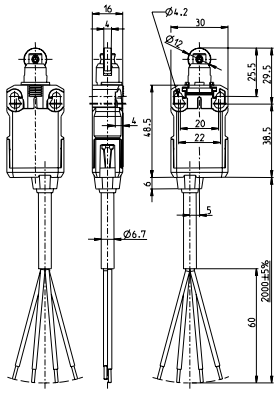
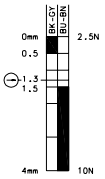
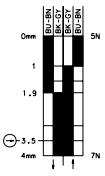
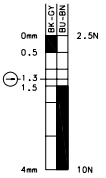
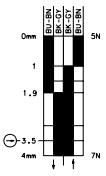
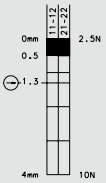
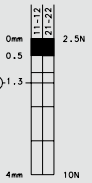
- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 2 NO
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

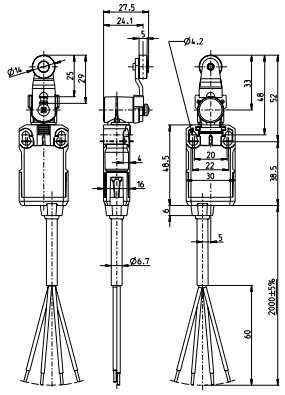
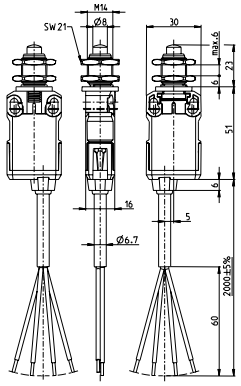
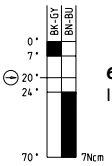
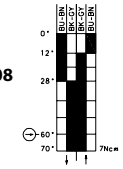
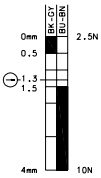
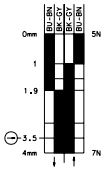
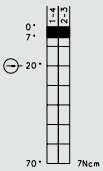
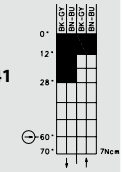
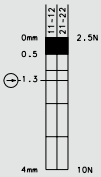
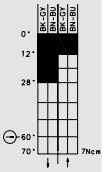
Mounting

- Two M4 screws for adjustment with slots
- Two M5 screws for safety applications; front mounting depending on type

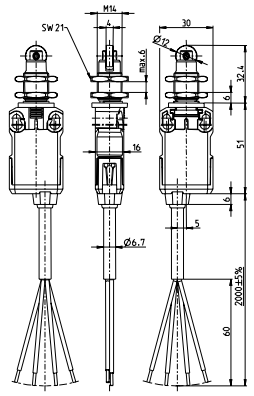
Technical data

Electrical data		
Rated insulation voltage	U_i max.	240 V AC
Conventional thermal current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		PA6 (glass fibre-reinforced)
Ambient temperature		-25 °C to +70 °C (Connection cable installed)
Mechanical service life		3 x 10^6 switching cycles
B10d		6 Mio.
Switching frequency		≤ 30/min.
Type of connection		Cable 4 x 0.75 mm²
Protection class		IP67 conforming to EN 60529; DIN VDE 0470 T1
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

	IW	RIW
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6089102001** IF-U1Z IW  **6089152006** IF-SU1Z IW 	**6089117002** IF-U1Z RIW  **6089167007** IF-SU1Z RIW 
2 NC contacts	**6089802011** IF-A2Z IW 	**6089817012** IF-A2Z RIW 
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request)	**Special features/variants** ● Actuator can be turned in steps of 90°

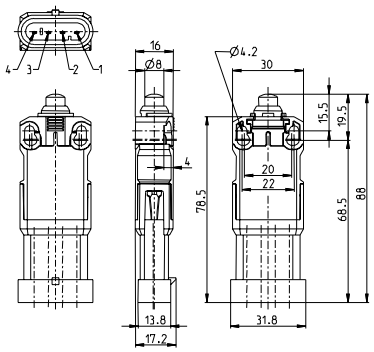
	AH	IWF
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6089135003** IF-U1Z AH  **6089185008** IF-SU1Z AH 	**6089102004** IF-U1Z IWF  **6089152009** IF-SU1Z IWF 
2 NC contacts	**6089835013** IF-A2Z AH  **6089885041** IF-SA2Z AH 	**6089802014** IF-A2Z IWF  **6089852043** IF-SA2Z IWF 
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants ● Actuator can be turned in steps of 90°	**Special features/variants** ● Front mounting

RIWF



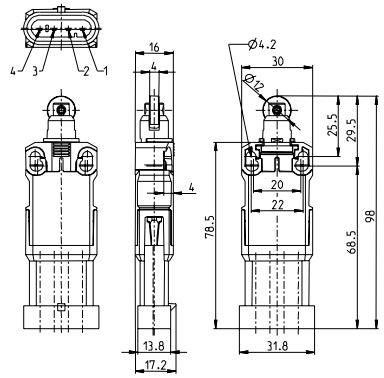
Slow-action	Snap-action
6089117005 IF-U1Z RIWF	**6089167010** IF-SU1Z RIWF
6089817015 IF-A2Z RIWF	

IW AMP4



Slow-action	Snap-action
6089102016 IF-U1Z IW AMP4	**6089152021** IF-SU1Z IW AMP4
6089802026 IF-A2Z IW AMP4	

RIW AMP4



Slow-action	Snap-action
6089117017 IF-U1Z RIW AMP4	**6089167022** IF-SU1Z RIW AMP4
6089817027 IF-A2Z RIW AMP4	

Replacement actuator: -

Special features/variants

- Front mounting
- Actuator can be turned in steps of 90°

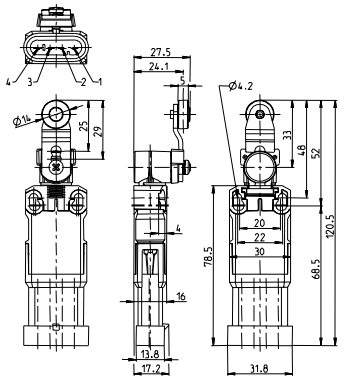
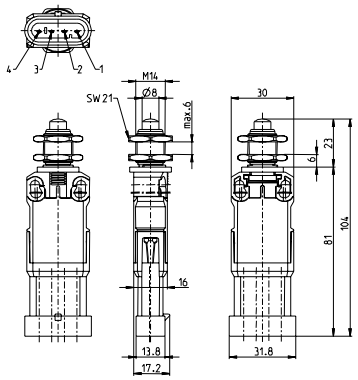
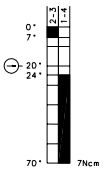
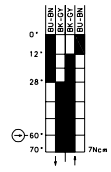
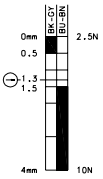
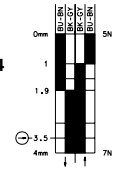
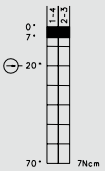
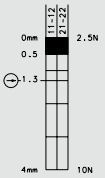
Replacement actuator: -

Special features/variants
(on request)

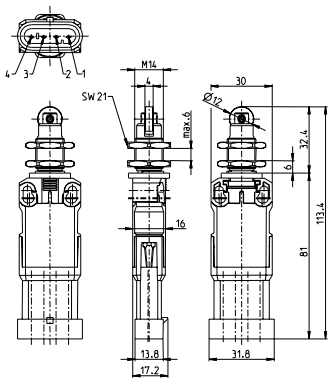
Replacement actuator: -

Special features/variants

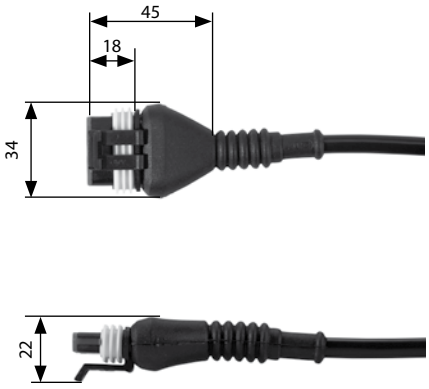
- Actuator can be turned in steps of 90

	AH AMP4	IWF AMP4
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6089135018** IF-U1Z AH AMP4  **6089185023** IF-SU1Z AH AMP4 	**6089102019** IF-U1Z IWF AMP4  **6089152024** IF-SU1Z IWF AMP4 
2 NC contacts	**6089835028** IF-A2Z AH AMP4 	**6089802029** IF-A2Z IWF AMP4 
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants ● Actuator can be turned in steps of 90	**Special features/variants** ● Front mounting

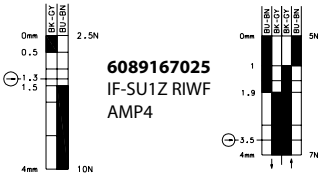
RIWF AMP4



AMP Connection cable

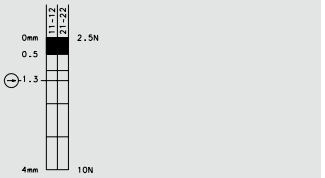


Slow-action **Snap-action**



6089117020
IF-U1Z RIWF
AMP4

6089167025
IF-SU1Z RIWF
AMP4



6089817030
IF-A2Z RIWF
AMP4

Cable length 3.5 m:
3251204309
AN-KAB.IF 3.5M AMP4

Cable length 5 m:
3251204281
AN-KAB.IF 5M AMP4

Cable
UL-CSA-S03VV2-F4x0.75 black n. UL2517, CSA C22.2/210.2 and n. VDE 0281 part 12 n. HAR 21.12 S1

Pin assignment
1-GY, 2-BU, 3-BN, 4-BK

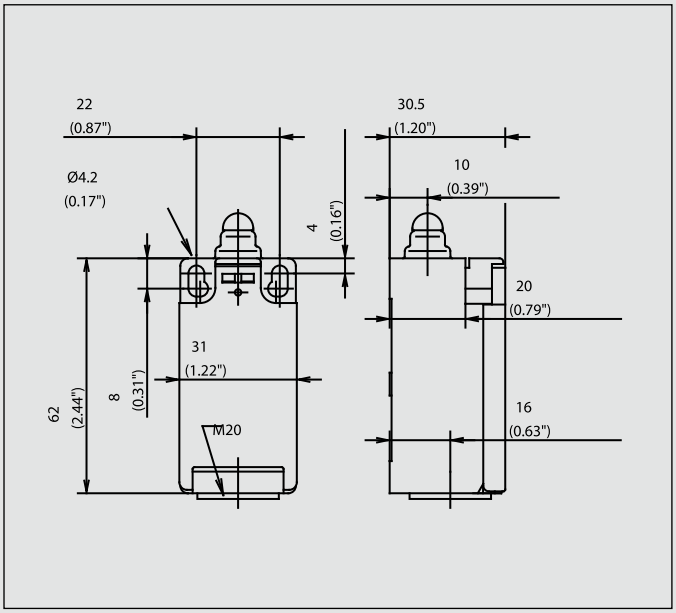
Replacement actuator: -

Special features/variants

- Front mounting
- Actuator can be turned in steps of 90

I88





Recommended use

Thanks to its standard dimensions as well as its wide range of contacts and actuators, this switch can be used on safety facilities and for position monitoring in virtually any industrial application.

Product advantages

- Standard switch conforming to DIN EN 50047
- Standard actuator conforming to DIN EN 50047, Type A, B, C, E
- Protection class IP65 to VDE 0470 T1
- Enclosure and cover PA 6, self-extinguishing (UL-94-V0)
- Actuator can be repositioned by 4 x 90°
- Cable entry M20 x 1.5
- Connection designation conforming to DIN EN 50013

Options

- Available with M12 connector
- AS interface variants available
- Cable entry M16 x 1.5

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 2 NO, overlapping contacts
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)
- Latching function on request

Mounting

- Two M4 screws (distance between centres 22 mm), adjustment with slots
- Two M5 screws for safety applications without additional fixing element (Fig. 1)
- Additionally secured by guide plate for lateral approach forces (Fig. 2)
- Front mounting (depending on type, Fig. 3)

Installation advantages

- Snap-on cover can be released with screwdriver
- Cover opening range 135° (cover can also be detached from hinge)
- Cover protects switching element during installation
- Screw connections with self-lifting clamping plates
- Easy-action cover lock (close and press)
- Cover additionally secured with screw

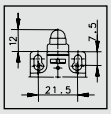


Fig. 1

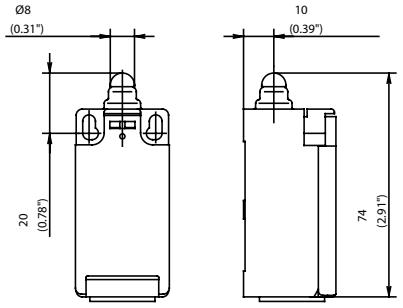
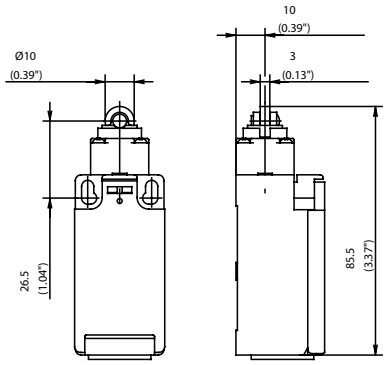
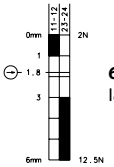
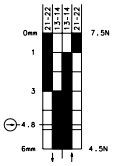
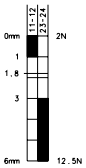
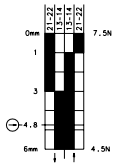
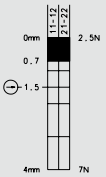
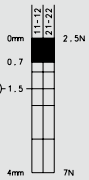
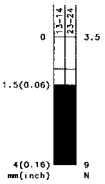
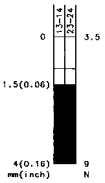
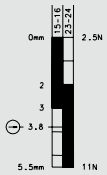

Fig. 2

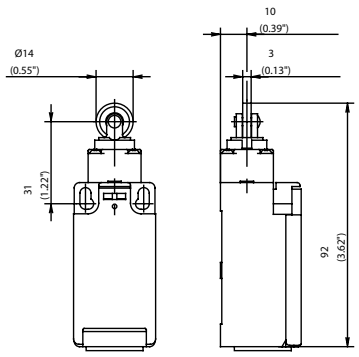
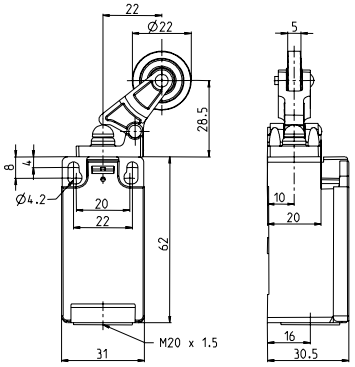
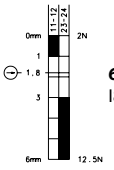
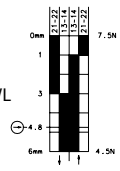
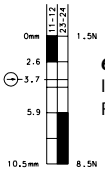
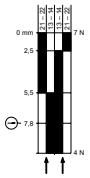
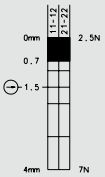
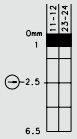
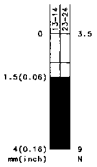

Fig. 3

Technical data

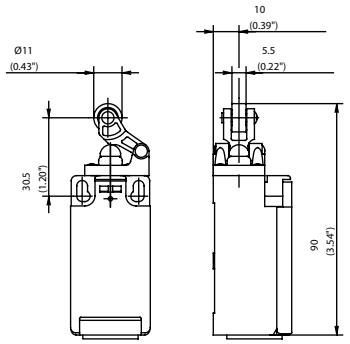
Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Conventional thermal current (up to) ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category (up to) ①		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced (UL 94-V0)
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) ①		10 x 10^6 switching cycles
B10d (up to) ①		20 Mio.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		1 x M20 x 1,5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

	W (Form B)	RIWK (Form C)
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6086103008** I88-U1Z W  **6086153012** I88-SU1Z W 	**6086117017** I88-U1Z RIWK  **6086167018** I88-SU1Z RIWK 
2 NC contacts	**6086803013** I88-A2Z W 	**6086817087** I88-A2Z RIWK 
2 NO contacts	**6086803014** I88-E2 W 	**6086817071** I88-E2 RIWK 
1 NC / 1 NO contact Overlapping	**6086303011** I88-UV1Z W 	
Approvals		
	Replacement actuator: -	**Replacement actuator: 3918161672**
	Special features/variants (on request) ● Available with black enclosure ● With latching function and following contacts: 2 NC /1 NO contact 1 NC /2 NO contact ● Both with and without overlap	**Special features/variants** (on request) ● Available with black enclosure ● With latching function ● With steel roller and following contacts: 2 NC /1 NO contact 1 NC /2 NO contact ● Both with overlap

	RIWL	KNW RO22
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6086117050** I88-U1Z RIWL  **6086167051** I88-SU1Z RIWL 	**6186127112** I88-U1Z KNW RO22  **6086177053** I88-SU1Z KNW RO22 
2 NC contacts	**6086817072** I88-A2Z RIWL 	**6186827246** I88-A2Z KNW RO22 
2 NO contacts	**6086817069** I88-E2 RIWL 	
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: 3918161673	**Replacement actuator: -**
	Special features/variants (on request) ● Available with black enclosure ● With latching function ● Available with different actuating directions ● With steel roller	**Special features/variants** (on request)

HW RO11 (Form E)



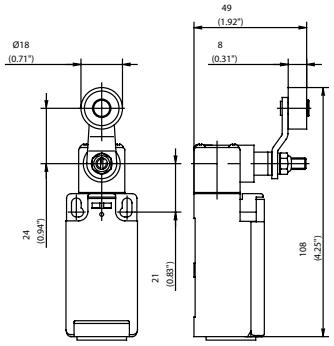
Slow-action	Snap-action
6086121021 I88-U1Z HW RO11	**6086171022** I88-SU1Z HW RO11
6086821099 I88-A2Z HW RO11	
6086821068 I88-E2 HW RO11	
6086321100 I88-UV1Z HW RO11	

Replacement actuator: 3918191547

Special features/variants
(on request)

- Available with black enclosure
- With steel roller
- Various roller diameters

AH (Form A)



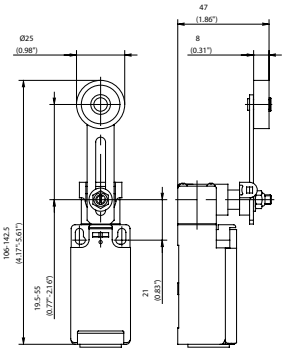
Slow-action	Snap-action
6086135033 I88-U1Z AH	**6086185034** I88-SU1Z AH
6086835059 I88-A2Z AH	
6086835116 I88-E2 AH	
6186335628 I88-UV1Z AH	

Replacement actuator: 3918351166

Special features/variants
(on request)

- Available with black enclosure
- Available with different actuating directions
- With steel roller
- Various roller diameters
- Cranked or straight lever
- Various lever lengths

AV

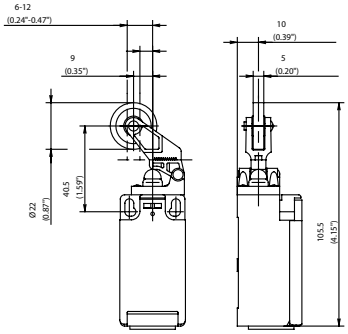
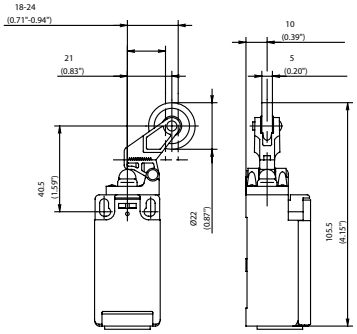


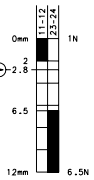
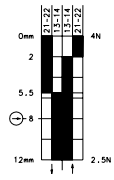
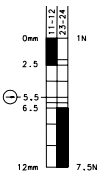
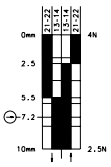
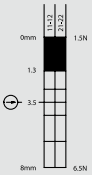
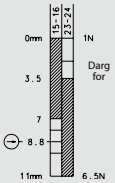
Slow-action	Snap-action
6086136037 I88-U1 AV	**6086186038** I88-SU1 AV
6086836131 I88-A2 AV	

Replacement actuator: 3918360984

Special features/variants
(on request)

- Available with black enclosure
- Various actuating directions
- Various roller diameters
- Cranked or straight lever
- Various lever lengths
- With roller over switch

	DGHW RO22	DGKW RO22
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6086121029** I88-U1Z DGHW RO22 	**6086171030** I88-SU1Z DGHW RO22 	**6086127025** I88-U1Z DGKW RO22 	**6086177026** I88-SU1Z DGKW RO22 
2 NC contacts	**6086821120** I88-A2Z DGHW RO22 			
2 NO contacts				
1 NC / 1 NO contact Overlapping	**6186321244** I88-UV1Z DGHW RO22 			
Approvals				

Replacement actuator: 3918211529

Replacement actuator: 3918271528

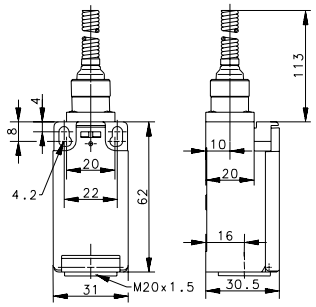
Special features/variants
(on request)

- Available with black enclosure
- Available with different actuating directions
- Various roller diameters

Special features/variants
(on request)

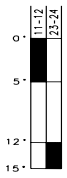
- With latching function
- Various roller diameters and with following contacts:
  2 NC /1 NO contact
  1 NC /2 NO contact
  Both with overlap

FF



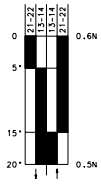
Slow-action

6186140217
I88-U1 FF



Snap-action

6086190078
I88-SU1 FF

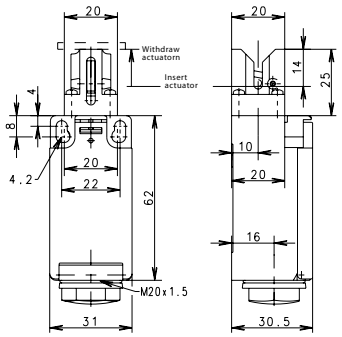


Replacement actuator: 3918401031

Special features/variants
(on request)

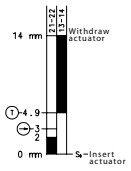
- Available with black enclosure
- Various spring lengths
- Different spring versions or spring rod

KS



Slow-action

6116819140
I88-U1Z KS

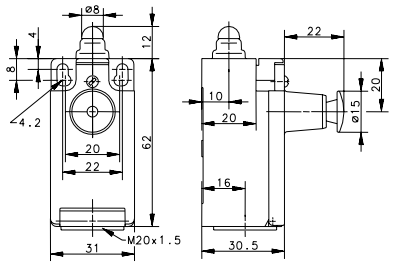


Snap-action

Replacement actuator: -

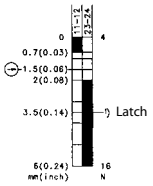
Special features/variants
(on request)

W RAST

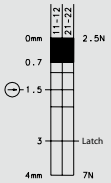


Slow-action

6186103005
I88-U1Z W
RAST



6186803155
I88-A2Z W
RAST



Replacement actuator: -

Special features/variants
(on request)

SGS

The SGS is a bistable safety switch with remote release facility. Once switched, the SGS remains in this position until it is manually reset at the plunger or via an external button. A built-in solenoid actuator controls the release action. In its rugged plastic housing, it represents an economically priced alternative to the BERNSTEIN GC Series with remote release.



The SGS can be used wherever an intentional (manual or electrical) reset function is required:

- In lift construction
- In door and gate systems
- In wind power stations or
- Wherever safety is of prime importance

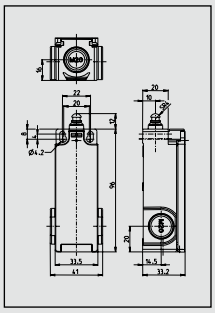
By correspondingly checking the NC contacts with positive opening action, an evaluator circuit is able to disconnect the power supply to a drive controller and shut down the machine.

SGS applications include

- Lift pre-switching (speed limiter)
- Monitoring of emergency release function
- Machine construction applications where specific reset of the switch is required
- Use in areas difficult to access
- Remote monitoring and reset over large distances

Features:

- Plunger indicates switch status
- Plunger groove for manual reset
- 2 versions: 230 V AC and 24 V DC
- Reset via built-in solenoid actuator
- 3 cable outlets M20 x 1.5
- Switching functions: 2 NC contacts
- TÜV EN 81 approval
- Other actuators from the standard range on request



Technical data

Electrical data		
Protection class		II, Insulated
Switching elements		
Rated insulation voltage	U_i	250 V AC
Thermal current	I_{the}	10 A
Utilization category		AC-15, U_e /I_e 240 V / 3 A DC-13, U_e /I_e 250 V / 0.27 A
Minimum switching voltage		24 V
Minimum switching current		5 mA
Positive opening	⊖	conforming IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 4 A gL/gG
Electromagnet		Without free-wheeling diode
Thermal class		B (130 °C)
Rated operating voltage	U_e	24 V DC / 230 V AC (depending on type)
Rated operating current	I_e	2.3 A / 0.23 A AC
Duty factor	ED	3 %
Minimum ON time	T_i	0.2 s
Maximum ON time	T_e	0.5 s
Minimum OFF time	T_p	17 s
Mechanical data		
Enclosure		Glass fibre-reinforced thermoplastic, self-extinguishing
Cover		Glass fibre-reinforced thermoplastic, self-extinguishing
Actuation		Plunger (thermoplastic)
Approach speed	V_{max}	0.5 $^m/_s$
Ambient temperature		-25 °C bis +50 °C
Contact type		2 NC contacts (Zb) / NC contacts, 1 NO contacts (Zb)
Switching principle		Snap action system, bistable
Mechanical service life		5 x 10^4 switching cycles
B10d		0,1 Mio.
Bolt		2 x M4 / 2 x M5 for safety applications
Type of connection Switching element		Screw connections
Conductor cross sections		Single-wire 0.5 ... 1.5 mm²
Type of connection Electromagnet		2 x butt connector similar to DIN 46341 (crushing zone 0,5 – 1,5 mm²)
Cable entry		3x M20x1,5
Installation position		Any
Contact opening		4 x >2 mm
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 DIN EN 81-1		

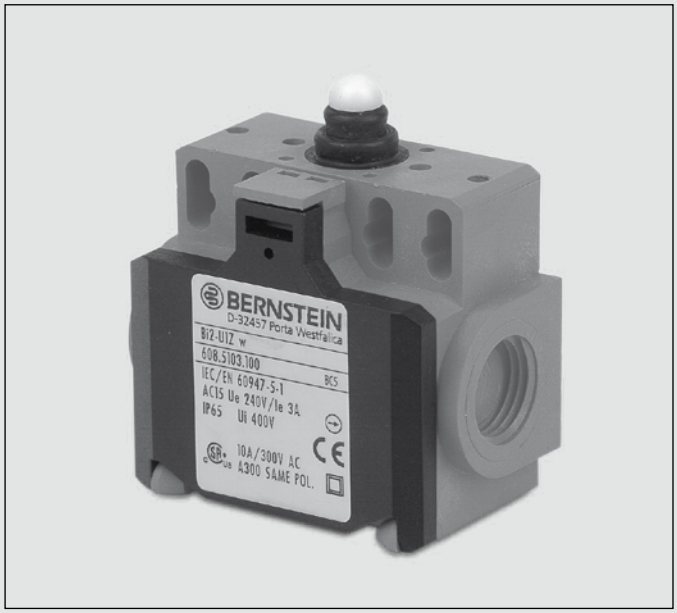
Product selection

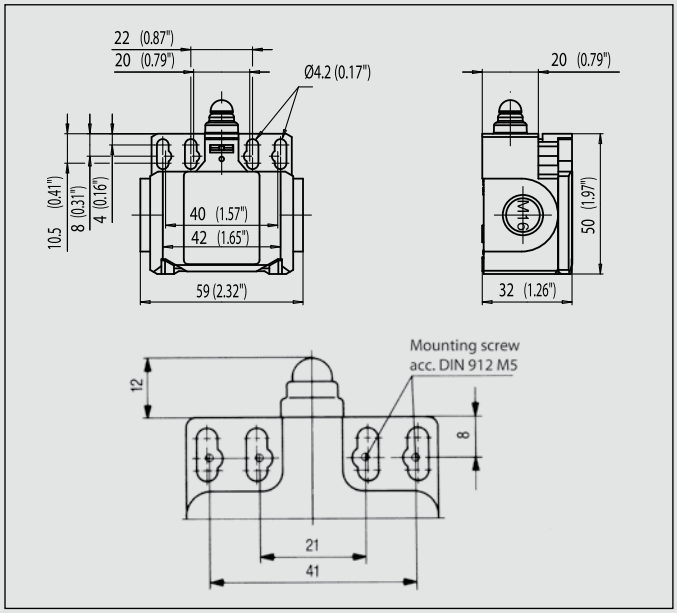
Supply voltage reset 24 Volt				
Switching operation	**Actuating force 3 N**		**Actuating force 6 N**	
1Ö/1S	-	-	-	-
2Ö	6010853002	SGS-SA2Z W F3 24 V	6010853001	SGS-SA2Z W F6 24 V

Supply voltage reset 230 Volt				
Switching operation	**Actuating force 3 N**		**Actuating force 6 N**	
1Ö/1S	-	-	6010153027	SGS-SU1Z W F6 230 V
2Ö	6010853004	SGS-SA2Z W F3 230 V	6010853003	SGS-SA2Z W F6 230 V

Notes

Bi2





Recommended use

Thanks to its two cable entries, this switch is ideal for use in series-connected monitoring facilities.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure and cover PA 6, self-extinguishing (UL-94 V0)
- Actuator can be repositioned by 4 x 90°
- Cable entry 2x M16 x 1.5
- Connection designation conforming to DIN EN 50013

Options

- Available with M12 connector
- AS interface variants available
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact9

Mounting

- Two M4 adjustment slots (distance between centres 22 mm)
- Two M4 adjustment slots (distance between centres 42 mm)
- Two M5 holes (distance between centre 21 mm) for safety applications
- Two M5 holes (distance between centre 41 mm) for safety applications without additional securing element

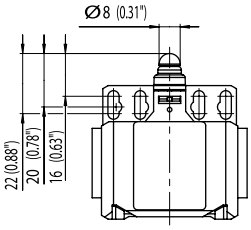
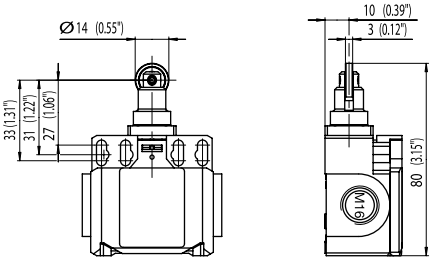
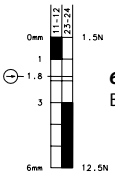
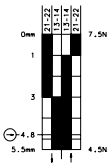
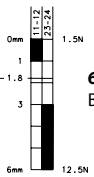
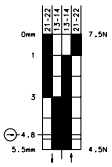
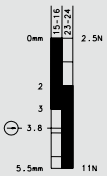
Installation advantages

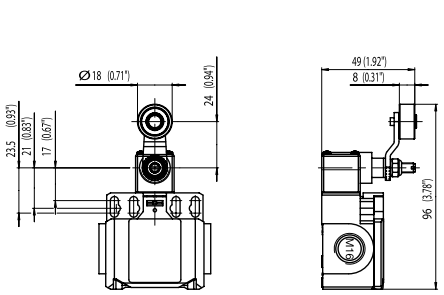
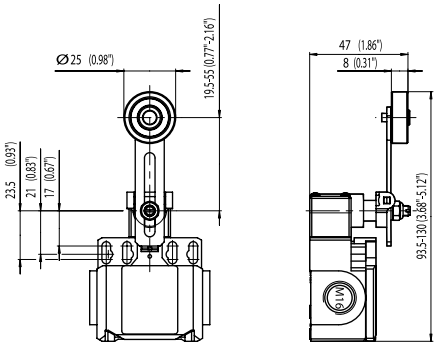
- Cover opening range 135° (cover can also be detached from hinge)
- Screw connections with self-lifting clamping plates
- Easy-action cover lock (close and press)
- Cover additionally secured with screw
- 2 cable entries for through-wiring

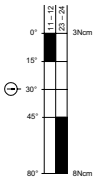
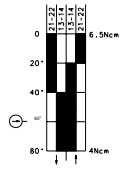
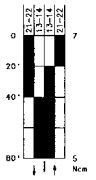
Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V AC
Utilization category		AC15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) ①		10 x 10^6 switching cycles
B10d (up to) ①		20 Mio.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		2 x M16 x 1,5
Protection class		IP65 conforming to EN 60529; DIN VDE 0470 T1
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

	W	RIW
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6085103100** BI2-U1Z W  **6085153107** BI2-SU1Z W 	**6085117101** BI2-U1Z RIW  **6085167108** BI2-SU1Z RIW 
2 NC contacts	**6085803116** BI2-A2Z W 	
2 NO contacts		
1 NC / 1 NO contact Overlapping	**6085303115** BI2-UV1Z W 	
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request)	**Special features/variants** (on request) ● With steel roller

	AH	AV
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6085135104** BI2-U1Z AH 	**6085185111** BI2-SU1Z AH 		**6085186112** BI2-SU1 AV 
2 NC contacts				
2 NO contacts				
1 NC / 1 NO contact Overlapping				
Approvals				

Replacement actuator: 3918351166

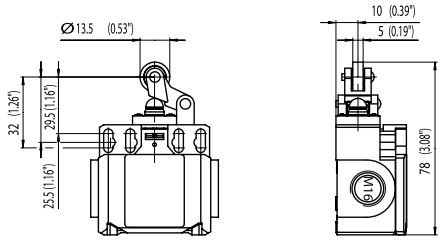
Replacement actuator: -

Special features/variants
(on request)

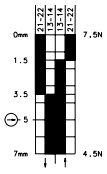
- Available with different actuating directions
- With steel roller
- Various roller diameters
- Cranked or straight lever
- Various lever lengths

Special features/variants
(on request)

HW RO13.5



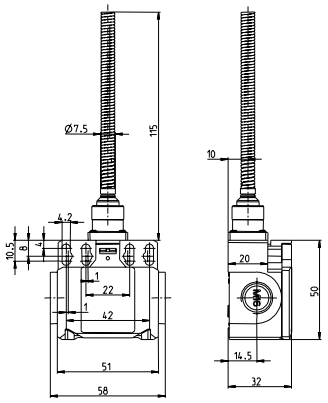
Slow-action	Snap-action
	6085171109 BI2-SU1Z HW RO13.5



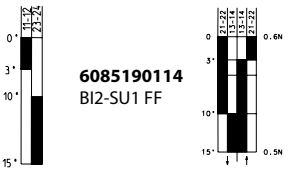
Replacement actuator: -

Special features/variants
(on request)

FF



Slow-action	Snap-action
6185140104 BI2-U1 FF	**6085190114** BI2-SU1 FF

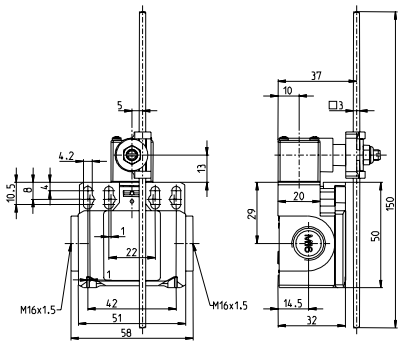


Replacement actuator: -

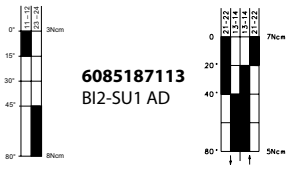
Special features/variants
(on request)

- Available with different spring lengths
- Spring rod
- Various spring versions

AD



Slow-action	Snap-action
6085137106 BI2-U1 AD	**6085187113** BI2-SU1 AD

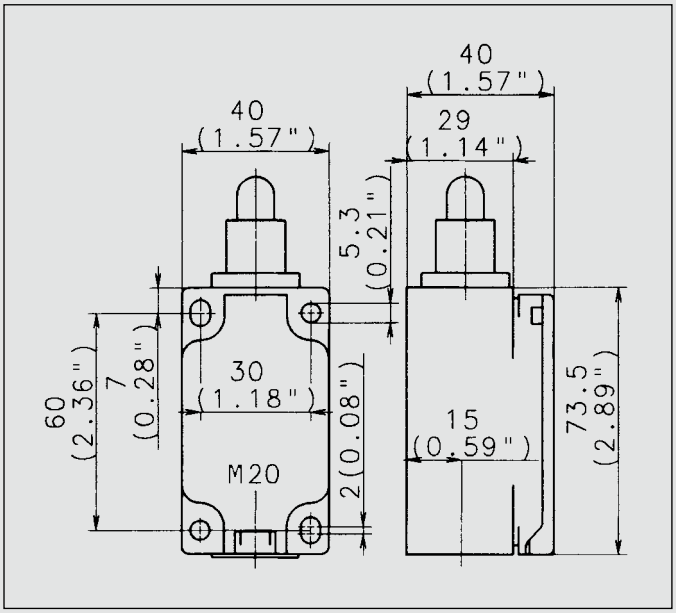


Replacement actuator: -

Special features/variants
(on request)

ENK





Recommended use

Thanks to its design and its metal actuator, the ENK limit switch is particularly suitable for applications requiring a sturdy safety switch made of plastic.

Product advantages

- Standard switch conforming to DIN EN 50041
- Standard actuator conforming to DIN EN 50041, Type A, B, C, D
- Protection class IP65 to VDE 0470 T1
- Enclosure and cover PA 6, (UL-94-V0)
- Actuator can be repositioned by 4 x 90°
- Cable entry M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Metal actuators for high loads

Options

- Available with M12 connector
- AS interface variants available
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 3 NC, overlapping contacts
- Latching function on request
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

Mounting

- 2 adjustment slots for M5 screws
- 2 holes for M5 mounting screws in safety applications

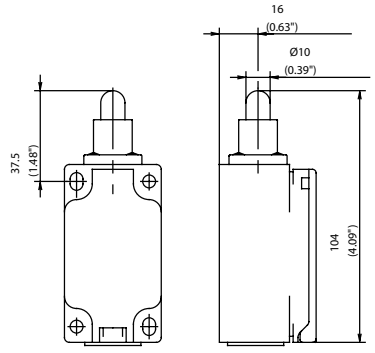
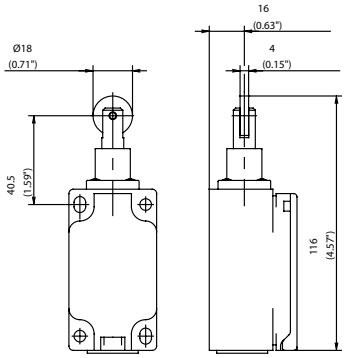
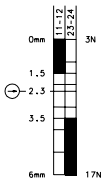
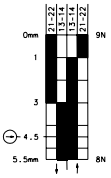
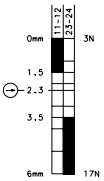
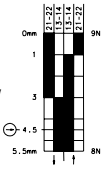
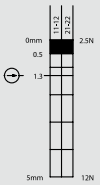
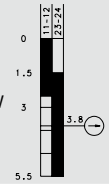
Installation advantages

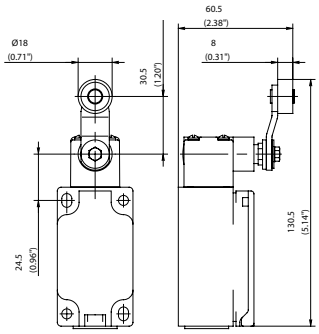
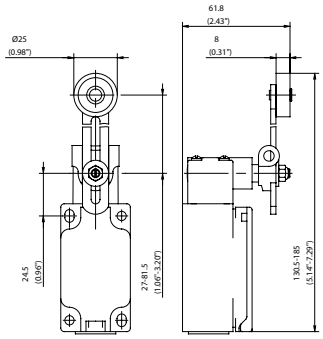
- Snap-on cover can be released with screwdriver
- Cover opening range 150° (cover can also be detached from hinge)
- Cover protects switching element during installation
- Screw connections with self-lifting clamping plates
- Easy-action cover lock (close and press

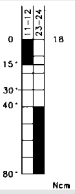
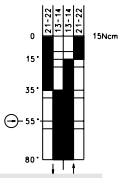
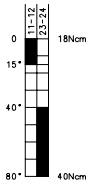
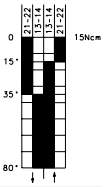
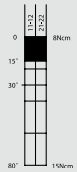
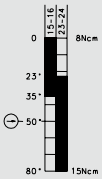
Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current (up to) ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) ①		10 x 10^6 switching cycles
B10d (up to) ①		20 Mio.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Cable entry		1 x M20 x 1.5 ≈ 0.15 kg
Protection class		IP65 onforming to EN 60529; DIN VDE 0470 T1
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

	IW (Form B)	RIW (Form C)
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6081102001** ENK-U1Z IW  **6081152007** ENK-SU1Z IW 	**6081117002** ENK-U1Z RIW  **6081167008** ENK-SU1Z RIW 
2 NC contacts		**6081817281** ENK-A2Z RIW 
2 NO contacts		
1 NC / 1 NO contact Overlapping		**6081317307** ENK-UV1Z RIW 
Approvals		
	Replacement actuator: 3918020660	**Replacement actuator: 3918170661**
	Special features/variants (on request) ● Available with black enclosure and following contacts: 3 NC contacts	**Special features/variants** (on request) ● Available for high temperature range and following contacts: 3 NC contacts

	AHS-V (Form A)	AV
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6081135003** ENK-U1Z AHS-V 	**6081185009** ENK-SU1Z AHS-V 	**6081136012** ENK-U1 AV 	**6081186018** ENK-SU1 AV 
2 NC contacts	**6081835323** ENK-A2Z AHS-V 			
2 NO contacts				
1 NC / 1 NO contact Overlapping	**6081335006** ENK-UV1Z AHS-V 			
Approvals				

Replacement actuator: -

Replacement actuator: -

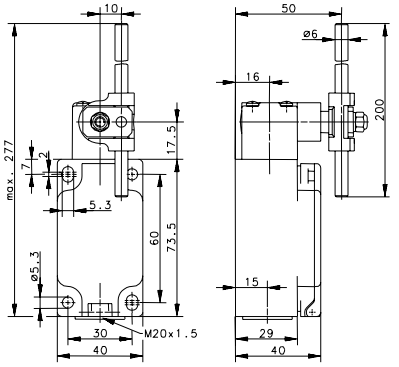
Special features/variants
(on request)

- Available with black enclosure
- With 50 mm diameter rubber roller and following contacts: 3 NC contacts

Special features/variants
(on request)

- Available with different lever lengths and roller diameters
- With 50 mm diameter rubber roller
- With roller over switch

AD (Form D)



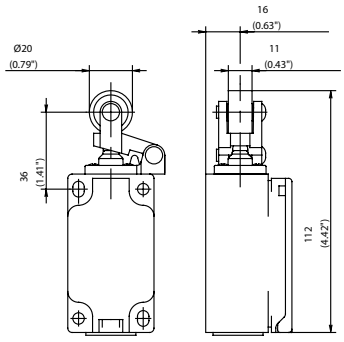
Slow-action	Snap-action
6081137011 ENK-U1 AD	**6081187017** ENK-SU1 AD

Replacement actuator: -

Special features/variants
(on request)

- Available with various actuator directions and actuator lengths

HW RO20



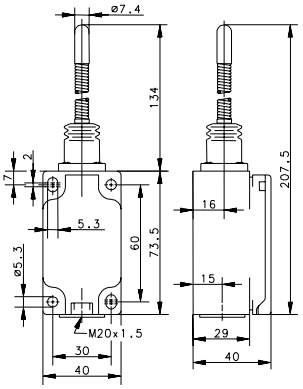
Slow-action	Snap-action
6081121095 ENK-U1Z HW RO20	**6081171096** ENK-SU1Z HW RO20

Replacement actuator: -

Special features/variants
(on request)

- Available with black enclosure and various roller diameters

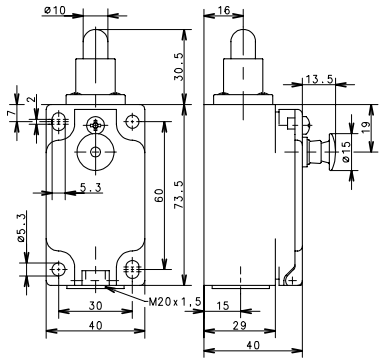
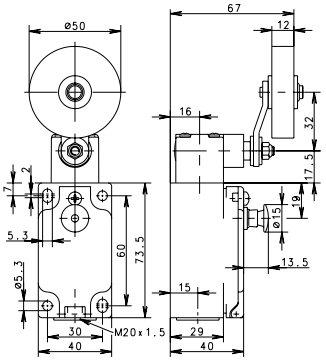
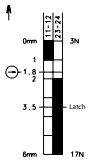
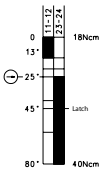
FF



Slow-action	Snap-action
	6081190045 ENK-SU1 FF

Replacement actuator: -

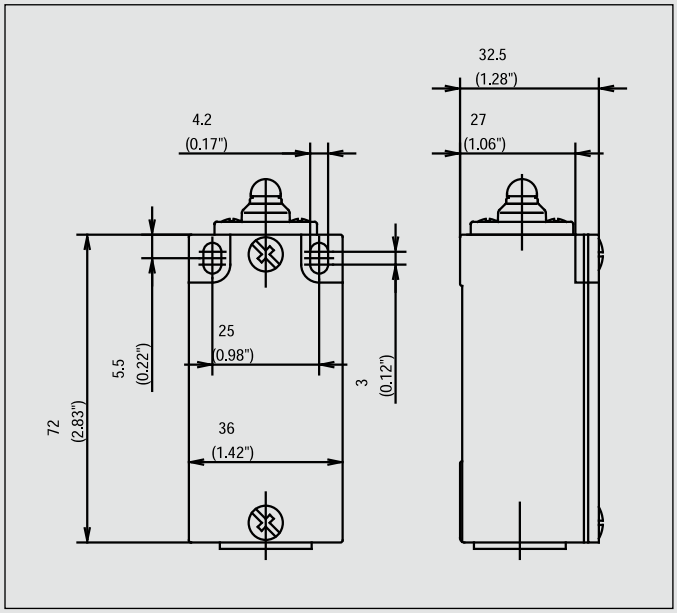
Special features/variants
(on request)

	IW RAST	AHSGU RAST RO50
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6181102137** ENK-U1Z IW RAST 	**6181135251** ENK-U1Z AHSGU RAST RO50 
2 NC contacts		
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request)	**Special features/variants** (on request)

Notes

GC





Recommended use

Thanks to its compact design, this metal-enclosed switch is ideally suited for virtually all safety and position monitoring applications.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminium pressure die-casting
- Cover: Sheet aluminium
- Actuator can be repositioned by 4 x 90°
- Cable entry M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Metal actuators for high loads
- Graduated adjustment of AH lever
- Selectable direction-dependent contact-making of AH actuator (basic setting: contact-making both sides)

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC/2 NO, 2 NC, overlapping contacts
- All NC contacts with ⊣in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)
- Latching function on request

Mounting

- 2 adjustment slots for M4 screws (for safety applications with blind hole for ø 4.0 mm fitted pin in enclosure base or enclosure with holes for M5)

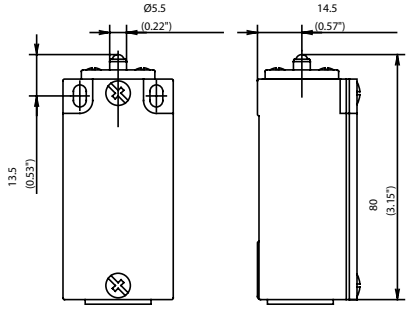
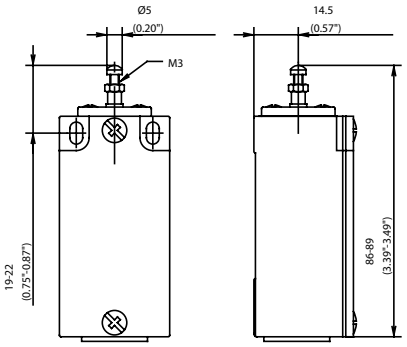
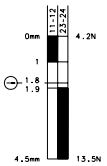
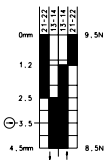
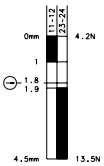
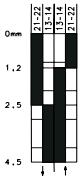
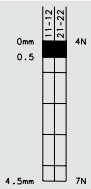
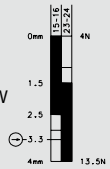
Installation advantages

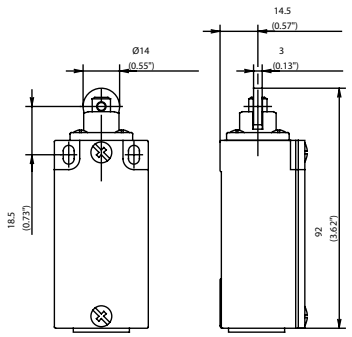
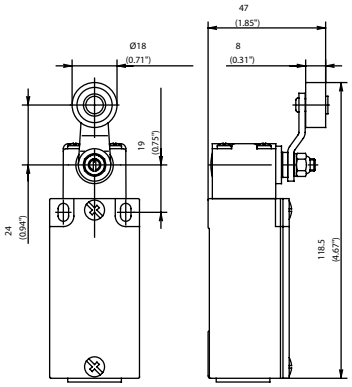
- Screw connections with self-lifting clamping plates
- Captive cover screws
- Easy-to-change switching system thanks to snap-in retainer
- Finely adjustable switching point with adjusting screw

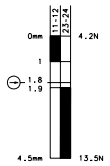
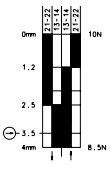
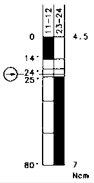
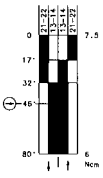
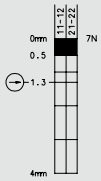
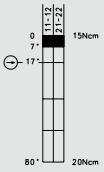
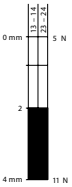
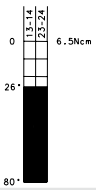
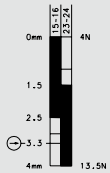
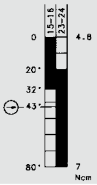
Technical data

Electrical data		
Rated insulation voltage (up to) ①	U_i max.	400 V AC
Conventional thermal current (up to ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category (up to) ①		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminium pressure die-casting
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) ①		10 x 10^6 switching cycles
B10d (up to) ①		20 Mill.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		1 x M20 x 1.5
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

	IW	STIW
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6021102001** GC-U1Z IW  **6021352620** GC-SU1Z IW 	**6021105015** GC-U1Z STIW  **6021155017** GC-SU1Z STIW 
2 NC contacts	**6021802189** GC-A2Z IW 	
2 NO contacts		
1 NC / 1 NO contact Overlapping		**6021305016** GC-UV1Z STIW 
Approvals		
	Replacement actuator: 3912030546	**Replacement actuator: 3912050523**
	Special features/variants (on request)	**Special features/variants** ● Actuator length adjustable with adjusting screw

	RIW	AH
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6021117029** GC-U1Z RIW 	**6021367626** GC-SU1Z RIW 	**6021135102** GC-U1Z AH 	**6021385634** GC-SU1Z AH 
2 NC contacts	**6021817172** GC-A2Z RIW 		**6121835833** GC-A2Z AHS See separate datasheet 	
2 NO contacts	**6021817154** GC-E2 RIW 		**6021835160** GC-E2 AH 	
1 NC / 1 NO contact Overlapping	**6021317030** GC-UV1Z RIW 		**6021335133** GC-UV1Z AH 	
Approvals				

Replacement actuator: 3912170518

Replacement actuator: 3912350722

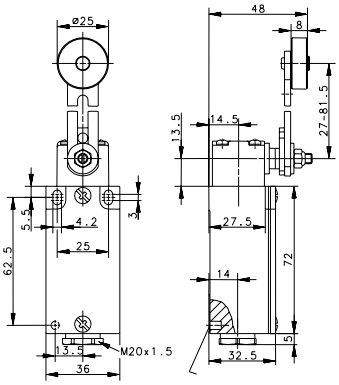
Special features/variants
(on request)

- Available for high temperature range and following contacts:
  2 NC /1 NO contact
  2 NC /2 NO contact
  (larger enclosure)

Special features/variants
(on request)

- Available with various roller diameters, cranked or straight lever and with various lever lengths
- With roller over switch and with following contacts:
  2 NC /2 NO contact
  (larger enclosure)

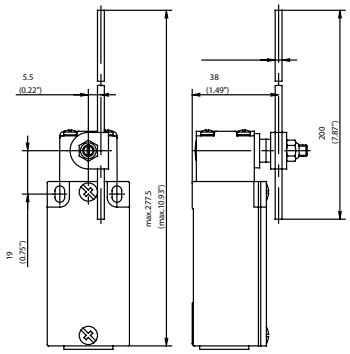
AV



Slow-action	Snap-action
6021136104 GC-U1 AV	**6021186118** GC-SU1 AV

Replacement actuator: 3912360723

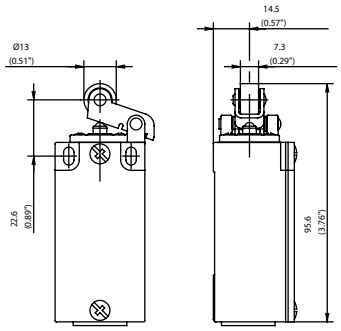
AD



Slow-action	Snap-action
6021137103 GC-U1 AD	**6021187125** GC-SU1 AD

Replacement actuator: 3912370724

HIW



Slow-action	Snap-action
6021120057 GC-U1Z HIW	**6021370629** GC-SU1Z HIW
6021820175 GC-A2Z HIW	
6021820157 GC-E2 HIW	
6021320058 GC-UV1Z HIW	

Replacement actuator: 3912200552

Special features/variants
(on request)

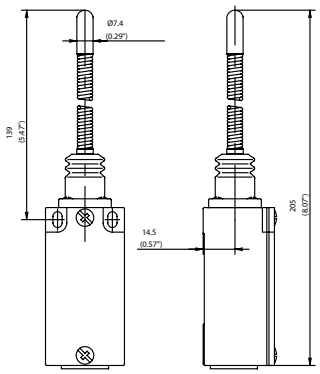
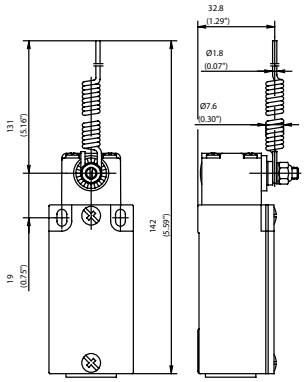
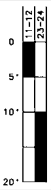
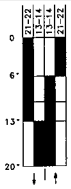
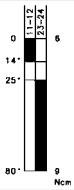
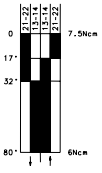
- Various roller diameters
- Different lever lengths
- With roller over switch and with following contacts:
  2 NC /2 NO contact

Special features/variants
(on request)

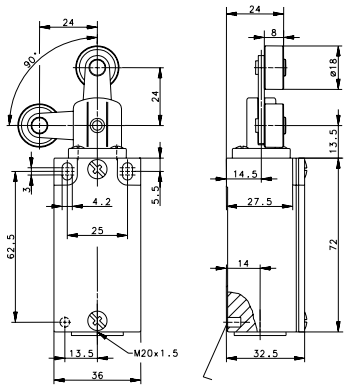
- Available with various actuator lengths and actuator directions
- With following contacts:
  2 NC /1 NO with overlap
  (larger enclosure)

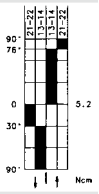
Special features/variants
(on request)

- Available with different actuating directions
- Available with steel roller
- With following contacts:
  2 NC /2 NO contact
  1 NC /2 NO with overlap
  (larger enclosure)

	FF	AF
		
Switching operation	**Slow-action** / **Snap-action**	**Slow-action** / **Snap-action**
1 NC / 1 NO contact	**6021140476** GC-U1 FF  **6021190100** GC-SU1 FF 	**6021139106** GC-U1 AF  **6021189128** GC-SU1 AF 
2 NC contacts		
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: 3912400510	**Replacement actuator: 3912390725**
	Special features/variants (on request) ● Different spring lengths ● Different spring versions or spring rod	**Special features/variants** (on request) Available with various actuator lengths and actuator directions

DR



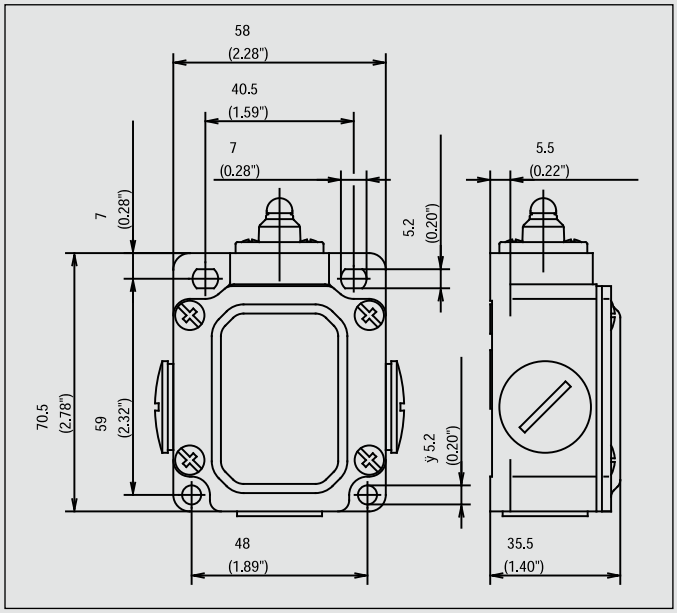
Slow-action	Snap-action	
	6021191099 GC-SU1Z DR	

Replacement actuator: 3912410593

Special features/variants
(on request)

SN2





Recommended use

With its three cable entries and spacious connection area, the SN2 limit switch is the optimum solution for through-wiring or even branching off electrical circuits.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminium pressure die-casting
- Cover: Sheet aluminium
- Actuator can be repositioned by 4 x 90°
- Cable entry 3x M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Metal actuators for high loads
- Graduated adjustment of AH lever
- Selectable direction-dependent contact-making of AH actuator (basic setting: contact-making both sides)

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

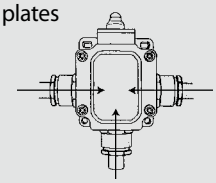
- Slow-action and snap-action contacts
- Versions: 1 NC / 1NO, 2 NC
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)
- Latching function on request

Mounting

- 2 adjustment slots for M5 screws
- 2 addition holes for M5 mounting screws in safety applications

Installation advantages

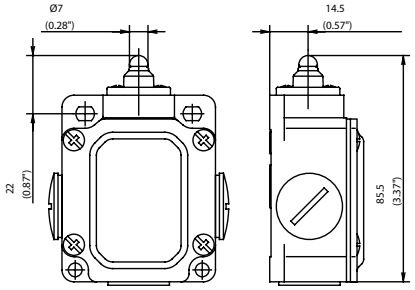
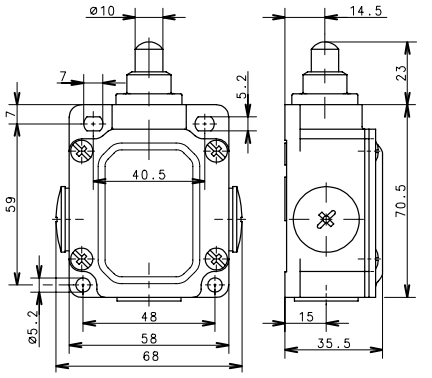
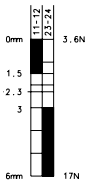
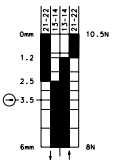
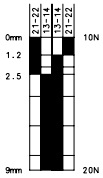
- 3 cable entries for through-wiring
- Generously dimensioned connection space
- Screw connections with self-lifting clamping plates
- Easy-to-change switching system thanks to snap-in retainer
- Finely adjustable switching point with adjusting screw

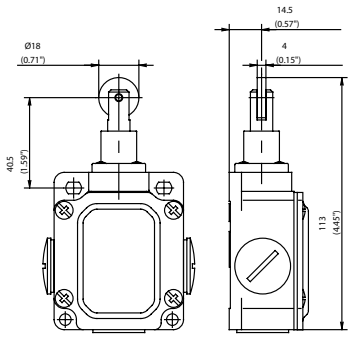
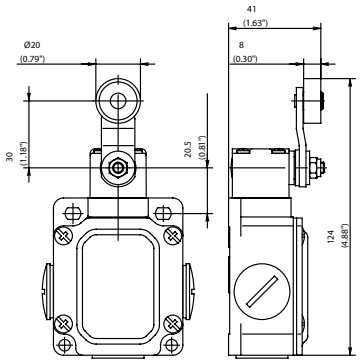
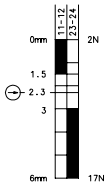
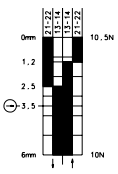
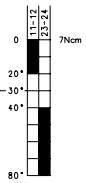
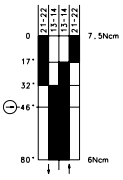
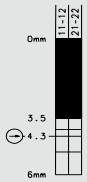


Technical data

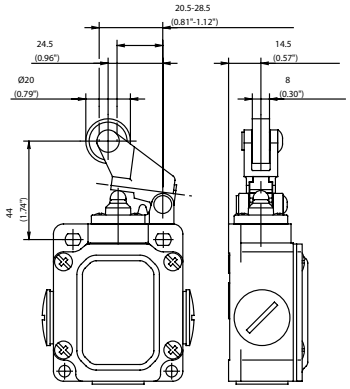
Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, A300, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminium pressure die-casting
Ambient temperature		-30 °C to +80 °C
Mechanical service life		10 x 10^6 switching cycles
B10d (up to) ①		20 Mill.
Switching frequency		max. 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		3 x M20 x 1.5
Protection class		IP65 conforming to EN 60529, DIN VDE 0470 T1
Standards		
conforming to EN 60947-1; EN 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

	W	LIW
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6033103023** SN2-U1Z W  **6033353016** SN2-SU1Z W 	**6033194022** SN2-SU1 LIW 
2 NC contacts		
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: 3913030537	**Replacement actuator: 3912440536**
	Special features/variants (on request)	**Special features/variants** ● Telescopic plunger, particularly long actuation travel of 9 mm

	RIW	AHS
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6033117025** SN2-U1Z RIW  **6033367017** SN2-SU1Z RIW 	**6033135002** SN2-U1Z AHS  **6033385018** SN2-SU1Z AHS 
2 NC contacts	**6033818038** SN2-A2Z RIW 	
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: 3918170587	**Replacement actuator: 3913351913**
	Special features/variants (on request) ● Available with different actuating directions ● With latching function	**Special features/variants** (on request) ● Available with different actuating directions

DGHW



Slow-action	Snap-action
6033121005 SN2-U1Z DGHW	**6033371004** SN2-SU1Z DGHW

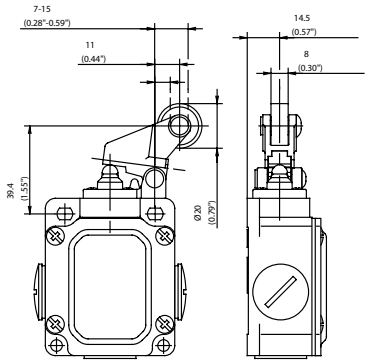


Replacement actuator: 3918211656

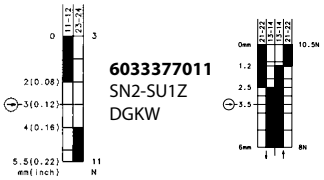
Special features/variants
(on request)

- Available with different actuating directions

DGKW



Slow-action	Snap-action
6033127010 SN2-U1Z DGKW	**6033377011** SN2-SU1Z DGKW

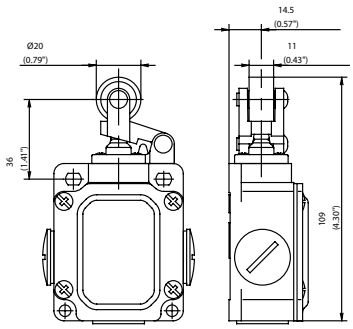


Replacement actuator: 3918271655

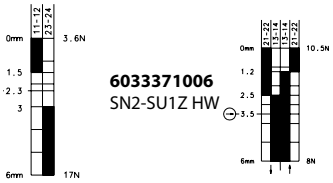
Special features/variants
(on request)

- Available with different actuating directions

HW



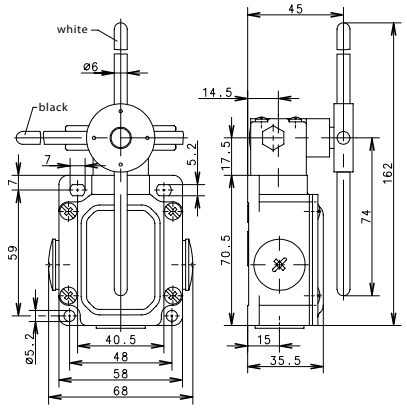
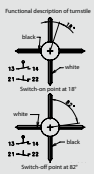
Slow-action	Snap-action
6033121007 SN2-U1Z HW	**6033371006** SN2-SU1Z HW



Replacement actuator: 3913210553

Special features/variants
(on request)

- Available with different actuating directions

	AD4K
	
Switching operation	**Slow-action** **Snap-action**
1 NC / 1 NO contact	
2 NC contacts	**6133887022** SN2-SA2Z AD4K 
2 NO contacts	
1 NC / 1 NO contact **Overlapping**	
Approvals	

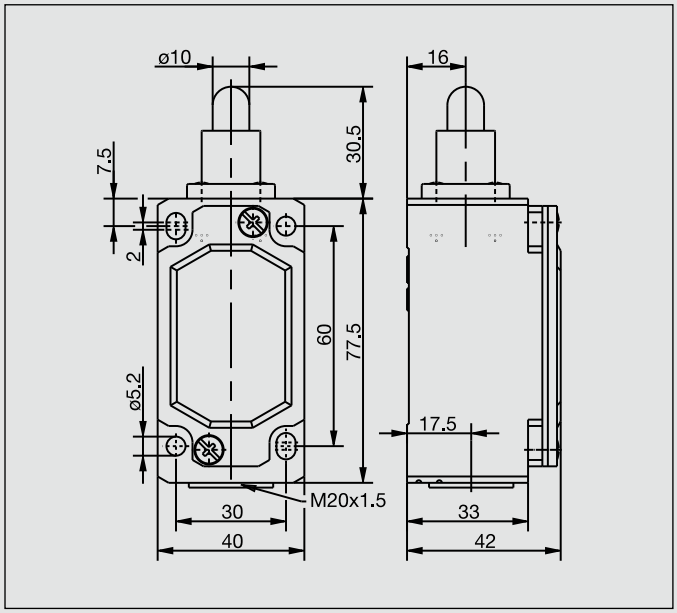
Replacement actuator: -

Special features/variants
(on request)

Notes

ENM2





Recommended use

With its standard enclosure, the ENM2 limit switch can be used universally in all industrial and safety applications.

Product advantages

- Standard switch conforming to DIN EN 50041
- Standard actuator conforming to DIN EN 50041, Type A, B, C, D
- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminium pressure die-casting
- Cover: Sheet aluminium
- Actuator can be repositioned by 4 x 90°
- Cable entry M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Metal actuators for high loads

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC /1NO, 2 NC, overlapping contacts
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

Mounting

- Two M5 adjustment screws with slots
- Two M5 screws for safety applications without additional securing element

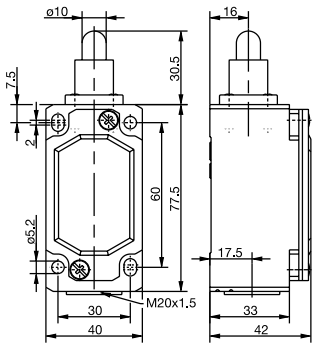
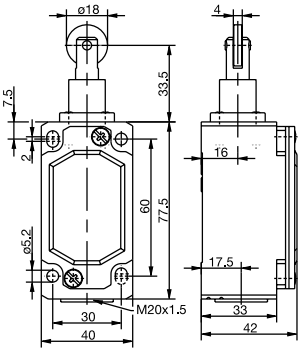
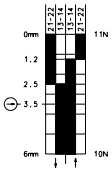
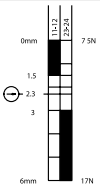
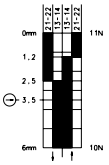
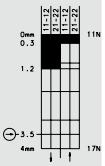
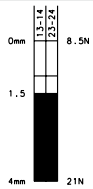
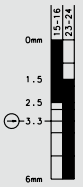
Installation advantages

- Screw connections with self-lifting clamping plates
- Easy-to-change switching system thanks to snap-in retainer (depending on type)
- Finely adjustable switching point with adjusting screw
- Captive cover screws
- Enlarged connection space
- Earthing surface on same level as switching system

Technical data

Electrical data		
Rated insulation voltage (up to) ①	U_i max.	400 V AC
Conventional thermal current (up to) ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category (up to) ①		A300, AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminium pressure die-casting
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) ①		10 x 10^6 switching cycles
B10d (up to) ①		20 Mill.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Cable entry		1 x M20 x 1.5
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

	IW (Form B)	RIW (Form C)
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6087102001** ENM2-U1Z IW  **6087352002** ENM2-SU1Z IW 	**6087117004** ENM2-U1Z RIW  **6087367005** ENM2-SU1Z RIW 
2 NC contacts	**6087802003** ENM2-A2Z IW 	**6087817006** ENM2-A2Z RIW  **6087867051** ENM2-SA2Z RIW 
2 NO contacts	**6087802021** ENM2-E2 IW 	
1 NC / 1 NO contact Overlapping	**6087302027** ENM2-UV1Z IW 	
Approvals		

Replacement actuator: 3918020584

Special features/variants
(on request)

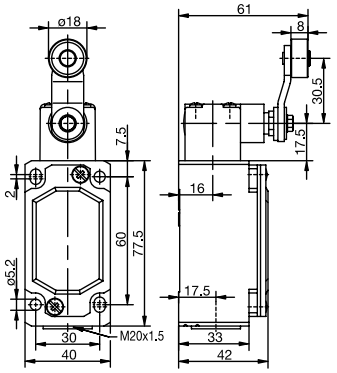
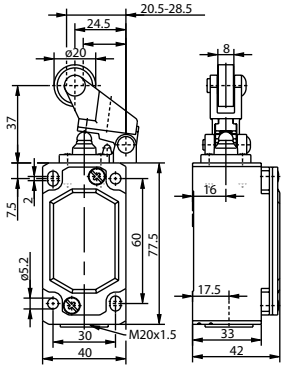
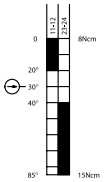
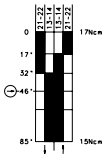
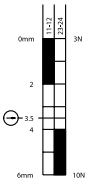
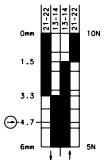
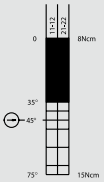
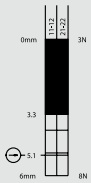
- Also available with following contacts:
  2 NC /1 NO with overlap
  1 NC /2 NO with overlap

Replacement actuator: 3918170587

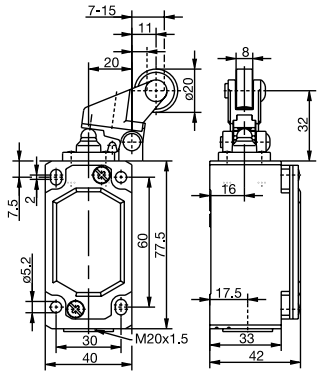
Special features/variants
(on request)

- Available with different actuating directions
- High temperature range
- Various roller diameters
- Also available with following contacts:
  2 NC /1 NO with overlap
  1 NC /2 NO with overlap

ENM2

	AHS-V (Form A)	DGHW RO20
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6087135013** ENM2-U1Z AHS-V  **6087385014** ENM2-SU1Z AHS-V 	**6087121007** ENM2-U1Z DGHW RO20  **6087371008** ENM2-SU1Z DGHW RO20 
2 NC contacts	**6087835015** ENM2-A2Z AHS-V 	**6087821009** ENM2-A2Z DGHW RO20 
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: 3918350729	**Replacement actuator: 3918211656**
	Special features/variants (on request) ● Available with different actuating directions	**Special features/variants** (on request) ● Available with different actuating directions

DGKW RO20



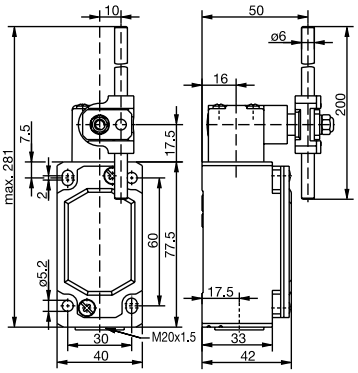
Slow-action	Snap-action
6087127010 ENM2-U1Z DGKW RO20	**6087377011** ENM2-SU1Z DGKW RO20

Replacement actuator: 3918271655

Special features/variants
(on request)

- Available with different actuating directions

AD (Form D)



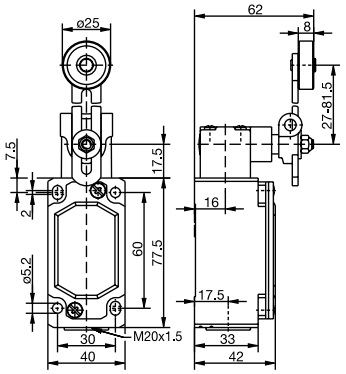
Slow-action	Snap-action
6087137018 ENM2-U1 AD	**6087387019** ENM2-SU1 AD

Replacement actuator: 3918370731

Special features/variants
(on request)

- Available with various actuator lengths and actuator directions

AV

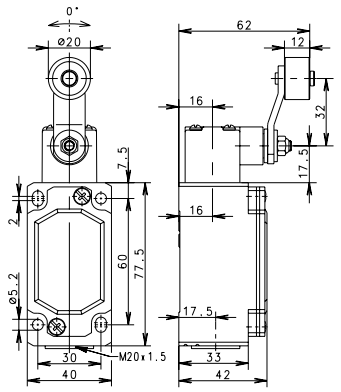
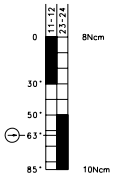


Slow-action	Snap-action
6087136016 ENM2-U1 AV	**6087386017** ENM2-SU1 AV
6187836060 ENM2-E2 AV	

Replacement actuator: 3918360730

Special features/variants
(on request)

- Available with different actuating directions
- Various roller diameters
- Different lever lengths
- With roller over switch

	AHZ
	
Switching operation	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6087135030** ENM2-U1Z AHZ 
2 NC contacts	
2 NO contacts	
1 NC / 1 NO contact Overlapping	
Approvals	

Replacement actuator: -

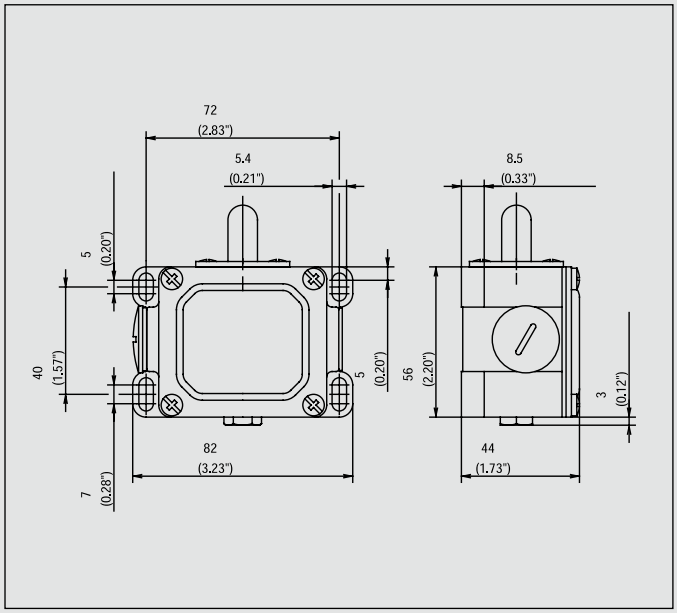
Special features/variants

- Positively opening action, forward and return AHZ
- For special safety applications, the positive opening action of the normally-closed contacts takes place both in forward (moving in one direction) as well as in return (moving back to home position) direction
- For personal protection applications movement of the roller must be restrained in a guide block in both directions

Notes

D





Recommended use

Heavy duty enclosure for harsh operating conditions with particularly tough design of actuator and switching systems.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminium pressure die-casting
- Cover: Sheet aluminium
- Actuator can be repositioned by 4 x 90° (depending on type)
- Cable entries 2x M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Sturdy contacts
- Hard wearing guide bushes

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC / 1NO, 2 NC, 2 NO, 3 NC, 3 NO, overlapping contacts
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Latching function on request

Mounting

- 4 slots for M5 screws

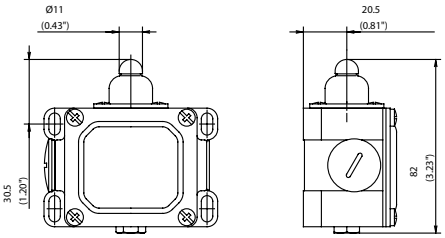
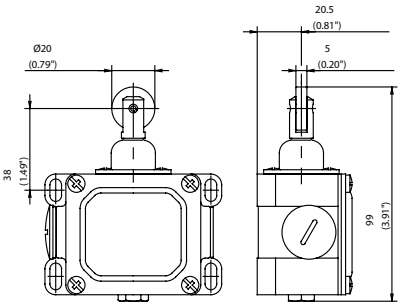
Installation advantages

- 2 cable entries for through-wiring
- Generously dimensioned connection space
- Captive cover screws

Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current (up to) ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminium pressure die-casting
Ambient temperature		-30 °C to +80 °C
Mechanical service life		10 x 10^6 switching cycles
B10d		20 Mill.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		2 x M20 x 1.5
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

	W	RW
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6041103002** D-U1 W	**6041153156** D-SU1 W	**6041118229** D-U1Z RW	**6041168162** D-SU1 RW
2 NC contacts	**6041803090** D-A2 W		**6041818741** D-A2Z RW	
2 NO contacts	**6041803046** D-E2 W		**6041818052** D-E2 RW	
1 NC / 1 NO contact Overlapping	**6041303134** D-UV1Z W		**6041318140** D-UV1Z RW	
Approvals				

Replacement actuator: -

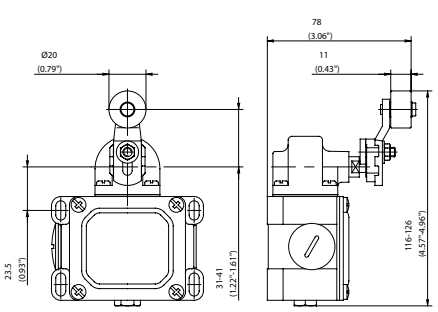
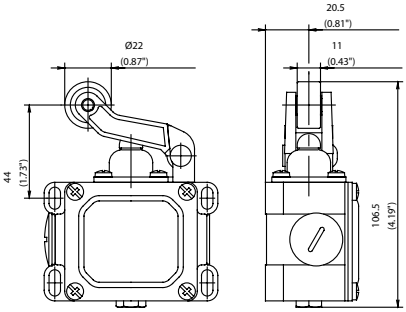
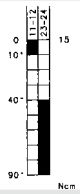
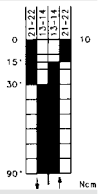
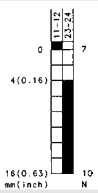
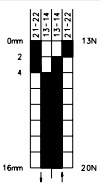
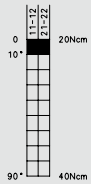
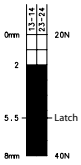
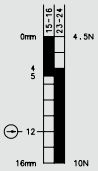
Replacement actuator: -

Special features/variants
(on request)

- Also available with following contacts:
  3 NC contacts
  3 NO contacts
  2 NC / 2 NO contact
  (larger enclosure)

Special features/variants
(on request)

- Available for high temperature range
- With following contacts:
  3 NC contacts
  3 NO contacts
  2 NC / 2 NO contact
  (larger enclosure)

	AH	HW
		
Switching operation	**Slow-action** / **Snap-action**	**Slow-action** / **Snap-action**
1 NC / 1 NO contact	**6041135019** D-U1 AH  **6041185173** D-SU1 AH 	**6041121010** D-U1 HW  **6041171164** D-SU1 HW 
2 NC contacts	**6041835107** D-A2 AH 	
2 NO contacts	**6141835709** D-E2 AH 	
1 NC / 1 NO contact Overlapping		**6041321142** D-UV1Z HW 
Approvals		
	Replacement actuator: 3914350924	**Replacement actuator: 3914211065**

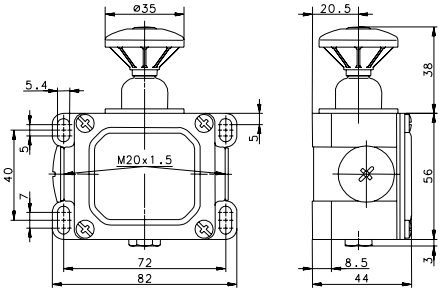
Special features/variants
(on request)

- With steel roller, various roller diameters
- Cranked or straight lever
- Different lever lengths
- Also available with following contacts:
  3 NC contacts
  2 NC / 2 NO contact

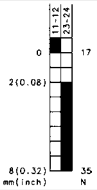
Special features/variants
(on request)

- Available for high temperature range
- With following contacts:
  3 NC contacts
  2 NC / 2 NO contact
  (larger enclosure)

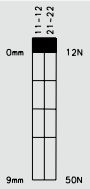
PW



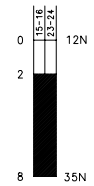
Slow-action



6041113006
D-U1 PW



6041813835
D-A2Z PW



6041813050
D-E2 PW

Replacement actuator: -

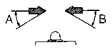
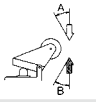
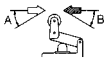
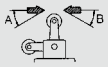
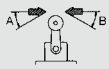
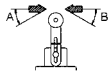
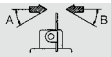
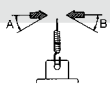
Special features/variants
(on request)

- Also available with following contacts:
  3 NC contacts
  3 NO contacts
  2 NC / 2 NO contact
  (larger enclosure)

Overview of Actuators

Actuator	Designation	Collar iw = internal w = external	Plastic series COMBI	TINY 2	I88	BIGGY 2	ENK	Metal series GC I	SN 2	ENM 2	D I
Plunger	–	iw	–	–	–	–	●	–	–	–	–
	–	w	–	●	●	●	–	–	–	–	–
	–	IP30	●	–	–	–	–	–	–	–	–
	–	IP43	–	–	–	–	–	–	–	–	○
Ball	KU	iw	–	–	–	–	–	○	○	○	–
Mushroom head	P	w	–	–	–	–	–	–	–	–	●
Telescopic plunger	L	iw	–	–	–	–	–	●	○	○	–
Adjustable plunger	ST	w	–	–	–	–	–	●	○	○	●
	ST	iw	–	–	–	–	–	●	○	○	–
	ST	IP30	●	–	–	–	–	–	–	–	–
Button	K	IP30	●	–	–	–	–	–	–	–	–
Roller	R	IP30	●	–	–	–	–	–	–	–	–
	R	iw	–	●	○	●	●	●	●	●	–
		w	–	–	–	–	–	–	–	–	●
		IP43	–	–	–	–	–	–	–	–	○
Roller, long	R ... L	iw	–	○	●	○	–	–	–	–	–
Roller, short	R ... K	iw	–	○	●	○	–	–	–	–	–
Lever	H	IP30	●	–	–	–	–	–	–	–	–
	H	w	–	●	●	●	●	–	–	–	–
	H, HT	iw	–	–	–	–	–	●	○	○	–
Lever, long	H/D-WI	w	–	–	–	–	–	●	●	○	●
	HL	iw	–	–	–	–	–	●	○	○	–
	HL/D-H	w	–	–	–	–	–	●	○	○	●
	D – H	IP43	–	–	–	–	–	–	–	–	○
Pivot joint, lever	DGH	w	–	○	●	○	○	○	●	●	–
Pivot joint, cranked lever	DGK	w	–	○	●	○	○	○	●	●	–
Cranked lever	KN	iw	–	–	–	–	–	●	○	○	–
	KN	w	–	○	●	○	–	●	○	○	○
Cranked lever link	KG	iw	–	–	–	–	–	●	○	○	–
	KG	w	–	○	●	○	–	●	○	○	–
Double roller	DR	iw	–	–	–	–	–	●	○	○	–
Spring feeler	FF	iw	–	–	–	–	–	●	●	○	–
	FF	w	–	●	○	●	●	–	–	–	–
Spring feeler, long	FFL	w	–	–	–	–	–	●	○	○	–
Spindle-mounted lever	AH	iw	–	●	●	●	–	●	○	○	●
Spindle-mounted lever, star clamping	AHS	iw	–	●	●	●	–	○	●	○	–
Spindle-mounted lever, fine spline	AHS-V	iw	–	–	–	–	●	○	●	●	–
Spindle-mounted lever for positive opening in forward/return direction	AHZ	iw	–	–	–	–	–	○	○	●	–
Spindle-mounted lever, adjustable	AV	iw	–	●	●	●	●	●	○	●	●
Spindle-mounted lever, wire	AD	iw	–	●	●	●	●	●	○	●	○
Spindle-mounted lever, spring	AF	iw	–	○	●	○	○	●	●	○	–

 ● Catalogue type (stock type or delivery time as per agreement) ○ Technical possible from modular system (from system layout) – Not included in design

Approach direction	Plunger direction	Approach speed/approach angle							Remarks
			m/s	0,1	0,5	1	2	5	
		Metal	A	20°	20°	10°	5°	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
			B	20°	20°	10°	5°	–	
		Plastic	A	20°	20°	10°	5°	–	
			B	20°	20°	10°	5°	–	
		Metal	A	30°	5°	–	–	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction** ● Plunger tip adjustable in ST version
			B	30°	5°	–	–	–	
		Plastic	A	30°	5°	–	–	–	
			B	30°	5°	–	–	–	
		Metal	A	30°	30°	20°	10°	5°	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
			B	30°	30°	20°	10°	5°	
		Plastic	A	30°	30°	20°	10°	5°	
			B	30°	30°	20°	10°	5°	
		Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
			B	20°	20°	10°	–	–	
		Plastic	A	–	–	–	–	–	
			B	40°	40°	30°	20°	10°	
									
									
		Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction** ● Adjustable upper section of actuator with roller
			B	20°	20°	10°	–		
		Plastic	A	–	–	–	–	–	
			B	40°	40°	30°	20°	10°	
		Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel/force refer to **90° to plunger direction** ● Adjustable upper section of actuator with roller
			B	30°	30°	20°	10°	–	
		Plastic	A	–	–	–	–	–	
			B	40°	40°	40°	30°	20°	
		Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel/force refer to **90° to plunger direction**
			B	30°	30°	20°	10°	–	
		Plastic	A	–	–	–	–	–	
			B	40°	40°	40°	30°	20°	
		Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
			B	40°	40°	30°	20°	–	
		Plastic	A	–	–	–	–	–	
			B	40°	40°	40°	30°	20°	
		Metal	A	45°	45°	40°	30°	–	● The values shown in the switching diagrams for switching travel/force refer **to direction of rotation** ● Switch position retained after actuation
			B	45°	45°	40°	30°	–	
		Plastic	A	–	–	–	–	–	
			B	–	–	–	–	–	
		Metal	A	60°	50°	45°	–	–	● The values shown in the switching diagrams for switching angle/actuation torque refer **to any approach direction** ● Not suitable for personal protection
			B	–	–	–	–	–	
		Plastic	A	20°	20°	10°	5°	–	
			B	–	–	–	–	–	
		Metal	A	45°	45°	45°	40°	30°	● The values shown in the switching diagrams for switching angle/actuation torque refer **to direction of rotation** ● Graduated adjustment of roller lever on spindle with 180° repositioning
			B	45°	45°	45°	40°	30°	
		Plastic	A	45°	45°	45°	40°	30°	
			B	45°	45°	45°	40°	30°	
		Metal	A	45°	45°	45°	40°	30°	● The values shown in the switching diagrams for switching angle/actuation torque refer **to direction of rotation** ● Graduated adjustment of roller lever on spindle with 180° repositioning ● Not suitable for personal protection
			B	45°	45°	45°	40°	30°	
		Plastic	A	45°	45°	45°	40°	30°	
			B	45°	45°	45°	40°	30°	
		Metal	A	45°	45°	40°	30°	20°	● The values shown in the switching diagrams for switching angle/actuation torque refer **to direction of rotation** ● Graduate adjustment of rod about pivot axis and in longitudinal direction
			B	45°	45°	40°	30°	20°	
		Plastic	A	45°	45°	40°	30°	20°	
			B	45°	45°	40°	30°	20°	
		Metal	A	45°	45°	40°	30°	20°	● The values shown in the switching diagrams for switching angle/actuation torque refer **to direction of rotation** ● Graduated adjustment of spring about pivot axis ● Not suitable for personal protection
			B	45°	45°	40°	30°	20°	
		Plastic	A	45°	45°	40°	30°	20°	
			B	45°	45°	40°	30°	20°	

Limit Switch - Spindle-Mounted Lever

Switching devices with spindle-mounted lever enclosure

On delivery, contact-making takes place in both pivot directions corresponding to the switching diagrams.

Adaptation of basic actuator setting on spindle

The basic setting of the device can be varied in steps and fixed for exact positioning:

- AH, AHS, AHZ, AF, AD, AV:
  Adjustment in steps of 15° (Fig. 1)
- AHS-V:
  Adjustment in steps of 7.5° or 15° (only here ⊖) by repositioning the intermediate piece (Fig. 2)
- Adaptation AV, AD:
  Adjustment in radial direction
- AH, AHS, AHS-V, AHZ, AV:
  The roller levers can be used in a different axial actuating plane by repositioning by 180° (Fig. 3 and 4)

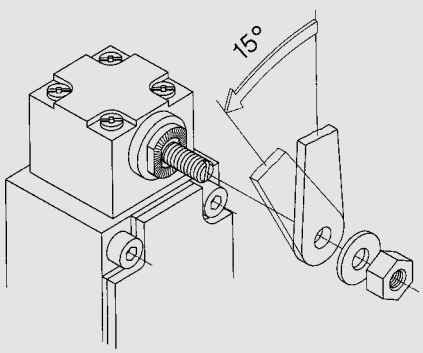


Fig.1

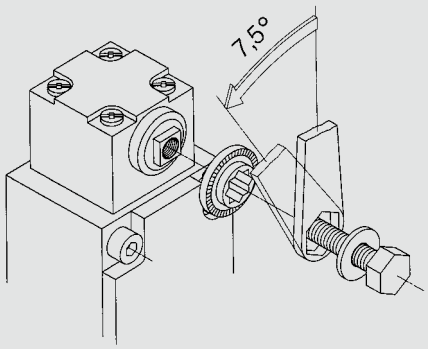


Fig. 2

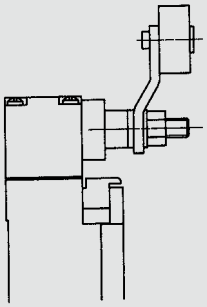


Fig. 3

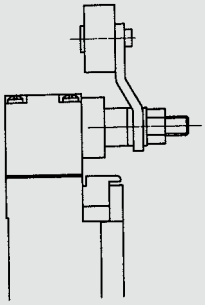


Fig. 4

Adaptation of direction-independent switching function

With actuators AHS, AHS-V, AV, AD.

On delivery, contact-making takes place in both pivot directions corresponding to the switching diagrams. An idle function in the required pivot direction is achieved by simply repositioning the actuator cam (Fig. 5 and 6).

The idle function can be used in control systems that cannot process successive rebound pulses caused by oscillatory movement of extremely long AV/AD actuators.

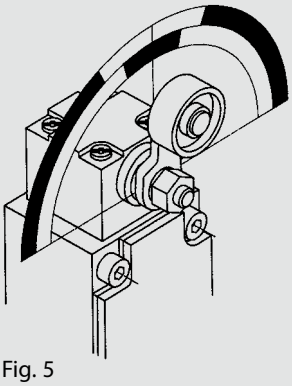


Fig. 5

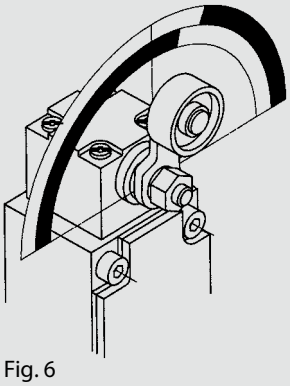


Fig. 6

Positive opening action Forward and return AHZ

For special safety applications, the positive opening action of the normally-closed contacts takes place both in forward (moving in one direction) as well as in return (moving back to home position) direction. For personal protection applications movement of the roller must be restrained in a guide block in both directions (Fig. 7 and 8).

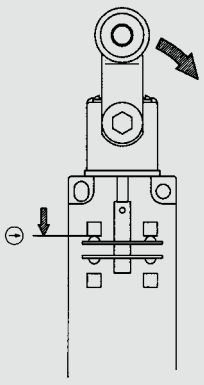


Fig. 7

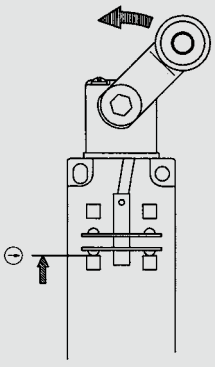


Fig. 8

Note on changing actuators AH, AHS, AHS-V, AHZ, AF, AD, AV, DGH, DGK

The guaranteed as-delivered properties change when the actuation directions are adjusted and when actuators are repositioned by 90°.

The user himself must ensure that the device achieves safe operation for its intended purpose.

Accessories for Insulation-Enclosed Limit Switches



Article	**Mounting pads**
Series	**I88**
Article number	**3191871157**



Article	**Mounting pads**
Series	**ENK**
Article number	**3191871154**



Article	**Finger guard**
Series	**I88, Biggy 2, ENK**
Article number	**3595900060**



Article	**Guide element**
Series	**I88**
Article number	**3515900209**



Article	**Mounting plate, control cabinet**
Series	**I88**
Article number	**3595900087**

Type 1 switches

Slow-action contact			C2 / Ti2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	A2Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A
Changeover contact	1NC/1S	U1Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A
Changeover contact, overlapping	1NC/1S	UV1Z	–	–	–	–	–	–	–	–
Normally-open contact	2S	E2	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	–	–	–

Snap-action contact			C2 / Ti2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	SA2Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A
Changeover contact	1NC/1S	SU1Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A
Normally-open contact	2S	SE2	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	–	–	–

Slow-action contact			Bi2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	A2Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.	400 V	5 A
Changeover contact	1NC/1S	U1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.	400 V	10 A
Changeover contact, overlapping	1NC/1S	UV1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.	400 V	10 A
Normally-open contact	2S	E2	–	–	–	–	–	–	–	–

Snap-action contact			Bi2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	SA2Z	–	–	–	–	–	–	–	–
Changeover contact	1NC/1S	SU1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.	400 V	10 A
Normally-open contact	2S	SE2	–	–	–	–	–	–	–	–

Slow-action contact			GC							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	A2Z	400 V	6 A	–	Fuse 6 A gL/gG	1×10^5	2 mill.①	400 V	10 A
Changeover contact	1NC/1S	U1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.②	400 V	10 A
Changeover contact, overlapping	1NC/1S	UV1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.	–	–
Normally-open contact	2S	E2	400 V	6 A	–	Fuse 6 A gL/gG	3×10^6	–	–	–

① 6021820175 GC-A2 HIW = 20 million ② 60121100622 GC-U1Z VKS, 6121100623 GC-U1Z VKW = 2 million

Snap-action contact			GC							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	SA2Z	–	–	–	–	–	–	–	–
Changeover contact	1NC/1S	SU1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.	400 V	10 A
Normally-open contact	2S	SE2	–	–	–	–	–	–	–	–

IF				I88					
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.*
–	–	–	–	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
–	–	–	–	250 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	–

*6116819140 I88-U1Z KS, 6186103005 I88-U1Z W RAST = 2 million

IF				I88					
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	–	–	–	–	–	–
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.
–	–	–	–	–	–	–	–	–	–

ENK			
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**
AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.*
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
–	–	–	–

*6181135251 ENK-U1Z AHSGU RAST RO50 = 2 million

ENK			
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**
–	–	–	–
AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.
–	–	–	–

SN2				ENM2					
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	10×10^6	20 mill.	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	10×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	–	20 mill.	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.*
–	–	–	–	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
–	–	–	–	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	–

*6087135013 ENM2-U1Z AHS-V, 6087135030 ENM2-U1Z AHZ = 2 million

SN2				ENM2					
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
–	–	–	–	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.
–	–	–	–	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	–

Electrical data

Type 1 switches

Slow-action contact			D					
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
Normally-closed contact	2NC	A2Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10 x 10^6	20 mill.
Changeover contact	1NC/1S	U1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10 x 10^6	20 mill.
Changeover contact, overlapping	1NC/1S	UV1Z	400 V	16 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10 x 10^6	20 mill.
Normally-open contact	2S	E2	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10 x 10^6	–

Snap-action contact			D					
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
			–	–	–	–	–	–
Normally-closed contact	2NC	SA2Z	–	–	–	–	–	–
Changeover contact	1NC/1S	SU1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10 x 10^6	20 mill.
Normally-open contact	2S	SE2	–	–	–	–	–	–

Type 2 switches

Slow-action contact			SKT							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	1NC	A1Z								
Normally-closed contact	2NC	A2Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A DC-13 U_e/I_e 250V / 0.27 A	Fuse 6 A gL/gG	A* 1 x 10^6 B* 1 x 10^5	2 mill.	250 V	10 A
Changeover contact	1NC/1S	U1/U1Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A DC-13 U_e/I_e 250V / 0.27 A	Fuse 6 A gL/gG	A* x 10^6 B* 1 x 10^5	2 mill.	250 V	10 A
Changeover contact, overlapping	2NC/1S	UV15Z	250 V	5 A	–	–	–	–	250 V	5 A

*A = Standard; B = Increased actuating force

Slow-action contact			SK							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	1NC	A1Z	–	–	–	–	–	–	–	–
Normally-closed contact	2NC	A2Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1 x 10^6	2 mill.		
Changeover contact	1NC/1S	U1/U1Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1 x 10^6	2 mill.	250 V	10 A
Changeover contact, overlapping	2NC/1S	UV15Z	400 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1 x 10^6	0,2 mill.	–	–

Slow-action contact			ENM2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	1NC	A1Z	–	–	–	–	–	–	–	–
Normally-closed contact	2NC	A2Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1 x 10^6	2 mill.	400 V	6 A
Changeover contact	1NC/1S	U1/U1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1 x 10^6	2 mill.	400 V	10 A
Changeover contact, overlapping	2NC/1S	UV15Z	250 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1 x 10^6	2 mill.		

U_i Rated insulation voltage
I_{the} Conventional thermal output from devices in enclosure

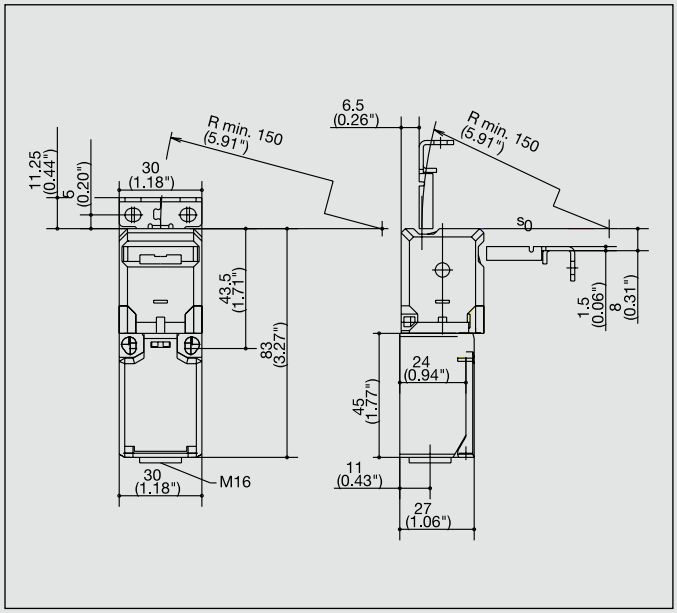
SKI				SKC					
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
				250 V	5 A	AC-15 U_e/I_e 240 V/1,5 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	A* 1×10^6 B* 1×10^5	2 mill.	–	–	–	–	–	–
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	A* 1×10^6 B* 1×10^5	2 mill.	–	–	–	–	–	–
AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	A* 1×10^6 B* 1×10^5	2 mill.	–	–	–	–	–	–
		*A = Standard; B = Increased actuating force							

I88				ENK					
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
–	–	–	–	–	–	–	–	–	–
				400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.
–	–	–	–	400 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	2 mill.

GC			
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**
–	–	–	–
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.

SKT





Safety switches with separate actuator are positive opening position switches. In terms of design, the switching element and actuator are separated. On actuation, the switching element and actuator are brought together or separated. The positive opening NC contact is always open when the actuator is withdrawn. These switches are assigned to Type 2.

BERNSTEIN AG offers various versions of these Type 2 switches. The differences and advantages of the individual switch groups are outlined in the following.

The SKT is the smallest safety switch with separate actuator. It is particularly suited for applications that require an extremely slim and short switch design. Its rotary head, two actuator openings and various switching functions underscore its versatility in extremely confined spaces.

Added to this, the SKT features other options to meet any requirements.

- **Integrated eject function (FE):**

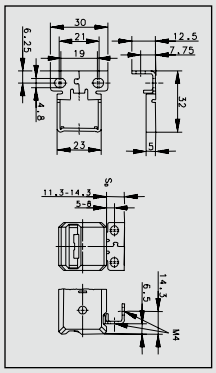
  The actuator is ejected if the door is not locked securely. Consequently, the safety contact is opened, thus preventing the machine from starting up. In addition, this function makes it apparent that the door still needs to be locked.

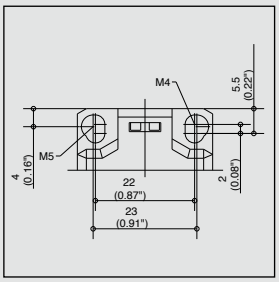
- **Actuating force (up to 50 N:**

  The standard actuating force is 10 N. Depending on the switch variant, an actuating force of 50 N can also be selected. In many applications, hatches and doors need to be secured to prevent them being opened unintentionally. This is achieved by means of bolts, fasteners or other latching mechanisms. The SKI safety switch should be selected for applications requiring increased actuating force.

- **Universeller Radiusbetätiger (MRU):**

  The MRU actuator is ideally suited for applications where the installation conditions severely restrict the actuating travel or radius. It has an adjustable actuating radius in the horizontal and vertical plane.





R_{min} 150 mm
Actuating forces FE to FI50

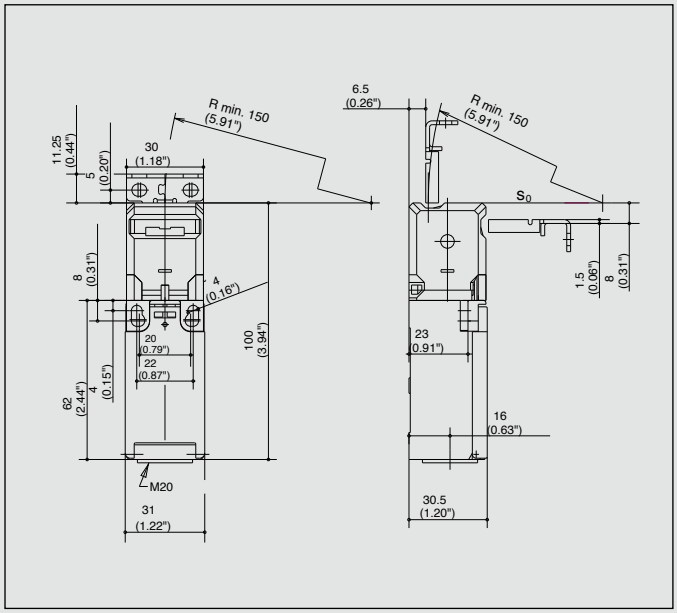
Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V
Rated operating voltage	U_e max.	240 V AC
Conventional thermal current	I_{the}	10 A
Utilization category		AC-15, U_e/I_e 240 V / 3 A; DC-13, U_e/I_e 250 V / 0.27 A
Mechanical data		
Switching frequency		≤ 30/min
Mechanical service life Standard Mechanical service life encreased actuator holding force		1 x 10^6 switching cycles 1 x 10^5 switching cycles
B10d (up to) ①		2 Mill.
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Ambient temperature		-30 °C to +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		M16 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

SKI





The SKI is the slimline version of a safety switch with separate actuator. It is based on the BERNSTEIN I88 family. Its dimensions, not including the actuating head, correspond to EN 50047.

The actuating head is rotary mounted and has two actuator openings. The SKI safety switch is predestined for installation on section structures and in applications with confined installation conditions. Compared to the SKT, it offers more connection space for the wiring and variants with up to three switching contacts are available.

Other advantages of this series include:

- **Integrated eject function (FE):**

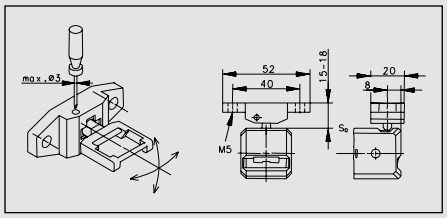
  The actuator is ejected if the door is not locked securely. Consequently, the safety contact is opened, thus preventing the machine from starting up. In addition, this function makes it apparent that the door still needs to be locked.

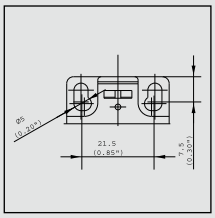
- **Actuating force (up to 50 N):**

  The standard actuating force is 10 N. Depending on the switch variant, an actuating force of 50 N can also be selected. In many applications, hatches and doors need to be secured to prevent them being opened unintentionally. This is achieved by means of bolts, fasteners or other latching mechanisms. The SKI safety switch should be selected for applications requiring increased actuating force.

- **Universal radius actuator (MRU):**

  The MRU actuator is ideally suited for applications where the installation conditions severely restrict the actuating travel or radius. It has an adjustable actuating radius in the horizontal and vertical plane.





R_{min} in setting directions 50 mm
Actuating forces FE to FI50

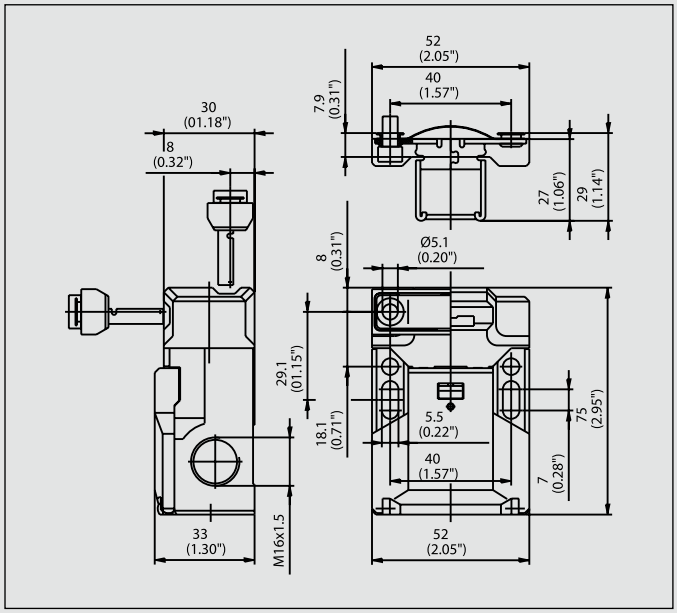
Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current (up to) ①	I_{the}	10 A
Utilization category (up to) ①		AC-15, U_e /I_e 240 V / 3 A
Mechanical data		
Switching frequency		≤ 30/min.
Mechanical service life Standard Mechanical service life encreased actuator holding force		1 x 10^6 switching cycles 1 x 10^5 switching cycles
B10d (up to) ①		2 Mill.
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Ambient temperature		-30 °C to +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		1 x M20 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

SKC





In terms of lengths, the SKC safety position switch is the 15 mm shorter variant of the SK. This makes it the right choice for confined installation conditions.

The SKC otherwise offers the same advantages as the SK: Industrial standard with particular emphasis on safety, personal protection, variable actuator head with two actuator openings.

Other decisive advantages include:

- **Different actuating forces:**

  Corresponding to your specific application, in addition to the standard 10 N, you can also choose an actuating force of 5, 20, 30 or 50 N.

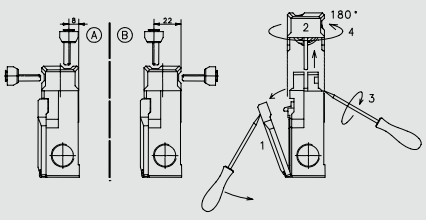
  Actuating forces from 30 to 100 N can be realised with the aid of additional components that are mounted on the outside of the switch.

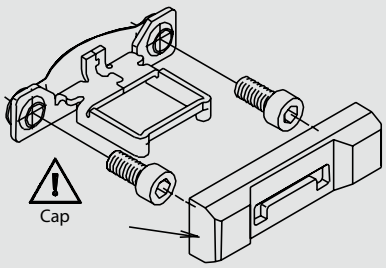
- **Anti-tamper facility:**

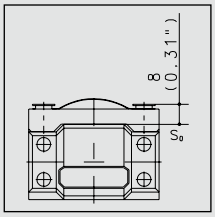
  The switching system is protected by multiple coding to ensure enhanced safety of your application.

- **Outstanding handling:**

  With the two slots you can easily adjust the SKC safety switch and lock it in position by means of the two holes accessible from the top or the two holes accessible from the front. The switch can be wired from three different sides. A transparent cover prevents foreign particles from entering the contact space while connecting the power supply cable.







R_{min} 150 mm (5.9")
Actuator: Metal

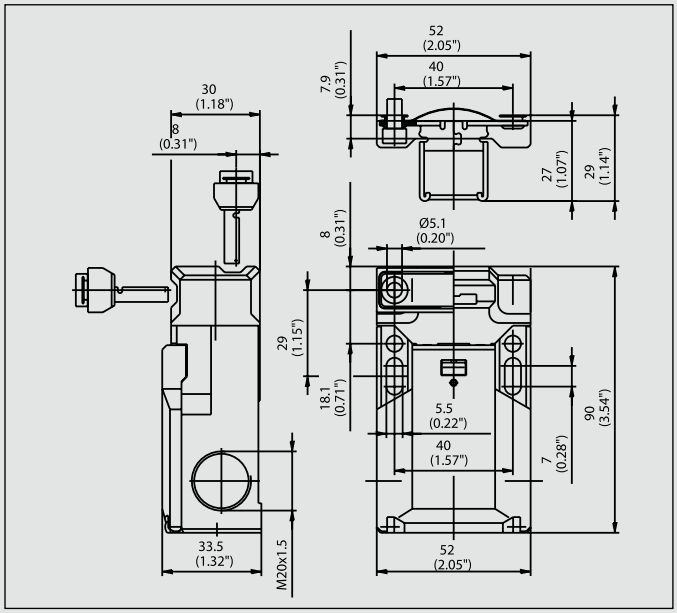
Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current	I_{the}	5 A
Utilization category		AC-15, U_e /I_e 240 V / 1.5 A
Mechanical data		
Switching frequency		≤ 30/min.
Mechanical service life		1 x 10^6 switching cycles
B10d (up to) ①		2 Mill.
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Ambient temperature		-30 °C ... +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		3 x M16 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

SK





The SK safety position switch is an industry standard and can be used in virtually any application.

Thanks to design safety features conforming to VDE 0660 T200, IEC 60947-5-1 and the test regulations GS-ET 15, the SK is particularly suitable for personal protection applications. Its versatility is enhanced by the variable actuator head and two actuator openings.

Other decisive advantages include:

- **Different actuating forces:**

  Corresponding to your specific application, in addition to the standard 10 N, you can also choose an actuating force of 5, 20 or 30 N.

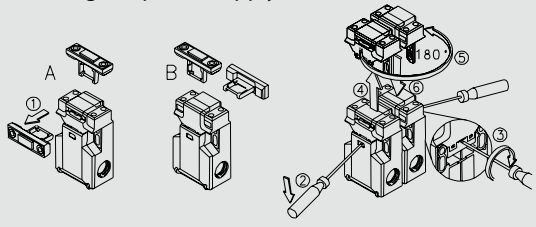
  Actuating forces from 30 to 100 N can be realised with the aid of additional components that are mounted on the outside of the switch.

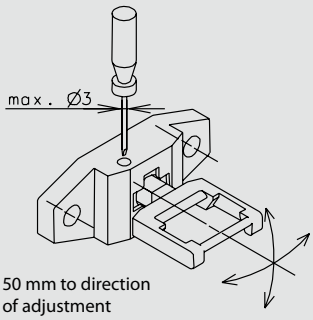
- **Anti-tamper facility:**

  The switching system is protected by multiple coding to ensure enhanced safety of your application.

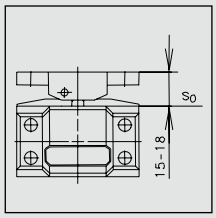
- **Outstanding handling:**

  With the two slots you can easily adjust the SK safety switch and lock it in position by means of the two holes accessible from the top or the two holes accessible from the front. The switch can be wired from three different sides. A transparent cover prevents foreign particles from entering the contact space while connecting the power supply cable.





50 mm to direction
of adjustment
Actuator: metal



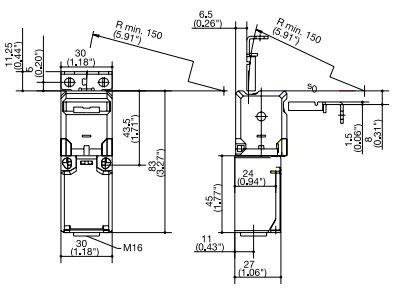
Technical data

Electrical data		
Rated insulation voltage (up to) ①	U_i max.	400 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current (up to) ①	I_{the}	10 A
Utilization category		AC-15, U_e /I_e 240 V / 1.5 A
Mechanical data		
Switching frequency		≤ 30/min
Mechanical service life		1 x 10^6 switching cycles
B10d (bis zu) ①		2 Mill.
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		II, Insulated
Ambient temperature		-30 °C ... +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		3 x M20 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

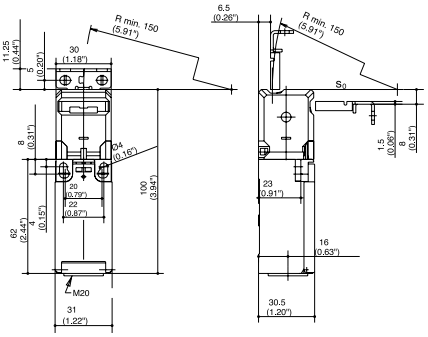
① Depending on switching system. See Table on Pages 76-79.

Safety Switches with Separate Actuator

SKT



SKI



Switching operation	Standard	High actuating force	Radius actuation
1 NC / 1 NO contact	**6016419059** SKT-U1Z M3		
1 NC contacts			
2 NC contacts	**6016469066** SKT-A2Z M3		
1 NC / 1 NO contact Overlapping			
Approvals			

Switching operation	Standard	High actuating force	Radius actuation
1 NC / 1 NO contact	**6016819052** SKI-U1Z M3	**6016819139** SKI-U1Z FI50 M3	**6016819123** SKI-U1Z MRU
1 NC contacts			
2 NC contacts	**6016869056** SKI-A2Z M3		**6016869122** SKI-A2Z MRU
1 NC / 1 NO contact Overlapping	**6016869058** SKI-UV15Z M3	**6016869145** SKI-UV15Z FI50 M3	**6016869131** SKI-UV15Z MRU
Approvals			

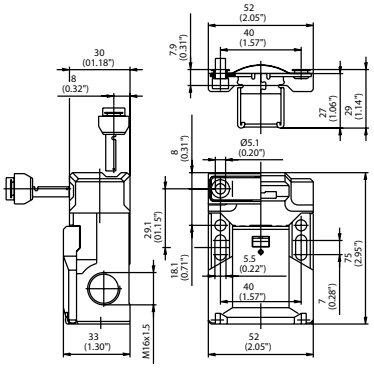
Special features/variants
(on request)

- Replacement actuator for:
  3112850340

Special features/variants
(on request)

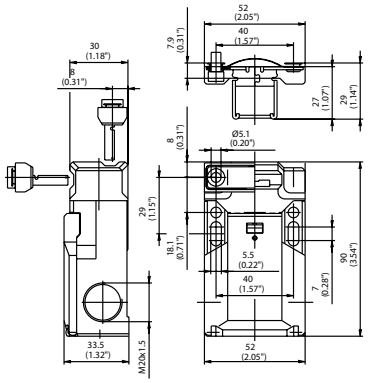
- Replacement actuator for:
  Standard **3112850340**
  High actuating force **3112850340**
  Radius actuation **3911452058**

SKC



Standard	High actuating force	Radius actuation
6016169039 SKC-A1Z M	**6116169016** SKC-A1Z F30 M	**6016169087** SKC-A1Z MRU

SK



Standard	High actuating force	Radius actuation
6016119016 SK-U1Z M	**6116119109** SK-U1Z F30 M	**6016119084** SK-U1Z MRU
6016169036 SK-A2Z M	**6016169053** SK-A2Z F30 M	**6016169085** SK-A2Z MRU
6016169026 SK-UV15Z M	**6016169061** SK-UV15Z F30 M	**6016169086** SK-UV15Z MRU

Special features/variants
(on request)

- 50 N and 100 N actuating force on request
- Replacement actuator for:
  Standard **3911452116**
  High actuating force **3911451914**
  Radius actuation **3911452058**

Special features/variants
(on request)

- 100 N actuating force on request
- Replacement actuator for:
  Standard **3911452116**
  High actuating force **3911451914**
  Radius actuation **3911452058**

Switch with VTW, VTU, VT actuator



ENM-VTW



ENK-VTU

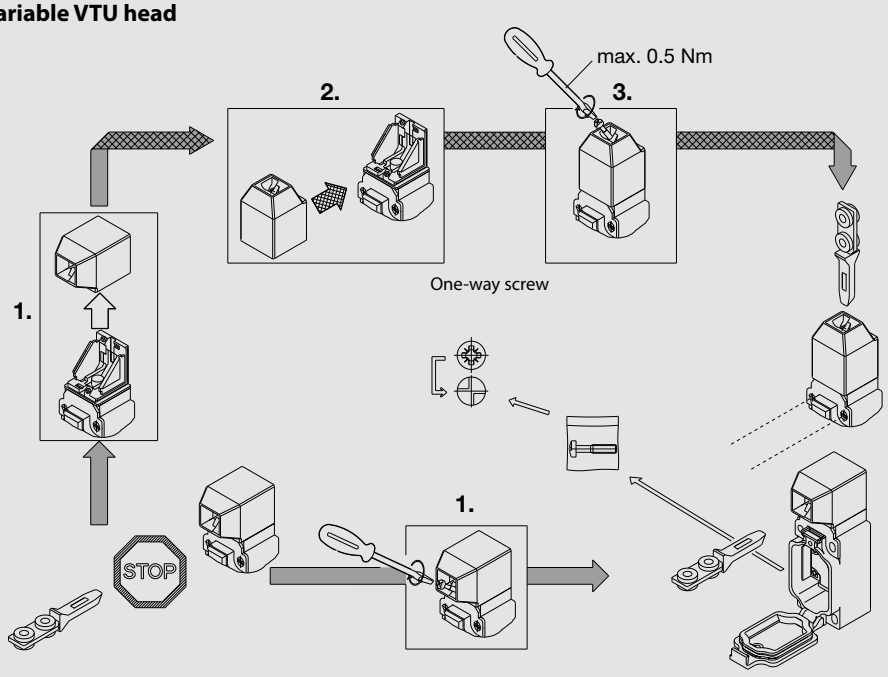
These position switches of the tried-and-tested switch families I88, ENK, ENM2 and GC correspond to Type 2.

This means that you can use Type 1 and Type 2 position switches corresponding to your applications while using one family of switches.

This results in many advantages:

- **Standardisation:**
  Switches of one family have the same mounting dimensions and the same electrical properties.
- **Reduced costs:**
  II88, ENK, ENM2 and GC are used in large quantities. This not only reflects the quality of the products but also means lower prices compared to special designs used in small quantities.

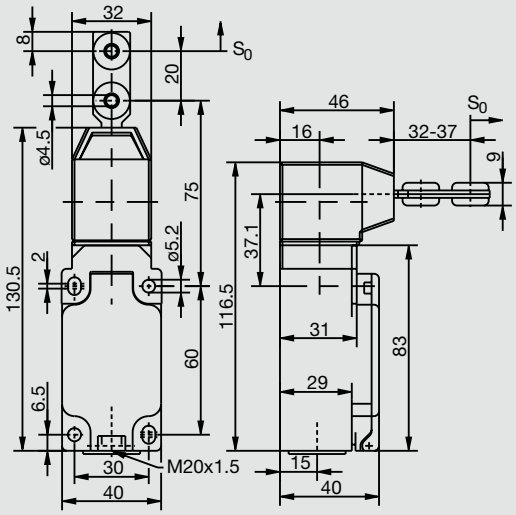
Variable VTU head



Repositioning the actuator head either in horizontal or vertical direction results in 8 approach actuator directions.



GC-VT

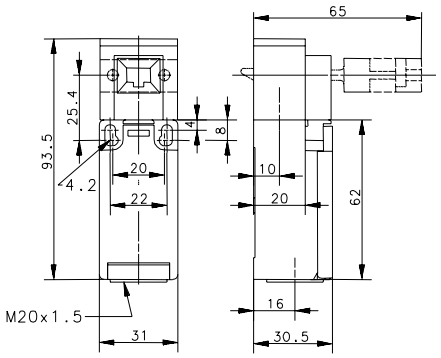
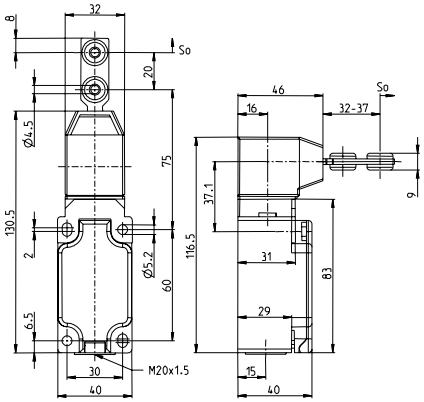


Technical data

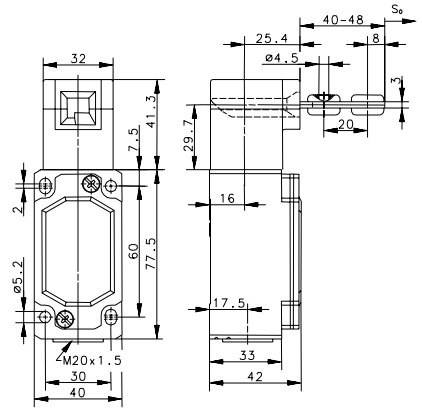
		I88	ENK	ENM2	GC
Electrical data					
Rated insulation voltage	U_i	250 V AC	400 V AC	400 V AC	400 V AC
Conventional thermal current (up to) ①	I_{the}	10 A	10 A	10 A	10 A
Rated operating voltage	U_e	240 V	240 V	240 V	240 V
Utilization category (up to) ①		AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e/I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A
Forced disconnection	⊝	conforming to IEC/EN 60947-5-1, Addendum K	conforming to IEC/EN 60947-5-1, Addendum K	conforming to IEC/EN 60947-5-1, Addendum K	conforming to IEC/EN 60947-5-1, Addendum K
Short-circuit protection (up to) ①		Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG
Protection class		II, Insulated	II, Insulated	I	I
Mechanical data					
Enclosure		Thermoplastic, glass fibre-reinforced (UL 94-V0)	Thermoplastic, glass fibre-reinforced	Aluminium pressure die-casting	Aluminium pressure die-casting
Cover		Thermoplastic, glass fibre-reinforced (UL 94-V0)	Thermoplastic, glass fibre-reinforced	Sheet aluminium	Sheet aluminium
Actuation		Separate actuator, Thermoplastic	Separate actuator, (St/PA), Actuator (PA6 GV/Zn-GD)	Separate actuator,(St / PA)	Separate actuator
Ambient temperature		-30°C to +80°C	-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Mechanical service life		1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d		2 mill.	2 mill.	2 mill.	2 mill.
Switching frequency		≤ 50/min.	max. 30/min.	≤ 50/min.	≤ 10/min.
Mounting		2 x M4	4 x M5	4 x M5	2 x M4
Type of connection		Screw connections	Screw connections	Screw connections	Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Cable entry		1 x M20 x 1.5	1 x M20 x 1.5	1 x M20 x 1.5	1 x M20 x 1.5
Weight		≈ 0.09 kg	≈ 0.23 kg	≈ 0.33 kg	≈ 0.32 kg
Installation position		Any	Any	Any	Any
Protection class		IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529
Standards					
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1					

① Depending on switching system. See Table on Pages 76-79.

Safety Switches with Separate Actuator

	I88 VTW	ENK VTU
		
Switching operation	**Standard** **High actuating force** **Radius actuation**	**Standard** **High actuating force** **Radius actuation**
1 NC / 1 NO contact	**6016819018** I88-U1Z VTW	**6016619132** ENK-U1Z VTU
2 NC contacts		**6016669133** ENK-A2Z VTU
1 NC / 1 NO contact **Overlapping**		**6016669154** ENK-UV15Z VTU
Approvals		
	Replacement actuator: 3911702100	**Replacement actuator: 3911702100**
	Special features/variants (on request) ● All actuators specified under „Safety Switches with Separate Actuator and Latching Device (SLK/SLM)“ can be used for these switches	**Special features/variants** (on request) ● All actuators specified under „Safety Switches with Separate Actuator and Latching Device (SLK/SLM)“ can be used for these switches

ENM2 VTW



Standard | **High actuating force** | **Radius actuation**

6016219100
ENM2-U1Z VTW

6016269105
ENM2-A2Z VTW

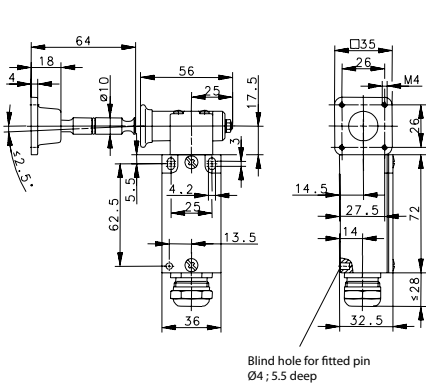
6016269104
ENM2-UV15Z VTW

Replacement actuator: 3911702100

Special features/variants
(on request)

- All actuators specified under „Safety Switches with Separate Actuator and Latching Device (SLK/SLM)“ can be used for these switches

GC VT



Standard | **High actuating force**

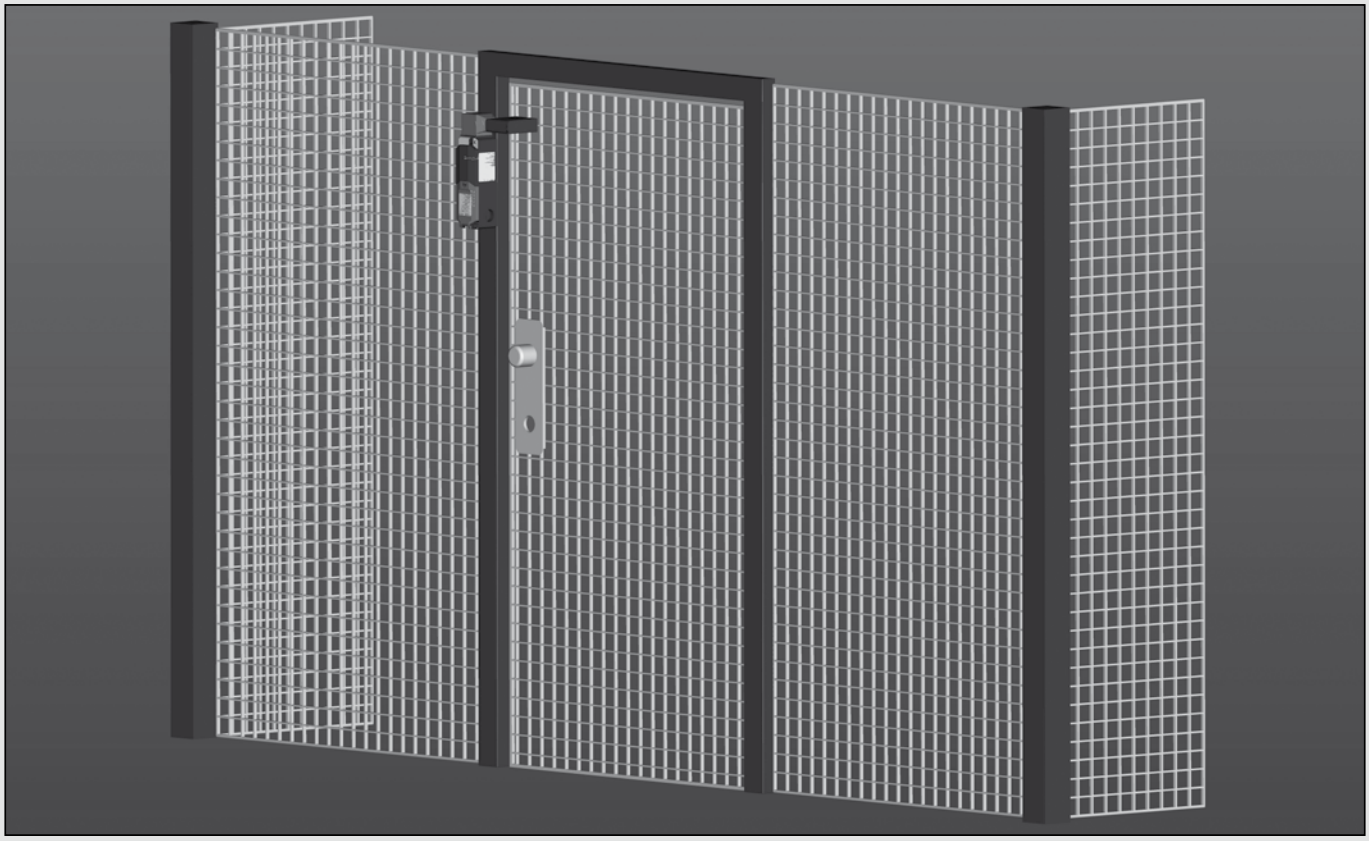
6121100555
GC-U1Z VT 90GR

6116769064
GC-A2Z VT 90GR

Replacement actuator: 3912001275

Special features/variants
(on request)

SLK



Machines that continue running after being switched off are often part of automated production processes. Safety guards prevent operator access and must therefore be kept closed until the hazards posed by machine movement have ceased.

Safety position switches with interlock function ensure that safety gates, safety doors and other protective guards remain closed for as long as a hazardous situation exists.

In production processes safety position switches have three main tasks:

- Enabling the machine/process when the safety guard is closed and interlocked
- Disabling the machine/process when the safety guard is opened
- Position monitoring of the safety guard and interlock

The SLK/SLM safety position switches with separate actuators and interlock enable the user to realise locking systems conforming to EN 1088, EN ISO 12100-1, 12100-2 and since 29.12.2009 to the compulsory Machinery Directive 2006/42/EC.

System description

SLK/SLM safety position switches with interlock function are available in versions with spring force locking action and magnetic force locking action. The separate actuator is connected form-fit with the safety guard. It transfers the locking force to the safety guard and monitors its position. Thanks to its triple coding, the separate actuator ensures a high degree of anti-tamper security. The interlock facility in association with the SLK/SLM safety position switches is integrated in the switch enclosure. To lock the actuator in connection with a switching mechanism, the required interlock is achieved by means of a spring mechanism in the spring-force locked version and by an electromagnet in the magnetic-force locked version.

Locking principle

Spring force (closed-circuit current)

The safety guard is locked automatically when the actuator is inserted to its end position. It is unlocked by energising the electromagnet, allowing the safety guard to be opened.

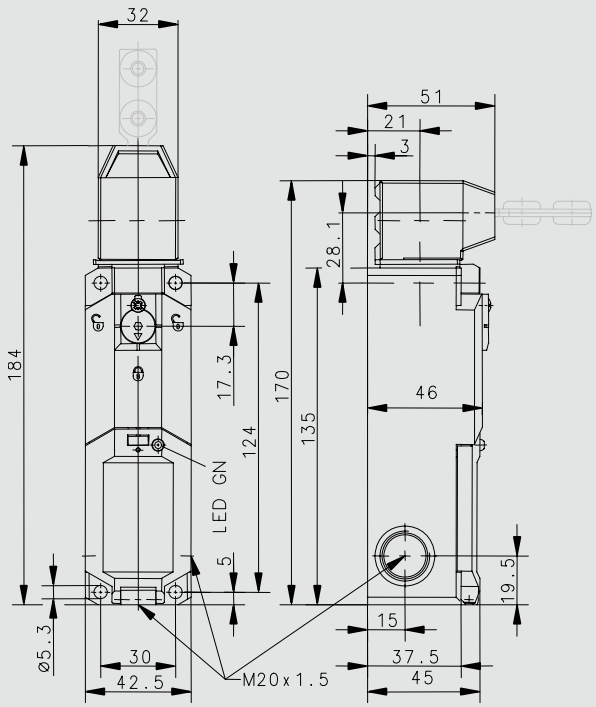
Magnetic force (working current)

The lock (interlock) is deactivated when the electromagnet is de-energised, in the event of fault in actuation or power failure. The safety guard can be opened.

Product advantages

- Two independent safety circuits ensure reliable integration
  - With two contacts, circuit 1 monitors the actuator
  - With two contacts, circuit 2 monitors the interlock

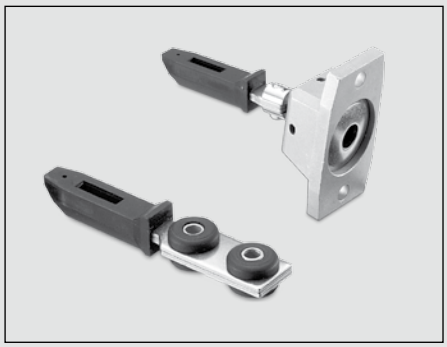
  The contact configuration is variable and may deviate from the selection table if required.
- Two different operating voltages for universal integration::
  - 24 V AC / DC
  - 110 V / 230 V AC
- Rotary actuating head (4x 90°) as well as horizontal and vertical actuation ensure complete flexibility in use
- Compact design with short overall size of only 170 mm
- Innovative installation with spring-loaded terminals
- Function conforming to GS ET 19, EN 60 204-1, EN 60 947-1 and EN 60 947-5-1



The actuator is not included and must be ordered separately.

Safe operation

The stainless steel actuator ensures safe and reliable operation. Its coding prevents tampering and bypassing the system „in an easier way". The radius actuator is ideal for monitoring smaller safety gates. It can be preset horizontally or vertically and is also made from stainless steel.

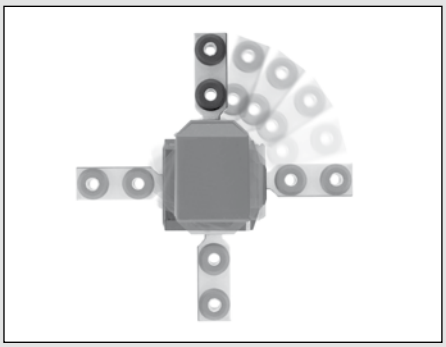


Innovative installation

The SLK is electrically connected safely and reliably by means of terminals. Spring-loaded terminals are used, into which the wires with ferrules can be inserted without the need for tools. The fact that the connection compartment is separate from the functional parts contributes to ensuring secure and reliable connection. The connection compartment conforms to protection class IP67.

Flexible in use

The SLK safety switch can be actuated in horizontal and vertical direction. Prior to installation it is preset by simply repositioning the head section.This flexibility in installation is achieved by positioning the actuator head in steps of 4 x 90°.



IMPORTANT: The actuator for the SLK must be ordered separately. You will find a corresponding overview on Pages 96-97.

SLK

Product selection

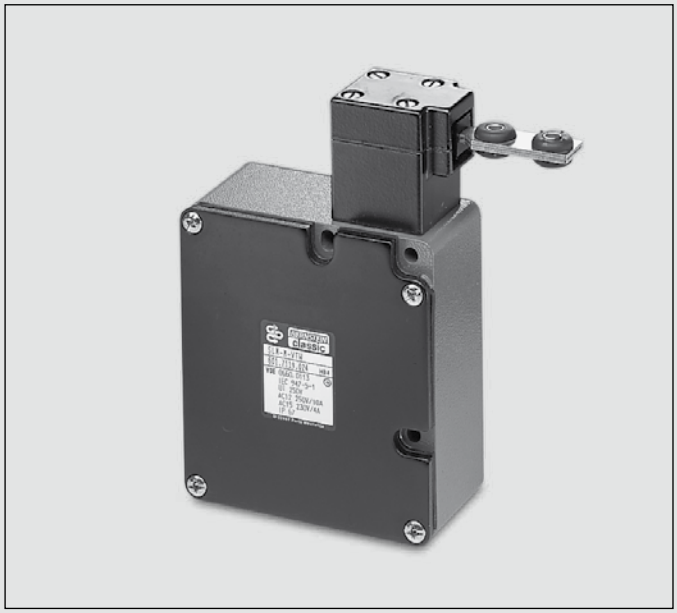
Article number	Designation	Locking action	Contacts		Supply voltage	Additional function
			Actuator	Interlock		
6018119045	SLK-F-UC-55-R1-A0-L0-0	Spring	1NC / 1NO	1NC / 1NO	24 Volt AC / DC	Auxiliary release
6018119066	SLK-F-UC-55-R1-A0-L1-0	Spring	1NC / 1NO	1NC / 1NO	24 Volt AC / DC	Auxiliary release, LED
6018169054	SLK-F-UC-22-R1-A0-L0-0	Spring	2 NC	2 NC	24 Volt AC / DC	Auxiliary release
6018169050	SLK-F-UC-25-R1-A0-L0-0	Spring	2 NC	1NC / 1NO	24 Volt AC / DC	Auxiliary release
6018169068	SLK-F-UC-25-R1-A0-L1-0	Spring	2 NC	1NC / 1NO	24 Volt AC / DC	Auxiliary release, LED
6018119061	SLK-F-UC-55-R2-A0-L0-0	Spring	1NC / 1NO	1NC / 1NO	24 Volt AC / DC	Emergency release
6018169055	SLK-F-NC-22-R1-A0-L0-0	Spring	2 NC	2 NC	110 / 230 AC	Auxiliary release
6018119046	SLK-F-NC-55-R1-A0-L0-0	Spring	1NC / 1NO	1NC / 1NO	110 / 230 AC	Auxiliary release
6018119067	SLK-F-NC-55-R1-A0-L1-0	Spring	1NC / 1NO	1NC / 1NO	110 / 230 AC	Auxiliary release, LED
6018169051	SLK-F-NC-25-R1-A0-L0-0	Spring	2 NC	1NC / 1NO	110 / 230 AC	Auxiliary release
6018169069	SLK-F-NC-25-R1-A0-L1-0	Spring	2 NC	1NC / 1NO	110 / 230 AC	Auxiliary release, LED
6018119047	SLK-M-UC-55-R0-A0-L0-0	Magnet	1NC / 1NO	1NC / 1NO	24 Volt AC / DC	
6018169052	SLK-M-UC-25-R0-A0-L0-0	Magnet	2 NC	1NC / 1NO	24 Volt AC / DC	
6018169056	SLK-M-UC-22-R0-A0-L0-0	Magnet	2 NC	2 NC	24 Volt AC / DC	
6018119048	SLK-M-NC-55-R0-A0-L0-0	Magnet	1NC / 1NO	1NC / 1NO	110 / 230 AC	
6018169053	SLK-M-NC-25-R0-A0-L0-0	Magnet	2 NC	1NC / 1NO	110 / 230 AC	
6018169057	SLK-M-NC-22-R0-A0-L0-0	Magnet	2 NC	2 NC	110 / 230 AC	

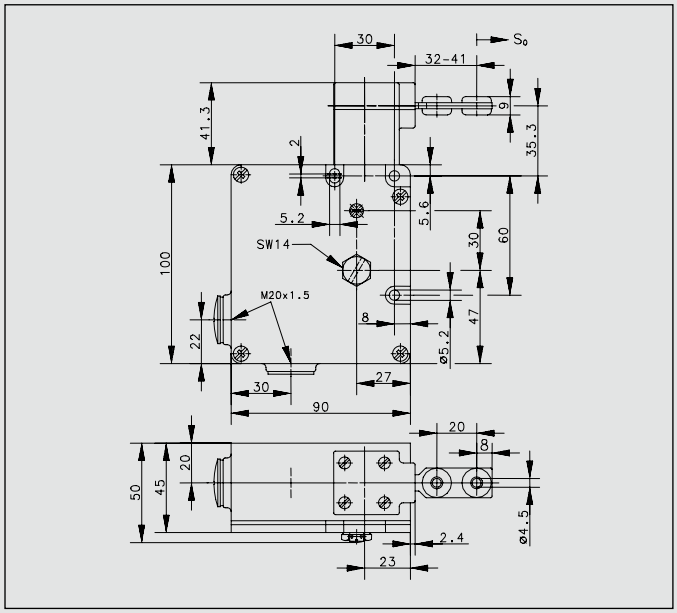
Technical data

		Spring 24 Volt AC / DC	Spring 110 / 230 AC	Magnet 24 Volt AC / DC	Magnet 110 / 230 AC
Electrical data					
Rated insulation voltage	U_i	250 V	250 V	250 V	250 V
Utilization category		AC-15, U_e /I_e 230 V / 2.5 A	AC-15, U_e /I_e 230 V / 2.5 A	AC-15, U_e /I_e 230 V / 2.5 A	AC-15, U_e /I_e 230 V / 2.5 A
Conventional thermal current	I_{the}	5 A	5 A	5 A	5 A
Short-circuit protection		4 A gL	4 A gL	4 A gL	4 A gL
Protection class		II, Insulated	II, Insulated	II, Insulated	II, Insulated
Electromagnet					
Duty factor		100 % ED (an E1; E2)	100 % ED (an E1; E2)	100 % ED (an E1; E2)	100 % ED (an E1; E2)
Thermal class		F (155 °C)	F (155 °C)	F (155 °C)	F (155 °C)
Switch-on power		12 VA (0.2 s)	65 VA (0.1 s)	12 VA (0.2 s)	12 VA (0.2 s)
Continuous power		4.4 VA	8 VA	4.4 VA	4.4 VA
Mechanical data					
Enclosure		Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)
Cover		Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)
Actuator		Thermoplastic GV / Zn-GD	Thermoplastic GV / Zn-GD	Thermoplastic GV / Zn-GD	Thermoplastic GV / Zn-GD
Ambient temperature		-25 °C to +70 °C	-25 °C to +70 °C	-25 °C to +70 °C	-25 °C to +70 °C
Switching function		2 NC contacts, 2 NO contacts	2 NC contacts, 2 NO contacts	4 NC contacts	2 NC contacts, 2 NO contacts
Switching principle		4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts
Mechanical service life		1 x 10^6 switching cycles (max. 600 switching cycles / h)	1 x 10^6 switching cycles (max. 600 switching cycles / h)	1 x 10^6 switching cycles (max. 600 switching cycles / h)	1 x 10^6 switching cycles (max. 600 switching cycles / h)
B10d		2 mill.	2 mill.	2 mill.	2 mill.
Minimum actuating radius	R_{min}	See datasheet, actuator	See datasheet, actuator	See datasheet, actuator	See datasheet, actuator
Approach speed	V_{max}	0.5 $^m/_s$	0.5 $^m/_s$	0.5 $^m/_s$	0.5 $^m/_s$
Mounting		4 x M5	4 x M5	4 x M5	4 x M5
Cross sections		0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2
Type of connection		Cage clamp terminal	Cage clamp terminal	Cage clamp terminal	Cage clamp terminal
Cable entry		3 x M20 x 1.5	3 x M20 x 1.5	3 x M20 x 1.5	3 x M20 x 1.5
Weight		≈ 0.34 kg	≈ 0.30 kg	≈ 0.30 kg	≈ 0.35 kg
Protection class		IP67 conforming to IEC/EN 60529	IP67 conforming to IEC/EN 60529	IP67 conforming to IEC/EN 60529	IP67 conforming to IEC/EN 60529
Installation position		Any	Any	Any	Any
Locking principle		Spring force	Spring force	Magnetic force	Magnetic force
Latching force	FZh	≤ 1500 N to GS-ET-19	≤ 1500 N to GS-ET-19	≤ 1500 N to GS-ET-19	≤ 1500 N to GS-ET-19

Notes

SLM



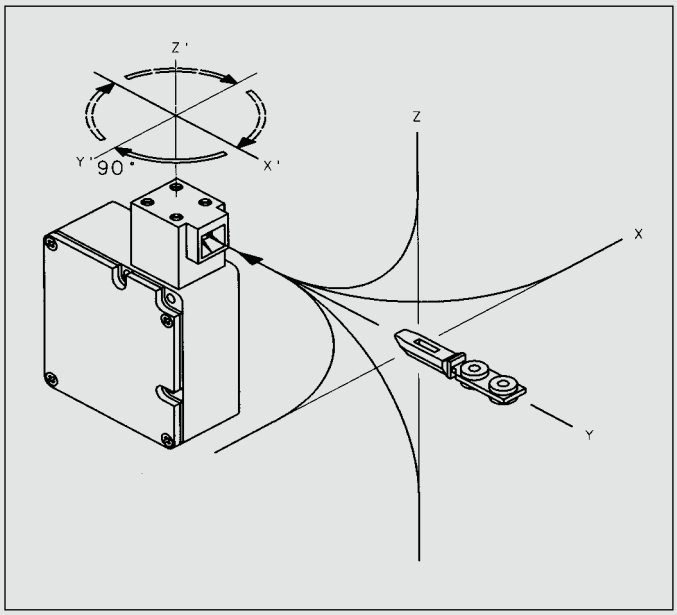


Product advantages

- Highly resistant in harsh industrial environments and with compact enclosure for space-saving installation
- Triple-coded actuator with high anti-tamper security
- Approach direction of actuator easily changed in 90° steps (repositioning only possible with actuator inserted)
- Entire function unit encapsulated on the inside
- Separate connection compartment for safe wiring at contact strip
- Two independent safety circuits ensure reliable integration
  - With two contacts, circuit 1 monitors the actuator
  - With two contacts, circuit 2 monitors the interlock
  - The contact configuration is variable and may deviate from the selection table if required
- Integrated protective circuit avoids polarity reversal and voltage peaks
- Function conforming to VDE 0660 Part 200, EN 60 947-5-1 and GS ET 19
- The SLM safety switches are supplied as standard with actuator A1

Options

- Individual contact configuration
- Radius actuator for actuating radii of less than 400 mm
- Auxiliary release
- Two independent safety circuits ensure reliable integration
- Solutions to customer specifications



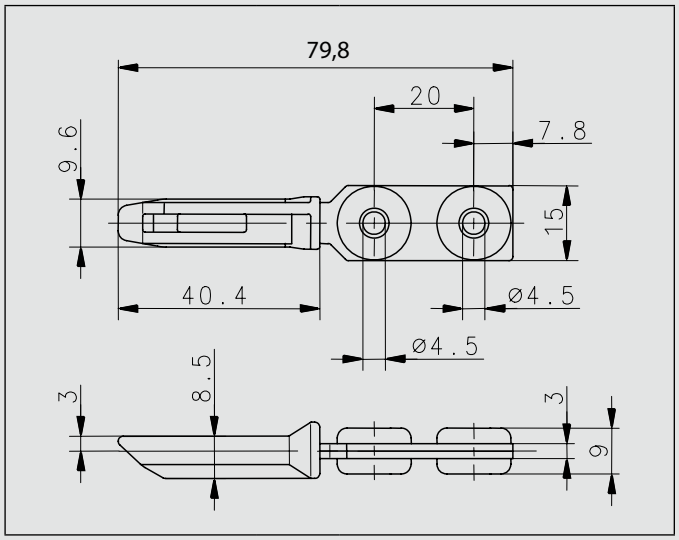
Product selection

Article number	Designation	Locking action	Contacts		Supply voltage	Additional function
			Actuator	Interlock		
6017119020	SLM-FVTW 24DC-55-AR	Spring	1NC / 1NO	1NC / 1NO	24 Volt DC	Auxiliary release
6017169067	SLM-FVTW 24DC-22-AR	Spring	2 NC	2 NC	24 Volt DC	Auxiliary release
6017119047	SLM-FVTW 24DC-55-KR	Spring	1NC / 1NO	1NC / 1NO	24 Volt DC	With key release
6017169023	SLM-FVTW 24AC-22-AR	Spring	2 NC	2 NC	24 Volt AC	Auxiliary release
6017119032	SLM-FVTW 120AC-55-AR	Spring	1NC / 1NO	1NC / 1NO	120 Volt AC	Auxiliary release
6017119022	SLM-FVTW 230AC-55-AR	Spring	1NC / 1NO	1NC / 1NO	230 Volt AC	Auxiliary release
6017169066	SLM-MVTW 24DC-22	Magnet	2 NC	2 NC	24 Volt DC	
6017119023	SLM-MVTW 24DC-55	Magnet	1NC / 1NO	1NC / 1NO	24 Volt DC	
6017119024	SLM-MVTW 230AC-55	Magnet	1NC / 1NO	1NC / 1NO	230 Volt AC	

Technical data		**Spring 24 Volt DC**	**Spring 120 Volt AC**	**Spring 230 Volt AC**	**Magnet 24 Volt DC**	**Magnet 230 Volt AC**
Electrical data						
Rated insulation voltage	U_i	250 V	250 V	250 V	250 V	250 V
Utilization category		AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A
Conventional thermal current	I_{the}	5 A	5 A	5 A	5 A	5 A
Short-circuit protection		10 A gL/gG	10 A gL/gG	10 A gL/gG	10 A gL/gG	10 A gL/gG
Protection class		I	I	I	I	I
Electromagnet						
Duty factor		100 % ED	100 % ED	100 % ED	100 % ED	100 % ED
Thermal class		B (130 °C)	B (130 °C)	B (130 °C)	B (130 °C)	B (130 °C)
Continuous power		5.2 W	5.2 W	5.2 W	5.2 W	5.2 W
Operating voltage		24 V DC	120 V AC	230 V AC	24 V DC	230 V AC
Mechanical data						
Enclosure		Al die-cast	Al die-cast	Al die-cast	Al die-cast	Al die-cast
Cover		Sheet aluminium	Sheet aluminium	Sheet aluminium	Sheet aluminium	Sheet aluminium
Actuator		ZN die-cast	Al die-cast	Al die-cast	Al die-cast	Al die-cast
Ambient temperature		-30 °C to +60 °C	-30 °C to +60 °C	-30 °C to +60 °C	-30 °C to +60 °C	-30 °C to +60 °C
Switching principle		4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts
Mechanical service life		1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d		2 mill.	2 mill.	2 mill.	2 mill.	2 mill.
Minimum actuating radius	R_{min}	400 mm	400 mm	400 mm	400 mm	400 mm
Approach speed	V_{max}	1.5 $^m/_s$	1.5 $^m/_s$	1.5 $^m/_s$	1.5 $^m/_s$	1.5 $^m/_s$
Mounting		3 x M5	3 x M5	3 x M5	3 x M5	3 x M5
Cross sections		0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2
Type of connection		Screws	Screws	Screws	Screws	Screws
Cable entry		2 x M20 x 1.5	2 x M20 x 1.5	2 x M20 x 1.5	2 x M20 x 1.5	2 x M20 x 1.5
Weight		≈ 0.81 kg	≈ 0.81 kg	≈ 0.81 kg	≈ 0.81 kg	≈ 0.81 kg
Protection class		IP67 conforming to IEC/EN 60529	IP67 conforming to IEC 529	IP67 conforming to IEC 529	IP67 conforming to IEC 529	IP67 conforming to IEC 529
Installation position		Any	Any	Any	Any	Any
Locking principle		Spring force	Spring force	Spring force latching	Spring force latching	Spring force latching
Latching force		≤ 1000 N to GS-ET 19	≤ 1000 N to GS-ET 19	≤ 1000 N to GS-ET 19	≤ 1000 N to GS-ET 19	≤ 1000 N to GS-ET 19

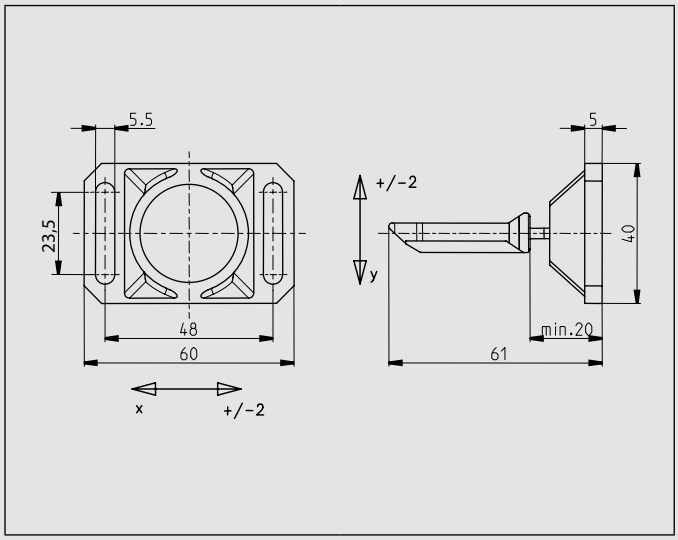
Product selection SLK, SLM, ENK-VTU, ENM2-VTW

Article number	Designation
3911702228	Actuator A1



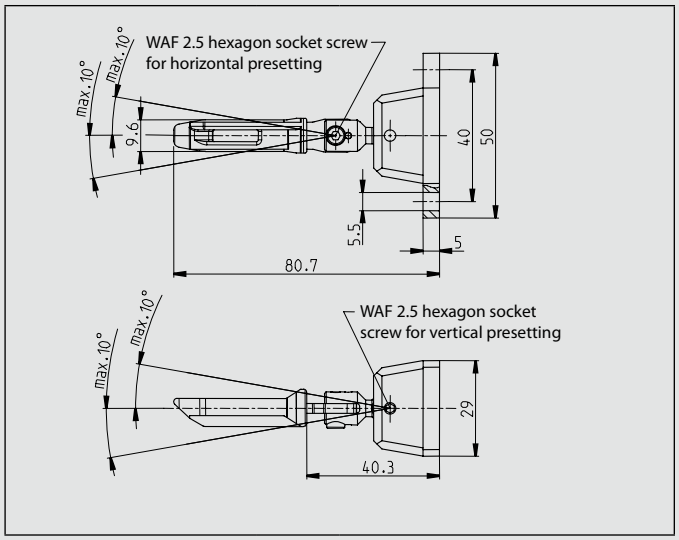
Mechanical data		
Actuator		Steel/PA
Minimum actuating radius	R_{min}	400 mm

Article number	Designation
3911702231	Actuator A4



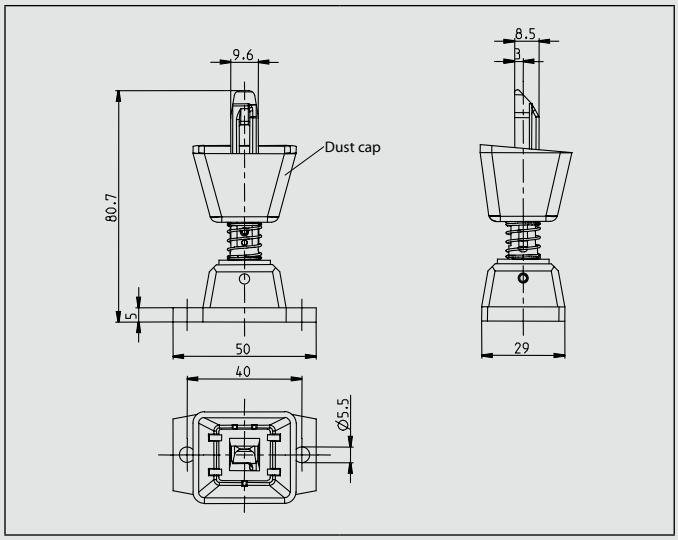
Mechanical data		
Actuator		Steel/PA
Enclosure		GD-Zn
Minimum actuating radius	R_{min}	350 mm
Repositioning of spring-mounted actuator by 4 x 90° in mounted state.		

Article number	Designation
3911702229	Actuator A2



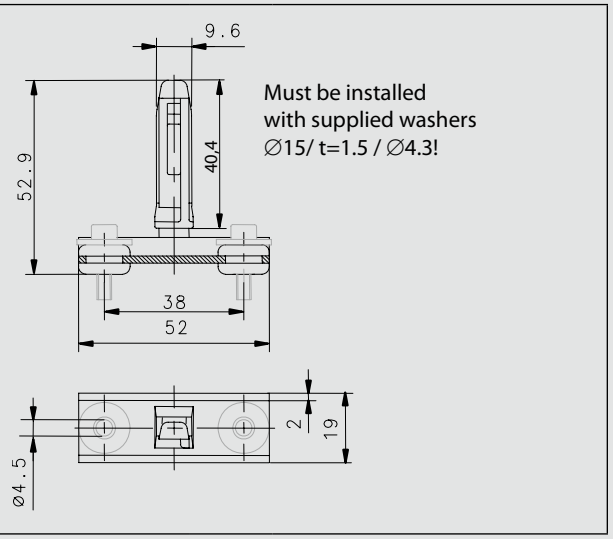
Mechanical data		
Enclosure / Actuator		Steel/PA
Minimum actuating radius	R_{min}	150 mm
Repositioning of spring-mounted actuator by 4 x 90° in not mounted state.		
WAF 2.5 Allen key, supplied		

Article number	Designation
3911702230	Actuator A3



Mechanical data		
Enclosure / Actuator		Steel/PA
Dust cap		Elastomer CR
Minimum actuating radius	R_{min}	400 mm
Repositioning of spring-mounted actuator by 4 x 90° in not mounted state.		

Article number	Designation
3911702234	Actuator A7



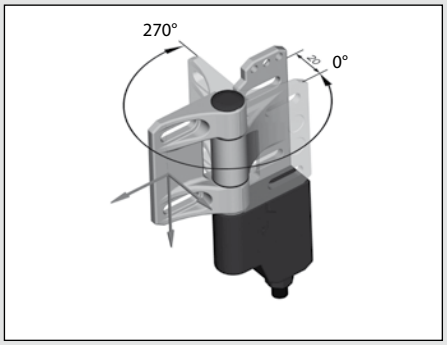
Mechanical data		
Actuator		Steel/PA
U-section		Steel
Minimum actuating radius	R_{min}	400 mm

Safety Hinge Switch – SHS3



With the SHS3 safety hinge switch BERNSTEIN presents the logical further development of the SHS series and a solution that makes it unnecessary to replace the safety hinge switch when equipment such as safety gates are damaged as the result of mechanical stress, such as after being bumped by a fork-lift truck for instance. Even after the switching point has been set, if need be, the user can now correct the hinge setting with the aid of the integrated fine adjustment system. The SHS3 hinge switch is reusable even when the entire system needs to be converted: With the aid of a change kit, the user can redefine the switching point without using the high protection rating of IP67.

The SHS3 has a swivel range from 0° to 270°. The switching point is also freely selectable within this range.



The SHS3 hinge switch has virtually no limits in terms of its installation flexibility. Not only does the SHS3 enable front and interior installation, right-hinged or left-hinged mounting or freely selectable direction of electric connection, but thanks to the switching point which can be set in an angle range of 270°, this hinge switch can also be installed in places that were previously not possible.

Safe:

With suitable system layout, the switch can be used up to performance level e. Following variants are available:

- 2 positive opening safety contacts
- 2 positive opening safety contacts with additional normally-open signalling contact
- With integrated AS interface Safety at Work.

Flexible:

- Freely and repeatedly adjustable switching point
- Switching point freely adjustable by user over a range of 270°
- Uncomplicated re-adjustment even of set switching point by ±1.5° thanks to integrated fine adjustment system
- Slots for mounting on sections and welded structures
- In addition to the plug connection version, an SHS with fixed cable connec tion at the rear is also available
- Right and left hinged systems possible for optimum cable routing
- Mounting between sections while maintaining the required finger guard gap

Fast:

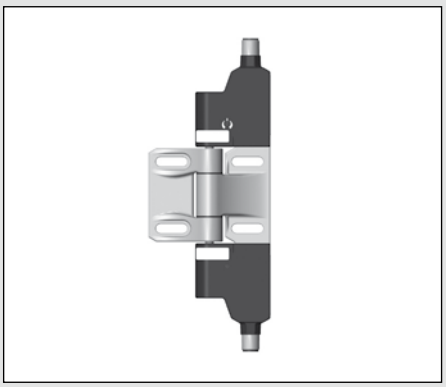
To connect the SHS3 even more efficiently, the two contacts are designed as normally-closed contacts with Ultra-Lock technology, thus enabling connection with an M12 cable.

Reliable:

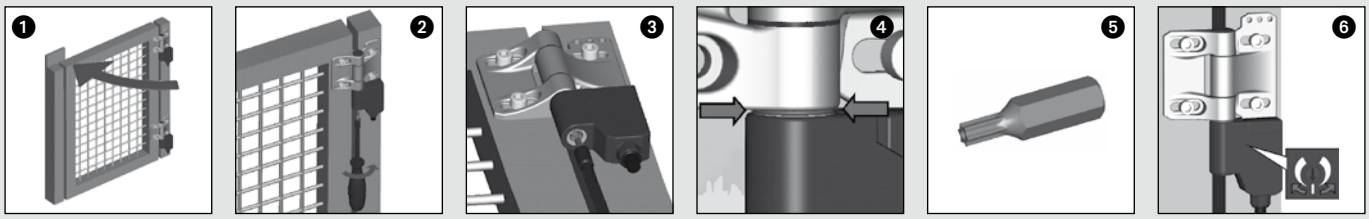
- The protection rating is IP67
- The load-bearing hinge is made from stainless steel while the switching system is housed in a high quality plastic enclosure

Double hinge

Thanks to its two switching elements on one hinge, the BG (occupational health and safety)-approved variant of the SHS3 provides two independently adjustable switching points. This arrangement not only makes it possible to monitor the opening of a safety guard but also the direction of opening of swing doors.



SHS3 – Setting the switching point



On delivery, the SHS3 hinge switch allows for all possible settings. With your specific application you define and lock the safe status of the hinged safety equipment (the closed position) (Fig. 1).

The adjusting screw located in axial direction in the switching system is then tightened with the special bit supplied with the hinge switch. The arrangement of the adjusting screw makes it possible to adjust the switching point in all installation positions (Fig. 2+3)

After establishing a form-fit connection, a green ring in the gap between the stainless steel hinge and switch enclosure indicates that the switching point has been set correctly at a min. torque of 2 Nm/+10% (Fig. 4).

A red ring at this point additionally indicates wear, e.g. caused by abrasive substances. With the same special bit you can not only freely adjust the switching point to suit your application but you can also change the mounting arrangement of your safety equipment from right-hinged to left-hinged (Fig. 5).

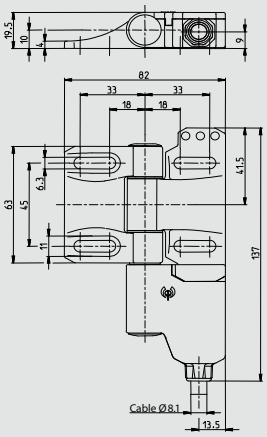
Fine adjustment

The set switching point can be subsequently varied by up to ±1.5% by turning the adjusting screw in the corresponding direction (Fig. 6).

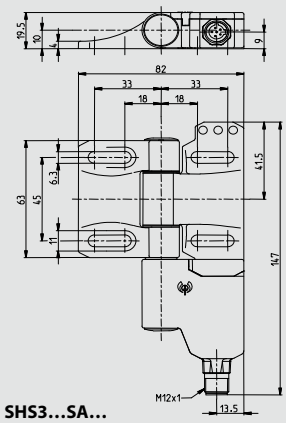
In many cases this fine adjustment makes it unnecessary to replace the switch or readjust the switching point due to mechanical deformation of the safety guard. The switching angle should generally be selected as small as possible.

Dimensioned drawings

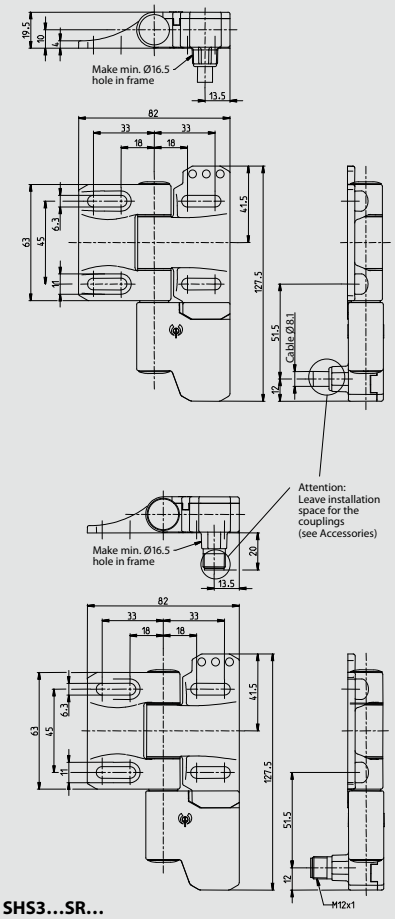
SHS3…KA…



SHS3…SA…



SHS3…KR…

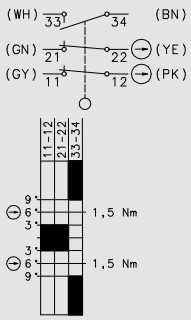


SHS3…SR…

Dimensioned drawings

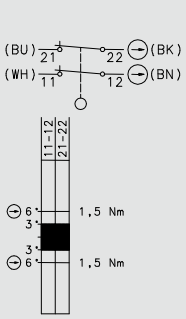
U15Z

2 NC contacts,
2 NO contacts (Zb)



A2Z

2 NC contacts (Zb)



Setting point freely selectable in range from 0°... 270° and 0°…180°

Tolerances:

Switching angle (opening) ± 1.5°
Positive opening torque 10 %
Positive opening angle ± 1.5°

Product selection

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Type of connection and direction		Required cable coupling / type	Mounting
					radial	axial		
6019390023	SHS3-U15Z-KA 5 L	2NC/1NO	230 V	AC/DC		Cable		Left
6019390022	SHS3-U15Z-KA 5 R	2NC/1NO	230 V	AC/DC		Cable		Right
6019390025	SHS3-U15Z-KR 5 L	2NC/1NO	230 V	AC/DC	Cable			Left
6019390024	SHS3-U15Z-KR 5 R	2NC/1NO	230 V	AC/DC	Cable			Right
6019390035	SHS3-U15Z-SA L	2NC/1NO	230 V	AC/DC		M12	D	Left
6019390034	SHS3-U15Z-SA R	2NC/1NO	230 V	AC/DC		M12	D	Right
6019390037	SHS3-U15Z-SR L	2NC/1NO	230 V	AC/DC	M12		D	Left
6019390036	SHS3-U15Z-SR R	2NC/1NO	230 V	AC/DC	M12		D	Right
6019390040	SHS3-A2Z-SA-R	2NC	230 V	AC/DC		M12	E	Right
6019390041	SHS3-A2Z-SA-L	2NC	230 V	AC/DC		M12	E	Left
6019390044	SHS3-A2Z-SR-R	2NC	230 V	AC/DC	M12		E	Right
6019390042	SHS3-U1Z-SA-R	1NC/1NO	230 V	AC/DC		M12	E	Right
6019390043	SHS3-U1Z-SA-L	1NC/1NO	230 V	AC/DC		M12	E	Left
6019390045	SHS3-U1Z-SR-R	1NC/1NO	230 V	AC/DC	M12		E	Right
6019390046	SHS3-2-SA/2-SA	2 x 2NC	230 V	AC/DC		M12	2 x E	Both sides
6019390047	SHS3-5-SA/5-SA	2 x 1NC/1NO	230 V	AC/DC		M12	2 x E	Both sides
6019390048	SHS3-7-KA5/7-KA5	2 x 1NC/1NO	230 V	AC/DC	Cable			Both sides
6019390039	SHS3-7-SA/7-SA	2 x 1NC/1NO	230 V	AC/DC		M12	2 x D	Both sides
6019390038	SHS3-HINGE (blank hinge)							Both sides

Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V
Rated operating voltage	U_e max.	230 V AC; 24 V DC
Conventional thermal current	I_{the}	5 A
Utilization category	U_e /I_e	AC-15, U_e /I_e 230 V / 3 A; DC-13 U_e /I_e 24 V/1 A
Short-circuit protection		4 A gL/gG
Protection class		II, Insulated

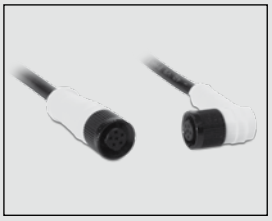
Mechanical data	
Switch	PBT / Hinge G-X22 Cr Ni 17
Ambient temperature	-25°C to +70°C (Connection cable installed)
Mechanical service life	10^6 switching cycles
Switching frequency max.	max. 300 switching cycles/hour
Mounting	4 x M6 Screws DIN EN ISO 7984
B10d	2 mill.
Type of connection	Fixed connection cable, 6 x 0.75 mm², minimum bending radius = 60 mm
Weight	approx. 0.7 kg (cable variant)
Installation position	Any
Protection class	IP67 conforming to IEC/EN 60529
Switching angle	± 3° from setting point
Positive opening angle	± 6° + 2
Positive opening torque	1.5 Nm
Mechanical load	F_{R1} = max. 1200 N, F_{R2} = max. 500 N, F_A = max. 1200 N

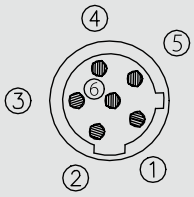
Standards
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

SHS3 Cable Type D

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251006291	AN-KAB.SHS3 2M STRAIGHT	2 m	Straight	6	M12 BG version
3251006292	AN-KAB.SHS3 5M STRAIGHT	5 m	Straight	6	M12 BG version
3251006293	AN-KAB.SHS3 10M STRAIGHT	10 m	Straight	6	M12 BG version
3251006294	AN-KAB.SHS3 2M ELBOW	2 m	Elbow	6	M12 BG version
3251006295	AN-KAB.SHS3 5M ELBOW	5 m	Elbow	6	M12 BG version
3251006296	AN-KAB.SHS3 10M ELBOW	10 m	Elbow	6	M12 BG version

Contact assignments, AC/DC versions





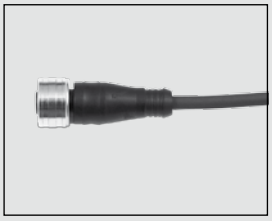
1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Grey
6 = Pink

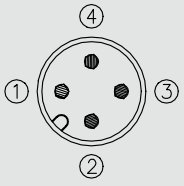
Core insulation/sheathing material:	PVC (∅ 5.6 mm)
Moulding/contact carrier material:	PUR Elastollan R3000
Max. rated voltage:	250 V AC
Max. current carrying capacity:	2.5 A (at 70 °C)
Min./max. temperature range:	–5 °C to +105 °C (moved)
	–40 °C to +105 °C (moved firmly)
Cable configuration mm²:	LiYwUL2517 6 x 0.34
Protection class when assembled:	IP68

SHS3 Cable Type E

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251004310	AN-KAB.SHS3 4P 2M STRAIGHT	2 m	Straight	4	M12 BG version
3251004311	AN-KAB.SHS3 4P 5M STRAIGHT	5 m	Straight	4	M12 BG version
3251004312	AN-KAB.SHS3 4P 10M STRAIGHT	10 m	Straight	4	M12 BG version
3251004313	AN-KAB.SHS3 4P 2M ELBOW	2 m	Elbow	4	M12 BG version
3251004314	AN-KAB.SHS3 4P 5M ELBOW	5 m	Elbow	4	M12 BG version
3251004315	AN-KAB.SHS3 4P 10M ELBOW	10 m	Elbow	4	M12 BG version
3251004316	AN-KAB.SHS3 4P U.L. 2M STRAIGHT	2 m	Straight	4	Ultra Lock BG version
3251004317	AN-KAB.SHS3 4P U.L. 5M STRAIGHT	5 m	Straight	4	Ultra Lock BG version
3251004318	AN-KAB.SHS3 4P U.L. 10M STRAIGHT	10 m	Straight	4	Ultra Lock BG version
3251004319	AN-KAB.SHS3 4P U.L. 2M ELBOW	2 m	Elbow	4	Ultra Lock BG version
3251004320	AN-KAB.SHS3 4P U.L. 5M ELBOW	5 m	Elbow	4	Ultra Lock BG version
3251004321	AN-KAB.SHS3 4P U.L. 10M ELBOW	10 m	Elbow	4	Ultra Lock BG version

Contact assignments, AC/DC versions





1 = White
2 = Brown
3 = Blue
4 = Black

Core insulation/sheathing material:	Heat resistant PVC UL 1731 / UL 2517 black
Moulding/contact carrier material:	APEX 7500-85 / R3000 Elastollan R3000 neutral
Max. rated voltage:	250 V
Max. current carrying capacity:	4 A
Min./max. temperature range:	At rest –25 °C to +105 °C
	Moved –5 °C to +105 °C
Protection class when assembled:	IP68

Change kit for re-adjusting switching point



Article number	Designation
3991990161	SHS3 change kit
Containing:	
2 replacement caps	
1 special bit	
1 plastic ring	

Installation tool



Article number	Designation
1910000005	Bit holder 1/4" flexible stem

Safety Hinge Switch – SHS



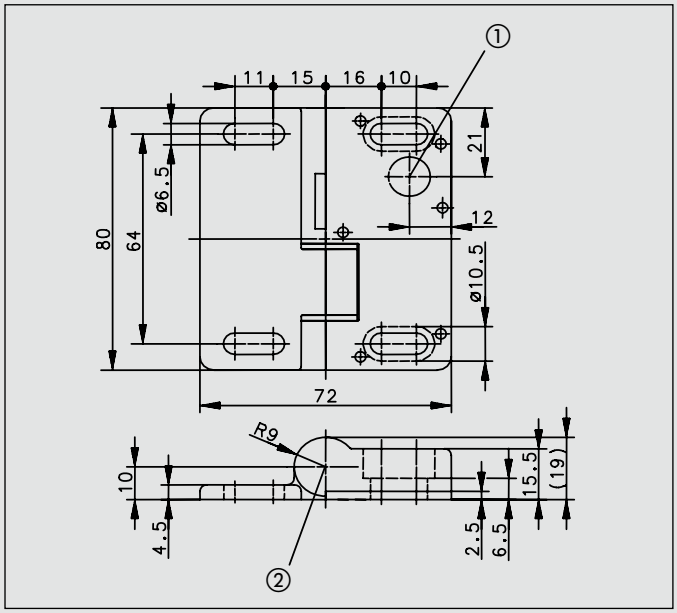


Illustration showing fixed pin and shearing bolt sheared off

① Position of connection variant 2, 5 and 6.

② Position of connection variant 1, 3 and 4.

Protective hoods and safety guards on machines such as gates in safety gate systems are often pivot mounted with hinges.

Since BERNSTEIN presented the world's first safety hinge switch SHS in 2002 it is hard to imagine modern production installations without it. It combines a hinge and safety switch in one single functional unit.

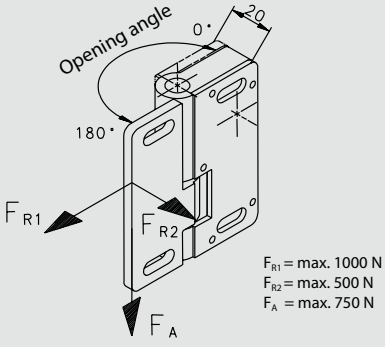
The design of the SHS safety hinge switch has been optimised to allow its effective use on aluminium section systems. Its shallow depth, even when fully opened, makes it ideally suited for use in constricted installation conditions on machines. Safety switches with separate actuators are often subjected to high mechanical stresses, especially when they are mounted on closing edges. The SHS hinge switch sets new standards. The safety guard is monitored directly in the hinge.

The concealed arrangement of the safety switch provides a high degree of protection against tampering. One or several SHS switches are be used depending on control requirements.

In many applications the conventional load bearing hinge can be replaced by a blank hinge with identical design features as the safety hinge. This has significant rationalisation benefits. The only parameter you need to take into account is the maximum extension of the hinged safety equipment that results from the switching angle and the permissible safe opening in the area of the closing edges. The SHS hinge switch provides maximum anti-tamper protection as, once set, the switching point can no longer be changed.

Safe:

- 2 SHS hinge switches, each equipped with a positively opening safety contact, allows you to configure a system up to performance level e



Flexible:

- The angle range extends from 0 to 225°
- A safety device ensures positive locking after the switch has been set
- In addition to the plug connection version, an SHS with fixed cable connection at the rear is also available

Fast:

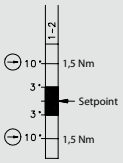
- Plug connector and fixed cable connections are available for axial and radial (rear) connection
- An AC/DC version (up to 250 V) or a DC version (up to 60 V) is available, depending on the configuration of the safety circuit

Reliable:

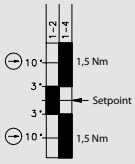
- A pressure die-cast zinc enclosure allows versatile use of the SHS switch in varied applications
- When used as a load bearing hinge, the SHS takes up loads of up to 750 N in axial direction and 1000 N in radial direction after the switching point has been finally set
- The protection rating is IP67

Switching diagram

1 NC contact (Type B)



1 Changeover contact (Type C)

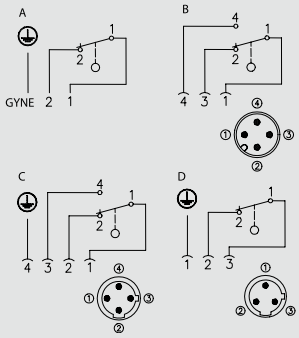


Setting point freely selectable in range from 0°... 225°

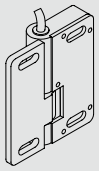
Tolerances:
Switching angle (opening) +2.0°/-1.5°
Positive opening torque 10 %
Positive opening angle +0.5°/-3°

Switching angle hysteresis (closing of normally-closed contact -1.0°) from typical hinge switch-off point

Connection drawing

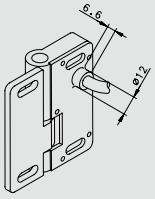


Connection variant 1



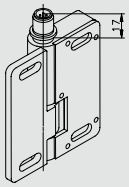
Cable, PVC

Connection variant 2



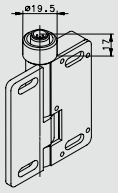
Cable, PVC

Connection variant 3



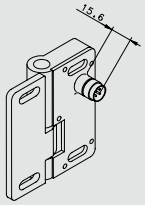
Connector M12 x 1, metal thread

Connection variant 4



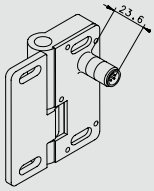
Connector M12 x 1, metal thread

Connection variant 5



Connector M12 x 1

Connection variant 6



Connector M12 x 1

Product selection

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Type of connection and direction		Required cable coupling/type	Remarks
					radial	axial		
6019261011	SHS-A1Z-KA 5	1NC	230 V	AC/DC		Cable		BG approval
6019261014	SHS-A1Z-KR 5	1NC	230 V	AC/DC	Cable			BG approval
6019261017	SHS-A1Z-SA-BG	1NC	230 V	AC/DC		M12	A	BG approval
6019261018	SHS-A1Z-SR-BG	1NC	230 V	AC/DC	M12		A	BG approval
6019261009	SHS-A1Z-SA	1Changeover contact	230 V	AC/DC		M12	C	
6019261010	SHS-A1Z-SR	1Changeover contact	60 V	DC	M12		B	
6019261015	SHS-A1Z-SA	1Changeover contact	60 V	DC		M12	B	
6019261016	SHS-A1Z-SR	1Changeover contact	230 V	AC/DC	M12		C	
6019291013	SHS-0Z							Blank hinge

Technical data

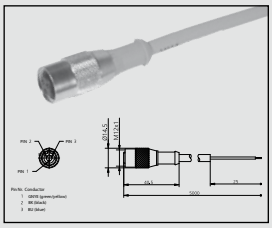
Electrical data		
Rated insulation voltage	U_i	250 V
Rated surge voltage strength	U_{imp}	2.5 kV
Thermal current	I_{the}	3 A
Rated operating voltage	U_e	230 V AC; 60 V DC
Utilization category		AC-15, 230 V AC/1.5 A;
Positive opening	⊕	conforming to IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 4 A gL/gG
Mechanical data		
Switch		GD-Zn
Ambient temperature		-25°C to +70°C (Connection cable installed)
Mechanical service life		10^6 switching cycles
B10d		2 mill.
Switching frequency		max. 1200 switching cycles/hour
Mounting		4x M6 screws DIN 7984 or DIN 6912
Type of connection		Fixed connection cable, 3 x 0.5 mm^2 x 5 m (AWG20), minimum bending radius = 25 mm
Weight		approx. 0.7 kg (cable variant) approx. 0.4 kg (connector and blank hinge variant)
Installation position		Any
Protection class		IP67 as per IEC/EN 60529
Switching angle		± 3° from setting point
Positive opening angle		± 10° from setting point
Positive opening torque		1.5 Nm
Mechanical load		F_{R1}= max. 1000 N, F_{R2}= max. 500 N, F_A = max. 750 N
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

SHS Cable Type A

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251103234	AN-KAB.SHS 5M AC GERADE	5 m	Straight	3	AC/ DC BG version
3251103236	AN-KAB.SHS 5M AC WINKEL	5 m	Elbow	3	AC/ DC BG version

Contact assignments, AC/DC versions

1 = Green/yellow
2 = Black
3 = Blue



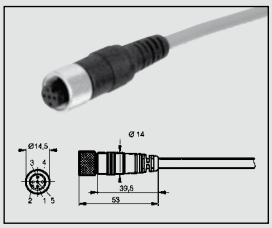
Core insulation/sheathing material:	PVC (UL)/PVC (UL)
Moulding/contact carrier material:	PUR (UL)/PUR (UL)
Max. rated voltage:	300 V AC
Max. current carrying capacity:	3 A
Min./max. temperature range:	–25 °C/+70 °C
	–13 °F/+158 °F
Cable configuration mm²:	3 x 0.5
Protection class when assembled:	IP67

SHS Cable Type B

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251003221	AN-KAB.SHS 2M DC STRAIGHT	2 m	Straight	3	DC approval
3251003222	AN-KAB.SHS 5M DC STRAIGHT	5 m	Straight	3	DC approval
3251003223	AN-KAB.SHS 10M DC STRAIGHT	10 m	Straight	3	DC approval
3251003224	AN-KAB.SHS 2M DC ELBOW	2 m	Elbow	3	DC approval
3251003225	AN-KAB.SHS 5M DC ELBOW	5 m	Elbow	3	DC approval
3251003226	AN-KAB.SHS 10M DC ELBOW	10 m	Elbow	3	DC approval

Contact assignments, DC versions

1 = Brown
2 = –
3 = Blue
4 = Black



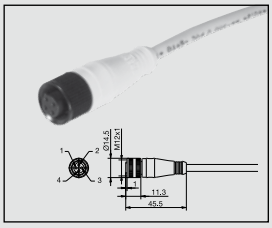
Core insulation/sheathing material:	PVC/PVC
Moulding/contact carrier material:	PUR/PUR
Max. rated voltage:	60 V AC/75 V DC
Max. current carrying capacity:	1.5 A
Min./max. temperature range:	–25 °C/+70 °C
	–13 °F/+158 °F
Cable configuration mm²:	3 x 0.34
Protection class when assembled:	IP67

SHS Cable Type C

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251004219	AN-KAB.SHS 5M AC STRAIGHTE	5 m	Straight	4	AC/DC-approval
3251004220	AN-KAB.SHS 5M AC ELBOWE	5 m	Elbow	4	AC/DC-approval

Contact assignments, AC/DC versions

1 = Brown
2 = Black
3 = Blue
4 = Green/yellow



Core insulation/sheathing material:	PVC/PVC
Moulding/contact carrier material:	PUR/Nylon 6.6
Max. rated voltage:	300 V AC
Max. current carrying capacity:	4.0 A
Min./max. temperature range:	–5 °C/+70 °C
	–13 °F/+158 °F
Cable configuration mm²:	4 x 0.34
Protection class when assembled:	IP68

Notes

I88 VKS, -VKW, -AHDB; GC VKS, -VKW; Ti2 AHDB



I88-AHDB



I88-VKW

Safety switches for hinged protective equipment

These switches are suitable for applications where SHS switches cannot be used. They are used for safety monitoring of safety gates, safety guards and protective equipment. Two different types of actuator are available for this type of safety switch. The actuators also differ in terms of their attachment to the safety guards.

The AHDB actuator is available in the Ti2 and I88 families. The switch is attached in such a way that a spindle on the safety guard or on the hinge can enter the hole in the safety switch. The safety contact is opened by turning the spindle when opening the safety guard. The switch can be actuated in both directions without a limit stop.

The VKS and VKW actuators are part of the I88 and GC families. The switch is mounted next to the safety guard. The lever fixture is mounted on the safety guard and opens the safety contact as it moves. The integrated longitudinal guide compensates for different pivot radii.

Two different actuator functions are available to facilitate use in varied applications:

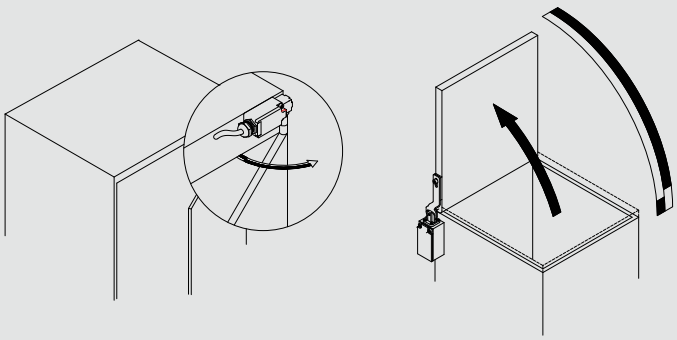
- **VKS with vertical setting**

  The safety contact is opened when the lever fixture is moved out of its vertical setting in one of the two possible pivot directions.

- **VKW with horizontal setting**

  The safety contact is opened as the lever fixture moves out of its horizontal setting. A distinction is made between VKW RE (right) and VKW LI (left) in connection with I88 switches. This designation makes it possible to identify whether the switch can be mounted on the right-hand or left-hand side of the safety guard. The GC family only contains switches for mounting on the left-hand side.

Both variants allow maximum pivot movements of 180°.



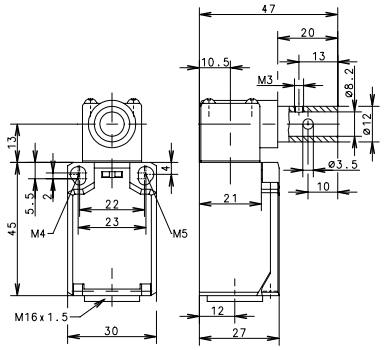
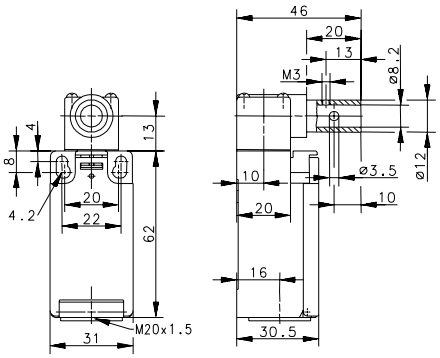
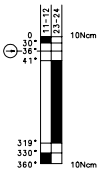
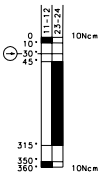
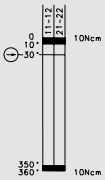


GC-VKS

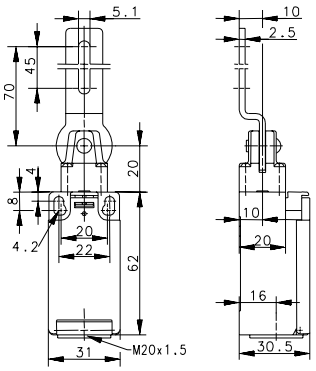
Technical data

			Ti2 AHDB	I88 AHDB	I88	GC
Electrical data						
Rated insulation voltage	U_i		250 V AC	250 V AC	250 V AC	400 V AC
Conventional thermal current	I_{the}	U1Z A2Z	10 A –	10 A 5 A	10 A 5 A	10 A 5 A
Rated operating voltage	U_e		240 V	240 V	240 V	240 V
Utilization category		U1Z A2Z	AC15, 240 V/3 A, –	AC-15, U_e /I_e 240 V / 3 A AC-15, U_e /I_e 240 V / 1.5 A	AC-15, U_e /I_e 240 V / 3 A AC-15, U_e /I_e 240 V / 1.5 A	AC-15, U_e /I_e 240 V / 3 A –
Positive opening action NC contacts	⊕		As per IEC/EN 60947-5-1, Addendum K	As per IEC/EN 60947-5-1, Addendum K	As per IEC/EN 60947-5-1, Addendum K	As per IEC/EN 60947-5-1, Addendum K
Short-circuit protection			Fuse 6A gL/gG	Fuse 10A gL/gG	Fuse 10A gL/gG	Fuse 10A gL/gG
Protection class			II, Insulated	II, Insulated	II, Insulated	I
Mechanical data						
Enclosure			PBT, glass fibre-reinforced	Thermoplastic, glass fibre-reinforced (UL 94-V0)	Thermoplastic, glass fibre-reinforced (UL 94-V0)	Aluminium pressure die-casting
Cover			PA6.6, black	Thermoplastic, glass fibre-reinforced (UL 94-V0)	Thermoplastic, glass fibre-reinforced (UL 94-V0)	Sheet aluminium
Actuation			Axis lever enclosure, lever (metal)	Axis lever enclosure, lever (metal)	Lever (metal)	Lever (steel)
Ambient temperature			-30°C to +80°C	-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Mechanical service life			1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d			2 mill.	2 mill.	2 mill.	2 mill.
Switching frequency			≤ 50 / min.	≤ 50 / min.	≤ 50 / min.	≤ 20 / min.
Mounting			2 x M4 or 2 x M5 fixed positioning for safety applications	2 x M4	2 x M4	2 x M4
Type of connection			Screw connections	Screw connections	Screw connections	Screw connections
Conductor cross sections			Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5
Cable entry			1 x M20 x 1,5	1 x M20 x 1,5	1 x M20 x 1,5	1 x M20 x 1,5
Installation position			Any	Any	Any	Any
Protection class			IP65 as per EN 60529	IP65 as per EN 60529	IP65 as per EN 60529	IP65 as per EN 60529
Standards						
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1						

① Depending on switching system. See Table on Pages 76-79.

	Ti2 AHDB	I88 AHDB
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6188100030** TI2-U1Z AHDB 	**6186100267** I88-U1Z AHDB 
2 NC contact		**6186800324** I88-A2Z AHDB 
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request)	**Special features/variants** (on request) ● Available in different actuation directions

I88 VKS

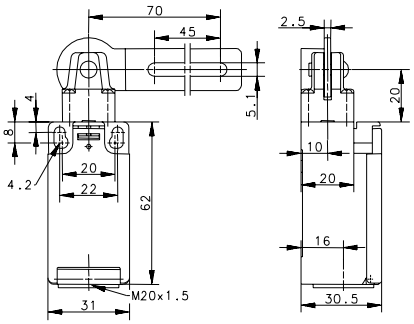


Slow-action	Snap-action
6086100093 I88-U1Z VKS	
6186800447 I88-A2Z VKS	

Replacement actuator: -

Special features/variants
(on request)

I88 VKW RE

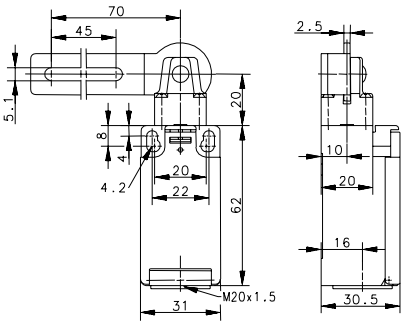


Slow-action	Snap-action
6086100094 I88-U1Z VKW RE	

Replacement actuator: -

Special features/variants
(on request)

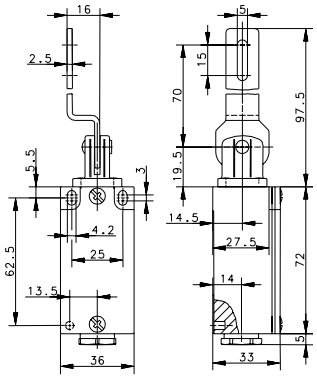
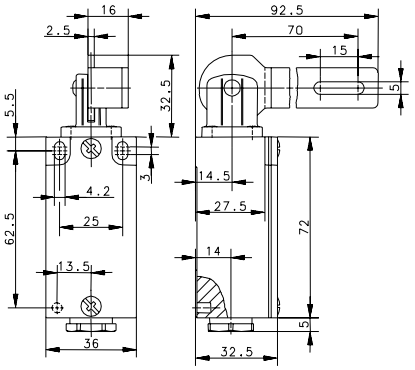
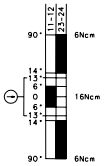
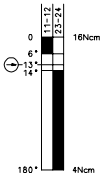
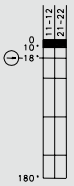
I88 VKW LI



Slow-action	Snap-action
6086100095 I88-U1Z VKW LI	

Replacement actuator: -

Special features/variants
(on request)

	GC VKS	GC VKW
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6121100622** GC-U1Z VKS 	**6121100623** GC-U1Z VKW 
2 NC contact		**6121800940** GC-A2Z VKW 
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request)	**Special features/variants** (on request)

Notes

SRM, SR



SRM



SR

General information on safety cable pull switches

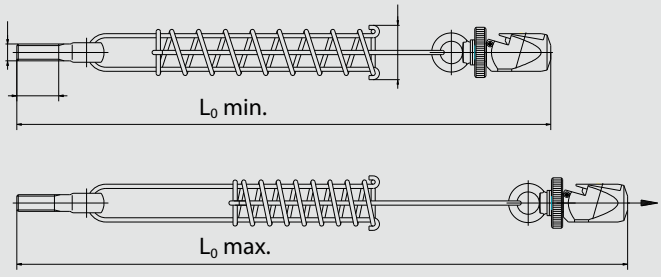
The series SR and SRM safety cable pull switching devices developed and manufactured by BERNSTEIN AG are designed and approved in accordance with the standards IEC 947-5-5, DIN EN 60947-5-5 and ISO 13850, i.e. on actuation or in the event of cable breakage, the emergency stop switching device locks automatically and can only be reset to its initial setting by means of the resetting device on the switch.

In order for the overall system to conform to the standards EN 60947-5-5 and EN 13850 governing the emergency stop function of cable pull switches it is necessary to integrate a spring in the system. The reasoning behind this requirement is that a person who triggers the emergency stop functions does not need to consider the activation direction. With the spring it is possible to pull the cable in the direction of the cable pull switch, thus activating the emergency stop function.

Safety cable pull switches may only be used in control power circuits. Safety cable pull switches are used on accessible sides of conveyor systems or machines. In contrast to Emergency Stop switching devices (e.g. mushroom pushbuttons) installed at intervals, with which the emergency stop signal can only be generated at the device itself, with the safety cable pull switch it is possible to generate the signal at any point in a section. Depending on the type of switching device, a span of up to 75 m can be achieved with a pull cable connected to the pulling element.

The maximum possible span length of a pull cable switch is always dependent on the temperature fluctuations to which the system is exposed. It is possible that the pull cable switch may trip due to the fact that, owing to its temperature coefficient, the length of the steel cable can change in response to changes in temperature. Ultimately, this change in length is dependent on the length of the cable, the difference in the temperature change and the type of springs used in the pull cable switch. Overview 1 shows which cable lengths are possible as a function of change in temperature.

Pull cable counterspringr
With overstretch safeguard based on compression spring principle



Application		
Type	SR...100/SR...175/SRM...175	SR...300/SRM...300
Spring Art. No.	**3911042153**	**3911042154**
$L_{0\,min.}$	383	483
$L_{max.}$	487	653

Advantages of SRM/SR safety cable pull switches:

- The SR (plastic enclosure) and SRM (metal enclosure) safety cable pull switches are available with the Quickfix quick-connect system, which renders unnecessary cable eye stiffeners, cable grips and turnbuckles that are otherwise required for mounting the cable. Added to this, the time required to install the cable is drastically reduced. Versions with a conventional eye are, of course, also available.

- All variants of the SRM and especially of the SR are equipped with an integrated emergency stop impact button that can be actuated by pressing in hazardous situations. In the same way as pulling the pull cable, the safety contacts are opened and the switch is locked.

- The type SRM...E-... safety cable pull switches are optionally available with a remote indicator for monitoring the cable tension. This option has an integrated sensor unit that monitors situations in which the cable tension may overshoot or undershoot the permissible value or triggering of the safety cable pull switch is imminent. This electronic output signals in good time that maintenance/adjustment is required otherwise the machine will shut down. This output can also be used for event signalling purposes or optionally available indicator lamps can be connected. This connection configuration con forms to "preventative maintenance" requirements.

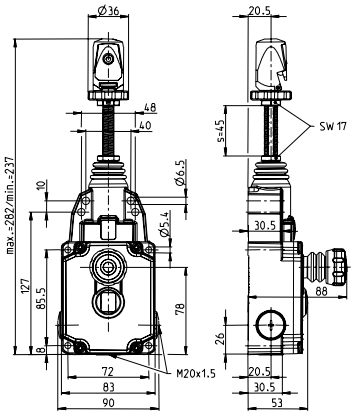
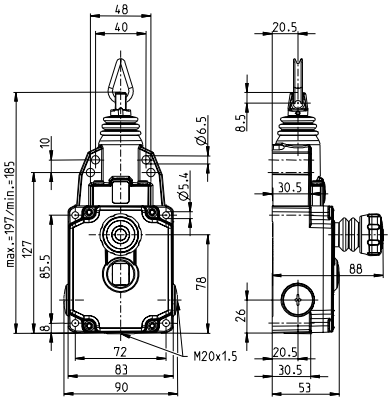
- During installation/adjustment of the cable span, the correct tension of the cable can be checked through the integrated inspection window. To ensure optimum cable tension as part of the adjustment procedure, the tips of the indicator arrows should be aligned with the marking.

- A second inspection window integrated in the SRM version makes it possible to check the status of the locking function and of the contacts. Yellow in the inspection window indicates that the safety cable pull switch is locked. Green in the inspection window indicates that the cable pull switch is ready for operation and the cable assembly is monitored.

Overview 1

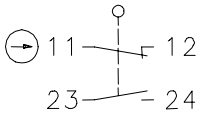
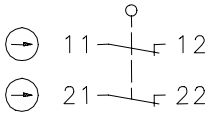
| | **Span L max. in metres [m]** | | |

Safety Cable Pull Switches

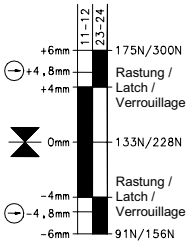
Max. span length	**75 metres** (Dimensioned drawing 1)		**37,5 metres** (Dimensioned drawing 2)	
				
	2 Ö/2 S	**3 Ö/1 S**	**2 Ö/2 S**	**3 Ö/1 S**
Quickfix (Dimensioned drawing 1)	**6012929087** SRM-U1Z/U1Z-QF-300	**6012999096** SRM-A2Z/U1Z-QF-300	**6012929085** SRM-U1Z/U1Z-QF-175	**6012999094** SRM-A2Z/U1Z-QF-175
Öse (Dimensioned drawing 2)	**6012921091** SRM-U1Z/U1Z-LU-300	**6012991100** SRM-A2Z/U1Z-LU-300	**6012921089** SRM-U1Z/U1Z-LU-175	**6012991098** SRM-A2Z/U1Z-LU-175
Quickfix **with remote monitoring** (Dimensioned drawing 1)	**6012929088** SRM-U1Z/U1Z-QF-300-E	**6012999097** SRM-A2Z/U1Z-QF-300-E	**6012929086** SRM-U1Z/U1Z-QF-175-E	**6012999095** SRM-A2Z/U1Z-QF-175-E
Eye **with remote monitoring** (Dimensioned drawing 2)	**6012921092** SRM-U1Z/U1Z-LU-300-E	**6012991101** SRM-A2Z/U1Z-LU-300-E	**6012921090** SRM-U1Z/U1Z-LU-175-E	**6012991099** SRM-A2Z/U1Z-LU-175-E
Approvals				

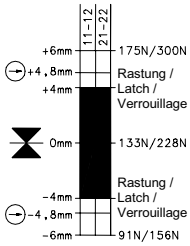
Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current	I_{the}	10 A
Utilization category	U_e /I_e	AC-15, U_e /I_e 240 V / 3 A; 120 V/6 A DC-13 U_e /I_e 250 V/0.27 A; 125 V/0.55 A
Short-circuit protection		6 A gL/gG
Protection class		I
Mechanical data		
Enclosure	Aluminium pressure die-casting	
Ambient temperature	-30°C to +80°C	
Mechanical service life	1 x 10^5	
Switching frequency max.	≤ 20 / min.	
Mounting	4 x M6 or 4 x M5	
B10d	0.2 mill.	
Type of connection	Screw connections	
Conductor cross sections	Single-wire 0.5 - 1.5 mm^2	
Cable entry	3 x M20 x 1.5	
Protection class	IP67 conforming to IEC/EN 60529	
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 VDE 0660 T210, DIN EN 60947-5-5, IEC 60947-5-5 ISO 13850		

Contact type	**1 Ö / 1 S (Zb)**	**2 Ö (Zb)**
Action contacts	**U1Z**	**A2Z**
Circuit symbol	**Slow-action contacts** 	**Slow-action contacts** 
Schaltdiagramm		

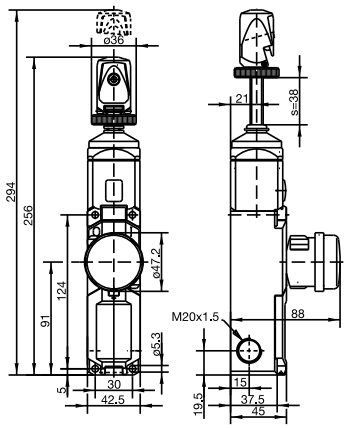
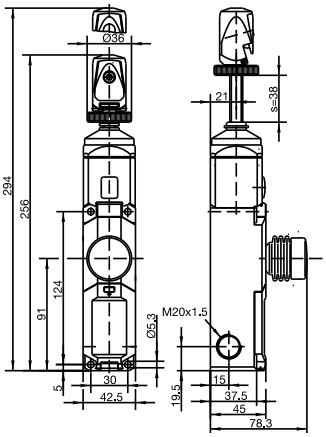
On
OFF





The pulling force data depend on the type of switch used. (SRM...175/SRM...300)
Tolerances: Switching point +/- 0.5 mm, actuating force +/- 15 %

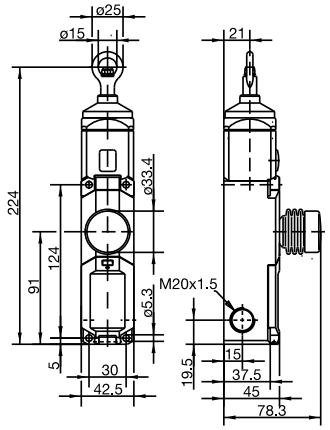
Safety Cable Pull Switches

Max. span length	**75 metres** (Dimensioned drawing 1)		**37.5 metres** (Dimensioned drawing 2)	
				
	2 Ö/2 S	**4 Ö**	**2 Ö/2 S**	**4 Ö**
Quickfix (Dimensioned drawing 1)	**6011629028** SR-U2Z-QF 300	**6011691051** SR-A4Z-QF 300	**6011629024** SR-U2Z-QF 175	**6011691050** SR-A4Z-QF 175
Quickfix N.A. (Dimensioned drawing 2)	**6011629019** SR-U2Z-NA-QF 300	**6011691054** SR-A4Z-NA-QF 300	**6011629027** SR-U2Z-NA-QF 175	**6011691053** SR-A4Z-NA-QF 175
Öse (Dimensioned drawing 3)	**6011620020** SR-U2Z 300	**6011691048** SR-A4Z 300	**6011621026** SR-U2Z 175	**6011691047** SR-A4Z 175
Approvals				

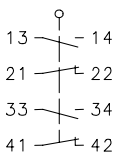
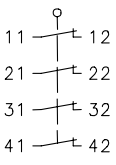
Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current	I_{the}	10 A
Utilization category	U_e /I_e	AC-15, U_e /I_e 240 V / 3 A
Short-circuit protection		6 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure	PA 6 GV (UL94-V0)	
Ambient temperature	-25°C to +70°C	
Mechanical service life	as per EN 60947-5-5	
Switching frequency max.	≤ 20 / min.	
Mounting	4 x M5	
B10d	0.02 mill.	
Type of connection	Cage clamp terminal	
Conductor cross sections	≤ 1.5 - 2 mm²	
Cable entry	3 x M20 x 1.5	
Protection class	IP67 conforming to IEC/EN 60529	
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 VDE 0660 T210, DIN EN 60947-5-5, IEC 60947-5-5 ISO 13850		

25 metres (Dimensioned drawing 3)



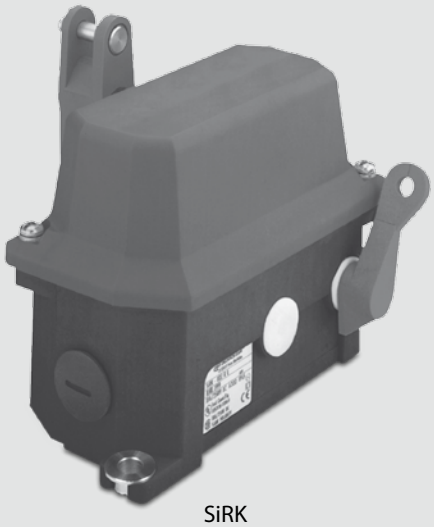
2 Ö / 2 S	4 Ö
6011629032 SR-U2Z-QF 100	**6011691049** SR-A4Z-QF 100
6011629031 SR-U2Z-NA-QF 100	**6011691052** SR-A4Z-NA-QF 100
6011621030 SR-U2Z 100	**6011691033** SR-A4Z 100

Contact type	**2 Ö / 2 S (Zb)**	**4 Ö**
Action contacts	**U2Z**	**A4Z**
Circuit symbol	**Slow-action contacts** 	**Slow-action contacts** 
Schaltdiagramm		

On
Off

The pulling force data depend on the type of switch used. (SR...100/SR...175/SR...300)
Tolerances: Switching point +/- 0.5 mm, actuating force +/- 15 %

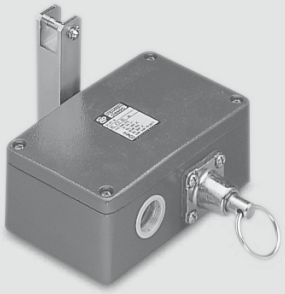
SiRK, Si1, Si2



SiRK



Si2



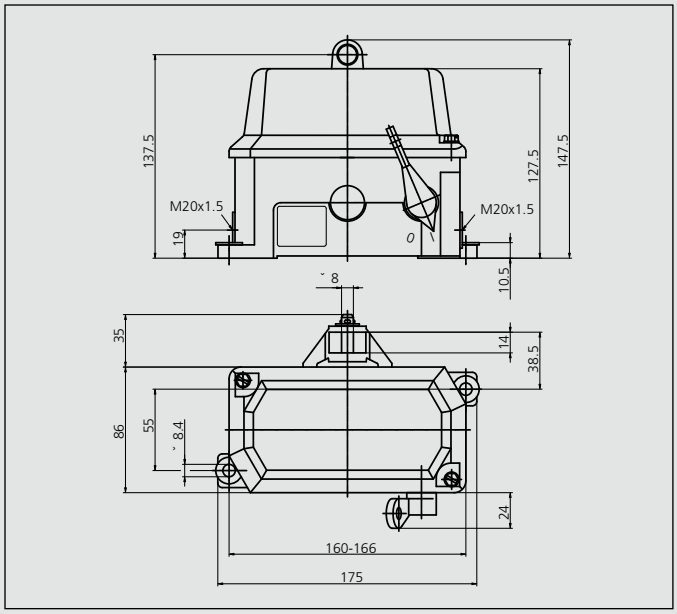
Si1

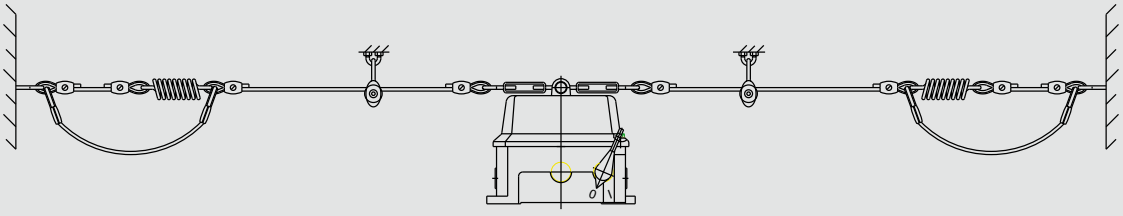
BERNSTEIN double-spanned cable pull switches (SiRK, Si1 and Si2) are also used in emergency stop applications. When the cable is pulled the switching lever is deflected in the corresponding direction and the system shut down.

The switches are available in two metal versions, the Si1 and Si2, as well as an insulation-enclosed version, the SiRK.

These types of cable pull switch are ideally suited for applications with high temperature fluctuations and long cable spans. With their sturdy enclosure, the Si1 and Si2 are the perfect switches for harsh environments.

Two cables spanned in opposite directions are attached to the switching device. The countersprings are secured to the wall at the ends of the cables. Provided the change in temperature is the same at all points along the cable, the springs will effectively compensate for the change in cable length.





Product selection

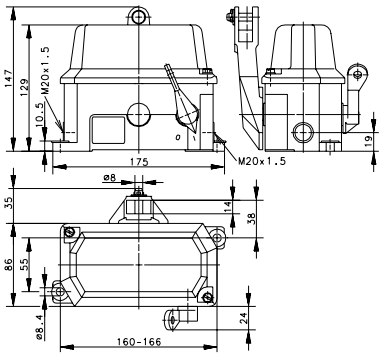
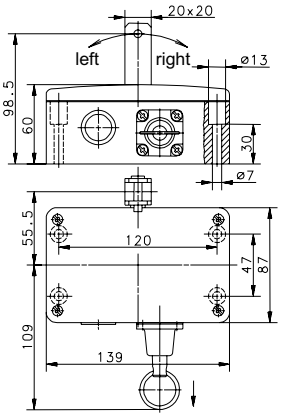
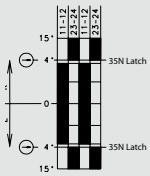
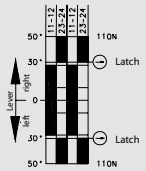
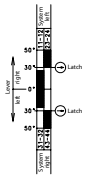
Designation	Max. span length
SI1-U2Z AK R-RAST	2 x 50 m
SI1-U1Z/U1Z AK R-RAST	2 x 50 m
SI2-U2Z AK R-RAST	2 x 50 m
SIRK-U2Z R	2 x 75 m

Technical data

		SiRK	Si1	Si2
Electrical data				
Rated insulation voltage	U_i	250 V AC	250 V AC	400 V AC
Rated operating voltage	U_e	240 V	250 V	240 V
Conventional thermal current	I_{the}	10 A	10 A	10 A
Utilization category		AC 15, A 300 240 V /3 A, 120 V /6 A DC 13, Q300 250 V/0.27 A, 125 V/0.55 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A
Positive opening action	⊕	as per IEC/EN 60947-5-1, Addendum K	as per IEC/EN 60947-5-1, Addendum K	as per IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 6 A gL/gG	Fuse 6 A gL/gG	Fuse 10 A gL/gG
Protection class		II, Insulated	I	I
Mechanical data				
Enclosure		ABS	Aluminium sand casting	Cast iron
Cover		ABS	Aluminium sand casting	Cast iron
Actuation		Lever, plastic (glass fibre-reinforced)	Lever (GRP)	Lever (GRP)
Ambient temperature		-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Contact type		2 NC / 2 NO contact (Zb)	2 NC / 2 NO contact (Zb)	2 NC / 2 NO contact (Zb)
Mechanical service life (up to)①		1 x 10^5 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
Switching frequency max.		Max. 30/min.	≤ 10 / min.	≤ 10 / min.
Mounting		2 x M8	4 x M8	4 x M8
B10d (up to)①		0,2 mill.	2 mill.	2 mill.
Type of connection		8 Screw connections (M3, 5)	8 Screw connections (M3, 5)	8 Screw connections (M3, 5)
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Cable entry		2 x M20 x 1.5	1 x M20 x 1.5	3 x M20 x 1.5
Weight		≈ 0.8 kg	≈ 1.62 kg	≈ 4.21 kg
Installation position		Any	Any	Any
Protection class		IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529
Standards				
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1				

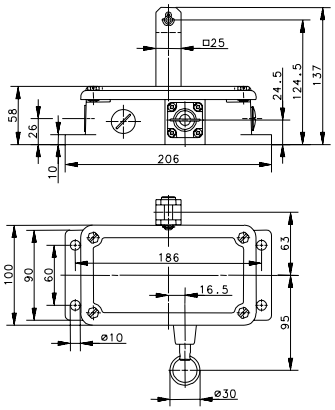
① Depending on switching system. See Table on Pages 76-79.

Double-Spanned Cable Pull Switches

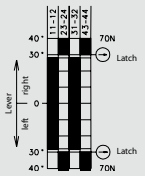
		SIRK	SI1
			
Variant 1	**Article No.** **Designation** Max. span	**6015625001** SIRK-U2Z R 2 x 75 m 	**6014735001** SI1-U2Z AK R-RAST 2 x 50 m 
Variant 2	**Article No.** **Designation** Max. span		**6014735025** SI1-U1Z/U1Z AK R-RAST 2 x 50 m 
Variant 3	**Article No.** **Designation** Max. span		

Technical Data		
Rated insulation voltage U_i max.	250 V AC	250 V AC
Rated operating voltage U_e max	240 V	240 V
Conventional thermal current I_{the}	10 A	10 A
Utilization category U_e/I_e	AC-15, 240 V/3 A, 120 V/6	AC-15, 240 V/3 A
Approvals		

SI2



6015735002
SI2-U2Z AK R-RAST
2 x 50 m



400 V AC
240 V
10 A
AC-15, 240 V/3 A

With and Without Latching Function



SEK



SEM2



SIEM2



SD



SID



SID



SIN

Because of their specifications governed by corresponding standards (see Cable Safety Pull Switches SRM/SR), these cable pull switches are used exclusively as safety command devices.

These switches are available in metal enclosures as well as in insulation-enclosed versions. They are operated manually by pulling on the attached cable.

Thanks to their pretension, these switches, which feature a switching contact with overlap, execute a switching function when the cable is pulled or in the event of cable breakage.

The field of application for these cable pull switches includes

- Opening and closing of (garage) doors
- Starting machines
- Issuing commands in production processes

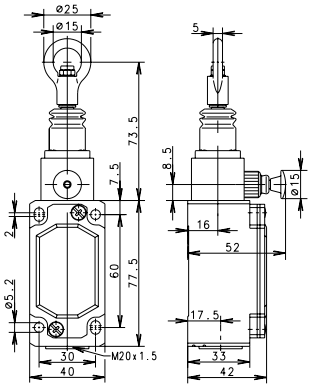
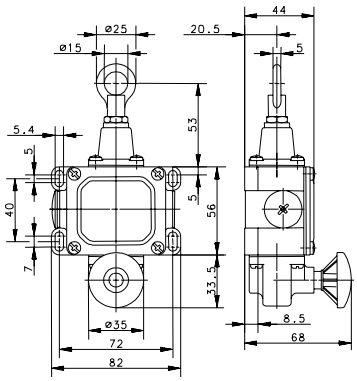
The basic design of the standard cable pull switches is based on that of position switches.

The specified cable length refers to the maximum length at minimum temperature variation. The maximum cable length may decrease under different environmental conditions.

Technical data		SEK	SiEK	SEM2	SiEM2
Electrical data					
Rated insulation voltage	U_i	400 V AC	400 V AC	400 V AC	400 V AC
Rated operating voltage	U_e	240 V	240 V	240 V	240 V
Conventional thermal current	I_{the}	10 A	10 A	10 A	10 A
Utilization category	U_e / I_e	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A
Mechanical data					
Switching frequency max.		≤ 50/min.	max. 100/min.	max. 50/min.	max. 50/min.
Mechanical service life		1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d		on request	on request	on request	on request
Short-circuit protection		Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG
Protection class		II, Insulated	II, Insulated	I	I
Ambient temperature		-30°C to +80°C	-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Protection class		IP65 conforming to IEC/EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529; DIN VDE 0470 T1
Type of connection		4 Screw connections (M3, 5)	4 Screw connections (M3, 5)	4 Screw connections (M3, 5)	Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Enclosure		Thermoplastic, glass fibre-reinforced	Thermoplastic, glass fibre-reinforced	Aluminium pressure die-casting	Aluminium pressure die-casting
Cable entry		1 x M20 x 1.5	1 x M20 x 1.5	1 x M20 x 1.5	1 x M20 x 1.5
Standards					
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1					

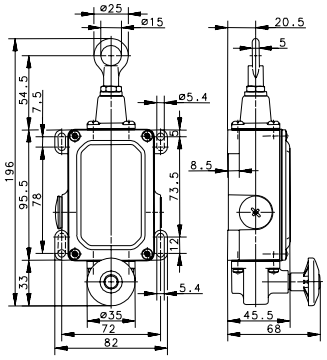
Technical data		SD	SiD	SIN
Electrical data				
Rated insulation voltage	U_i	400 V AC	400 V AC	400 V AC
Rated operating voltage	U_e	240 V	240 V	240 V
Conventional thermal current	I_{the}	16 A	16 A	10 A
Utilization category	U_e / I_e	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A
Mechanical data				
Switching frequency max.		≤ 20/min.	max. 20/min.	≤ 20/min.
Mechanical service life		1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d		on request	on request	on request
Short-circuit protection		Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG
Protection class		I	I	I
Ambient temperature		-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Protection class		IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529
Type of connection		Screw connections	Screw connections	Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Enclosure		Aluminium pressure die-casting	Aluminium pressure die-casting	Aluminium pressure die-casting
Cable entry		2 x M20 x 1.5	2 x M20 x 1.5	2 x M20 x 1.5
Standards				
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1				

Standard Cable Pull Switches

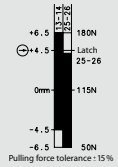
		SIEM2 RAST	SID RAST
			
Variant 1	**Article No.** Designation Max. span	**6012831023** SIEM2-UV1Z P-RAST 6 m	**6011411868** SD-U1 P-RAST 8 m
Variant 2	**Article No.** Designation Max. span		**6111431060** SID-UV1Z P-RAST 15 m
Variant 3	**Article No.** Designation Max. span		**6011431869** SID-UV1Z P-RAST 12 m

Technical data		
Rated insulation voltage U_i max.	400 V AC	400 V AC
Rated operating voltage U_e max	240 V	240 V
Conventional thermal current I_{the}	10 A	16 A
Utilization category U_e/I_e	AC-15, 240 V/3 A	AC-15, 240 V/3 A

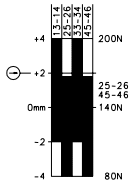
SID RAST



6112431050
SID-UV1Z P-RAST
35 m

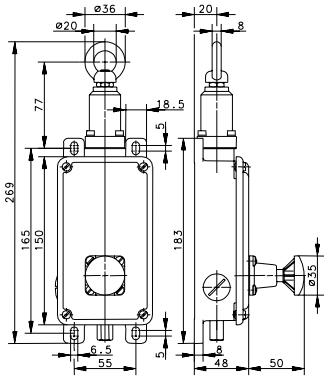


6012441907
SID-UV2Z P-RAST
18 m

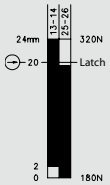


400 V AC
240 V
16 A
AC-15, 240 V/3 A

SIN RAST

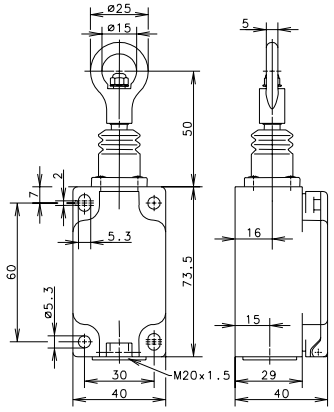
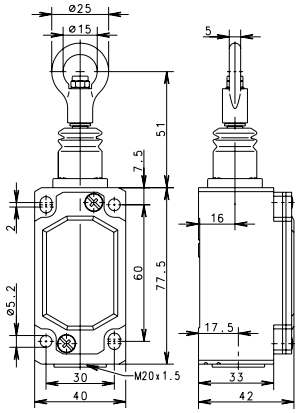
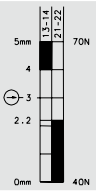
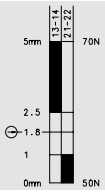
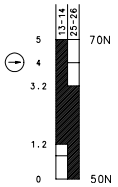
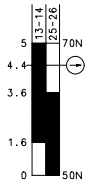


6013531367
SIN-UV1Z P-RAST
60 m

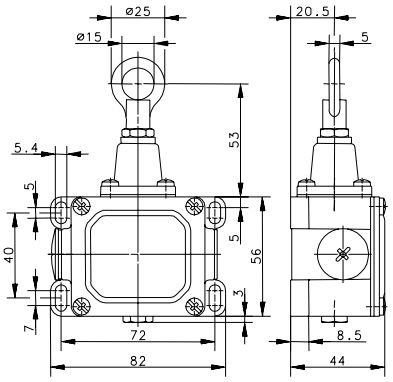
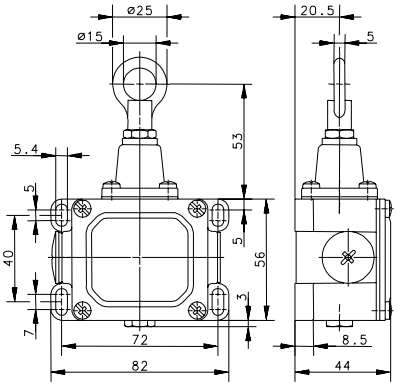
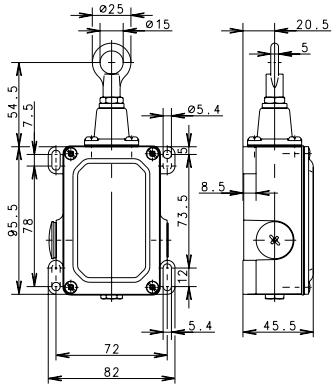
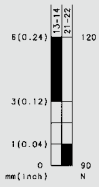
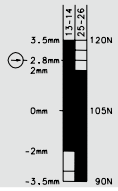
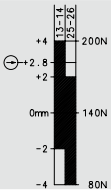
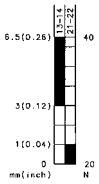
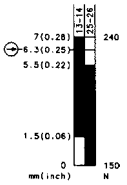
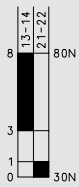
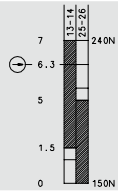


400 V AC
240 V
10 A
AC-15, 240 V/3 A

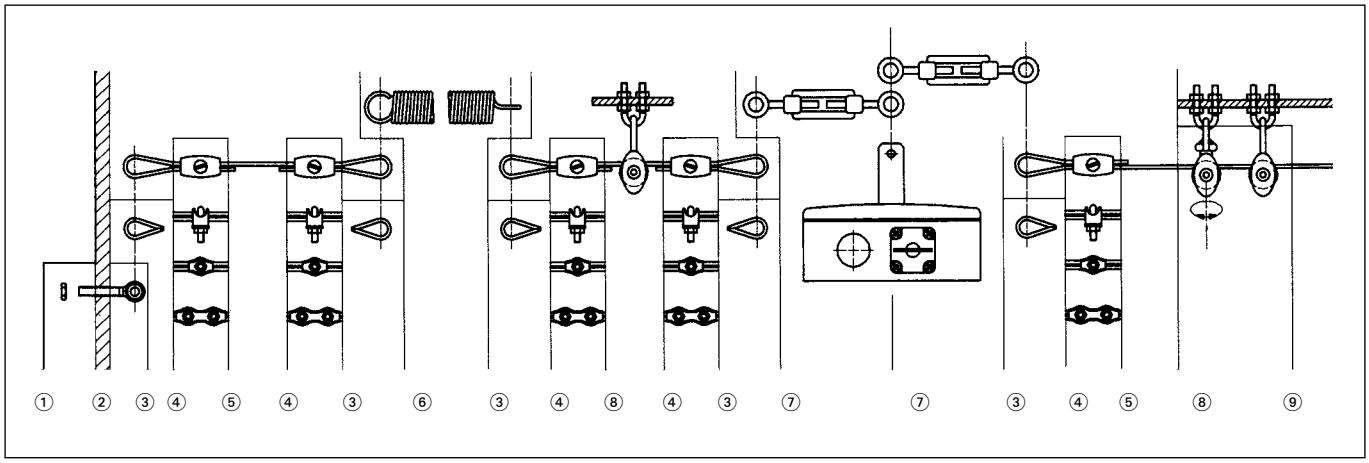
Standard Cable Pull Switches

		SEK/SIEK	SEM/SIEM2
			
Variant 1	**Article No.** Designation Max. span	**6011811133** SEK-U1Z 6 m 	**6012811029** SEM2-U1Z 6 m 
Variant 2	**Article No.** Designation Max. span	**6011831134** SIEK-UV1Z 4 m 	**6012831022** SIEM2-UV1Z 6 m 
Variant 3	**Article No.** Designation Max. span		

Technical data		
Rated insulation voltage U_i max.	400 V AC	400 V AC
Rated operating voltage U_e max	240 V	240 V
Conventional thermal current I_{the}	10 A	10 A
Utilization category U_e/I_e	AC-15, 240 V/3 A	AC-15, 240 V/3 A

SD	SID	SID
		
6011411856 SD-U1 8 m 	**6011431857** SID-UV1Z 4 m 	**6012431877** SID-UV1 8 m 
6111411029 SD-U1 6 m 	**6111431022** SID-UV1Z 8 m 	
6111411161 SD-U1 6 m 	**6111431069** SID-UV1Z 12 m 	
500 V AC	400 V AC	500 V AC
240 V	240 V	240 V
16 A	kein DB	16 A
AC-15, 240 V/3 A	AC-15, 240 V/3 A	AC-15, 240 V/3 A

Accessories for Cable Pull Switches



① Nut



Size		Strength class	Art. No.
M 6	DIN 439T2	A2-70	**2600439090**
M 8	DIN 439T2	04	**2600439187**
M 10	DIN 934	8	**2600934092**
Coating: Thick-layer passivated (M 8/M 10), RoHs-compliant			

② Eye bolt



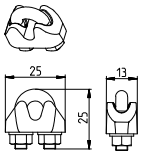
Size	Strength class	Art. No.
M 10 x 50	4.6	**2600444076**
M 6 x 50	4.6	**2600444185**
M 8 x 50	4.6	**2600444186**
Coating: Thick-layer passivated, RoHs-compliant		

③ Cable eye stiffener



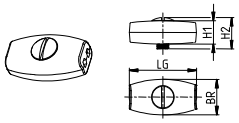
Size		Art. No.
D 2.5	to DIN 65457	**2696899013**
D 3	to DIN 65457	**2696899014**
D 4	to DIN 65457	**2696899015**
D 5	to DIN 6899B	**2696899001**
Material: Steel strip		
Coating: Blue passivated, RoHs-compliant		

④ Cable grip



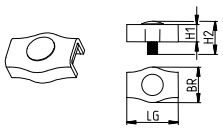
Size	Art. No.
D5	**2690741002**
Material: GTW/steel	
Coating: Yellow chromated, RoHs-compliant	

④ Cable grip, oval



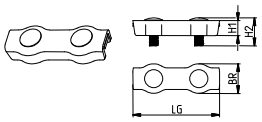
Size	LG	BR	H1	H2	Art. No.
2	28 mm	15 mm	11 mm	13 mm	**2690000004**
3	28 mm	15 mm	12 mm	13 mm	**2690000005**
4	34 mm	20 mm	14 mm	18 mm	**2690000006**
Material: Refined zinc cast alloy					
Coating: Blue passivated, RoHs-compliant					

④ Cable grip, simplex



Size	LG	BR	H1	H2	Art. No.
2	15 mm	12 mm	5 mm	11 mm	**2690000007**
3	17 mm	14 mm	6 mm	14 mm	**2690000008**
4	20 mm	17 mm	7 mm	16 mm	**2690000009**
Material: Steel strip					
Coating: Blue passivated, RoHs-compliant					

④ Cable grip, duplex



Size	LG	BR	H1	H2	Art. No.
2	35 mm	12 mm	5 mm	11 mm	**2690000010**
3	35 mm	14 mm	6 mm	14 mm	**2690000011**
4	40 mm	17 mm	7 mm	16 mm	**2690000012**

Material: Steel strip

Coating: Blue passivated, RoHs-compliant

⑤ Cable

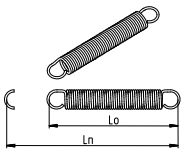


Cable Ø / Sheath Ø	Design	Minimum breaking strength		Art. No.
D 1,8 / D 5	Similar to DIN 3055	275 kp		**3699100008**
D 2 / D 2.5	to DIN 3055	239 kp		**3699100024**
D 3 / D 4	to DIN 3055	538 kp	Ideal for Quickfix (QF)	**3699100025**
D 4 / D 5	to DIN 3055	957 kp		**3699100026**

Material: Fibre-core galvanised, strength 1770 N/mm²

Coating: Blue passivated, RoHs-compliant

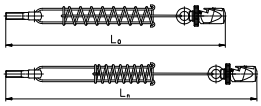
⑥ Compression spring, eye shape to DIN 1479



Fo	Fn	R	Lo	Ln	Art. No.
18 N	296 N	1.269 N/mm	188 mm	408 mm	**3652100331**
24 N	354 N	2.466N/mm	180 mm	314 mm	**3652100332**
13.3 N	153 N	0.694 N/mm	185 mm	387 mm	**3652100211**
35.2 N	450 N	3.490 N/mm	201 mm	319 mm	**3652100198**

Material: Wire to DIN 2076 - 1.4310

⑦ Pull cable spring

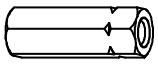


Fn	R	Lo	Ln	Art. No.
218 N	2.1 N/mm	383 mm	487 mm	**3911042153**
335 N	1.9 N/mm	483 mm	653 mm	**3911042154**

Material: Wire to DIN 2076 – 1.4310, cable grip – zinc pressure die-cast alloy, eye bolt to DIN 444 – 4.6

Coating: Thick-layer passivated (except spring), RoHs-compliant

⑦ Turnbuckle sleeve



Size	Art. No.
M 6	**2601479188**
M 8	**2601479189**

Material: Steel, min. tensile strength 330 N/mm²

Coating: Blue passivated, RoHs-compliant

⑦ Turnbuckle similar to DIN 1480 with two eyes

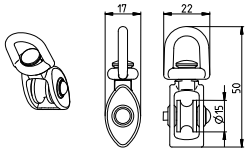


Ösen	Art. No.
M 5 x 50	**2601480016**
M 6 x 60	**2601480017**

Material: Steel, forged

Coating: Blue passivated, RoHs-compliant

⑧ Pulley block, swivel version

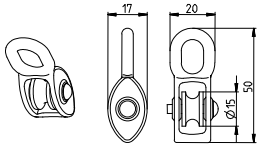


Art. No.
2690000023

Material: Zink pressure die-cast alloy (pulley polyamide)

Coating: Blue passivated, RoHs-compliant

⑧ Pulley block, fixed version

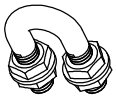


Art. No.
260000022

Material: Zink pressure die-cast alloy (pulley polyamide)

Coating: Blue passivated, RoHs-compliant

⑨ Mounting bracket for pulley to DIN 1142

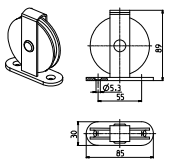


Art. No.
3911751437

Material: Steel

Coating: Blue passivated, RoHs-compliant

Deflection pulley ø 75 mm for cable diameter up to 8 mm



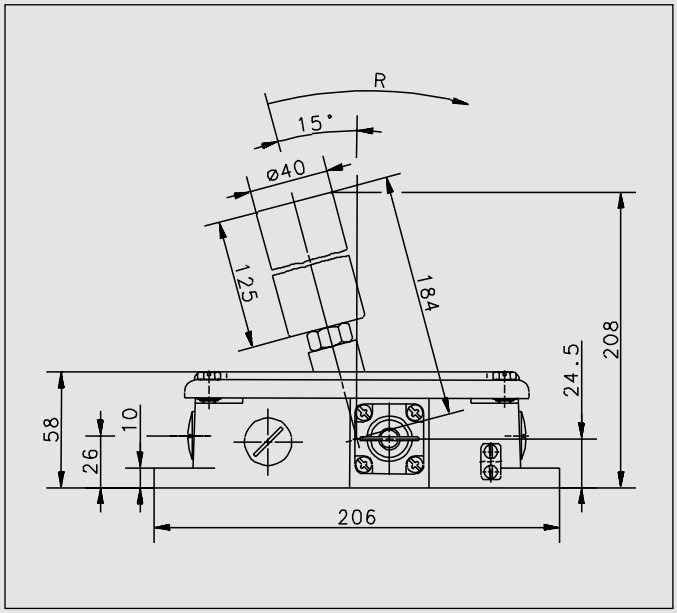
Art. No.
2690000051

Material: Steel/polyamide

Coating: Blue passivated, RoHs-compliant

Belt alignment switch



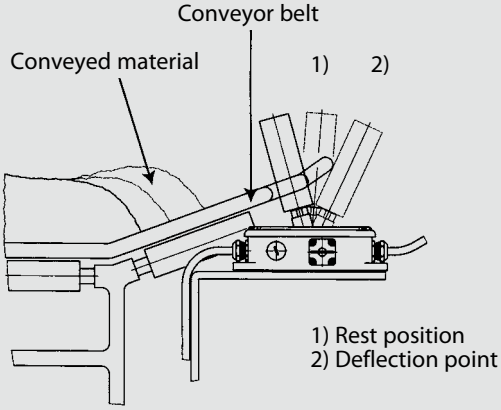


Metal-enclosed belt alignment switches for monitoring conveyor belts

In conveyor belt applications, the safety switch prevents conveyor belts from being damaged or being destroyed as the result of the belt running off track. When the roller lever is deflected by a conveyor belt running off track the safety contacts in the switch engage, thus shutting down the conveyor belt.

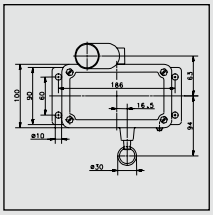
Only after eliminating the cause of the malfunction can the system be restarted by means of the pull release (key ring).

The roller lever is mounted in ball bearings. The cast iron enclosure has three M20 x 1.5 cable entries ready for through-wiring. The belt alignment switch is equipped with 2 normally-open contacts and 2 positive opening NC contacts ⊖. Thanks to its sturdy design, the device guarantees continuous trouble-free operation even under extreme operating conditions.



Product selection

Part number	Designation
6015736003	Si2-U2Z AW R-Rast



Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V
Rated operating voltage	U_e max.	240 V AC
Conventional thermal current	I_{the}	10 A
Utilization category	U_e /I_e	AC-15, U_e /I_e 240 V / 3 A
Positive opening action	⊖	as per IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure		Cast iron
Cover		Cast iron
Actuation		Roller lever
Ambient temperature		-30°C to +80°C
Contact type		2 NC / 2 NO contact (Zb)
Resetting the lock		Pulling the keyring (< 50 N)
Mechanical service life		2 x 10^6 switching cycles
Switching frequency max.		≤ 10 / min.
Mounting		4 x M8
B10d		4 mill.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Cable entry		3 x M20 x 1.5
Weight		≈ 4.1 kg
Installation position		Any
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

Notes

1-3 Pedal Foot Switches

Tailored to your applications – the modular foot switch concept from BERNSTEIN!

BERNSTEIN offers you a wide range of foot switches to meet exacting requirements in industrial applications.

From one to three pedals in versions with or without a protective hood (UN) to prevent unintentional operation of the switch, the sturdy all-metal enclosure has a protection class of IP65 as standard. The modular design enables you to define pedal functions with up to four switching combinations per pedal to suit your specific application.

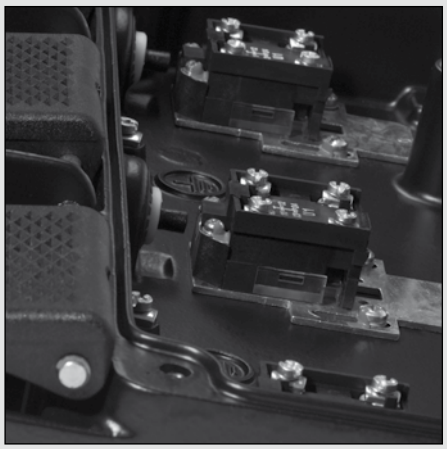
Additional functions and equipment in combination with the basic enclosures and switching elements, open up further control and function variants up to BG (operational health and safety)-approved foot switches with and without mechanical latching.

The respective designation precisely describes the function of the BERNSTEIN foot switches.

❶ **Type**
Example:
F1, F2, F3

❷ **Number and type of contact elements**
Specified from right to left for multi-pedal switches.
Example: ***F3-U1/SU1/U2***

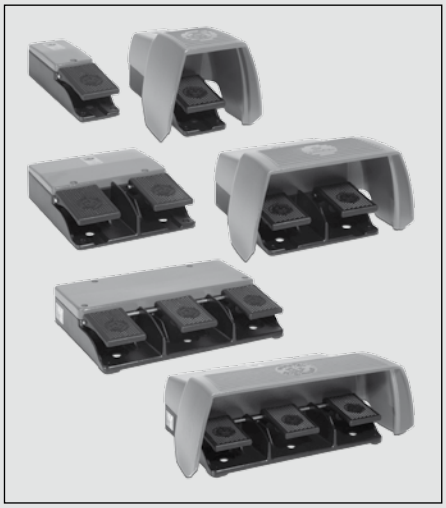
❸ **Number and type of contact elements**
These features are denoted in the type designation directly after the corres ponding switching element.
Example with latching and pressure point: ***F3-U1/SU1 Y/U2 D***



Three basic enclosures

The range of foot switches comprises:

- Three basic enclosures of the same length and height with different width dimensions for one (F1), two (F2) and three (F3) pedals



Cover panel or protective hood

The aluminium enclosures can be optionally equipped with an aluminium cover panel or a protective hood (UN).

Protective hood *UN* for *F1/F2/F3/FH*

The aluminium pressure die-cast protective hood (F3: aluminium sand casting) fully shields the pedal at the top and sides while the wide base provides a high degree of stability. It reliably prevents accidental operation from above by falling objects or careless operation from the side.



The interior of the cover is prepared ready to accommodate additional elements:

- Emergency stop button
- Contactor on standard mounting rail as main power switch
- Customer-specific built-in equipment

Mounting holes, rubber feet and separators

The mounting holes make it possible to anchor the foot switch to the floor.

Each foot switch is equipped with four rubber feet to prevent it slipping.

The separators on multi-pedal foot switches prevent several pedals being inadvertently operated simultaneously (version without separators available on request).

Type F1–F3 foot pedals are made from a thermoplastic material.

Switching function *U1Z, SU1Z, A2Z, ...*

Depending on the application, momentary-contact or snap-action systems from the BERNSTEIN modular system can be used individually or as a combination. Potentiometer (RG) versions are available for control applications.

Latch-action switching *Y*

After initially pressing the pedal, the switch setting is retained even after the pedal is released. The contact is not interrupted before the pedal is pressed again (bistable).



Fig. 2

Pressure point *D*
(Fig. 2)

Momentary-contact switching with pressure point using two built-in elements with different lead settings.

- Pedal pressed up to pressure point: Switching position for first contact element
- Pedal pressed as far as it will go beyond the pressure point: Switching point for second contact element The first contact element remains switched on.

Switching element with controller output *RG*

An integrated potentiometer enables infinitely variable control tasks to be performed via a controller output corresponding to the pedal position. A microswitch is additionally activated to provide potential isolation when at rest or in end position. Provisions are made for two microswitches for rest and end position deactivation. The standard potentiometer has a rating of 104 Ω/0.5 W. Other types are available on request.

Emergency Stop impact button *NA*
(Fig. 3)

Since the foot switch is often used in other locations than on the actual machines or systems, an Emergency Stop impact button conforming is directly available to the operator on the command unit.



Fig. 3

Power contactor *LS*

To accommodate analytical applications it is necessary to combine an auxiliary power switch with a main power switch. In line with the cost-effective design and to enable wiring without the need for an additional switch box, this version features a contactor mounted directly on a standard mounting rail in the hooded enclosure.

Hinged protective hood *UK* für *F1*

The cast aluminium protective hood UK , which must be raised with the foot before the pedals can be operated, is optionally available for the F1 enclosure to provide protection against falling objects and inadvertent pedal operation.

Pedal lock *AT* for *F1/F2/F3*
(Fig. 4)

The pedal cannot be operated before the locking lever is released with the foot. This prevents inadvertent actuation of the pedals even in the event of strong vibration/ shaking caused by incorrect handling.



Fig. 4

Footrest *FS* for *F1/F2/F3*

Applying effective workplace ergonomics to establish the right foot position (heel) is invaluable in prolonged working procedures. The wedge-shape prevents inadvertent operation.

The cast aluminium footrest can also be used under the harshest environmental conditions and, with corresponding interlinking and screw connections, it can be used together with all types of foot switch. Approved by the Swedish Accident Prevention Commission.

Enclosure specifications (on request)

- Paint finish to customer specification
- Colour of pedals
- Customer logos are possible on the UN protective hood and/or pedal
- Screen print/colour on cover with pedal function or logo
- Enclosure without separators for simultaneous pedal operation
- Additional elements with wider pedals, e.g. On/Off button in pedal or in UN protective hood
- Complete units with cable/plug connection

Ex versions

Complete units with corresponding approvals are available (see ATEX).

Foot switch in *AP*

Versions are illustrated in the Medical Technology catalogue!

1-3 Pedal Foot Switches

Safety foot switch

Safety lock with manual release

❶ **Pedal pressed up to pressure point:**

The make contact is closed and the work process is started.

❷ **Pedal pressed beyond resistance of the pressure point in an emergency situation:**

The make contact is interrupted and locked, the work process is interrupted. In this phase the lock remains in the Off position even when the pedal is not pressed. This reliably prevents uncontrolled restart of the machine or moving parts.

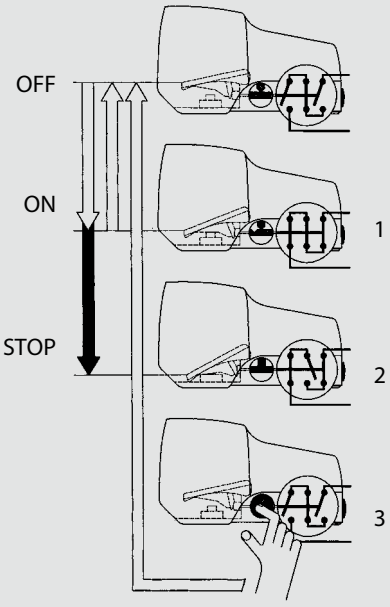
❸ **Release:**

Only after the hazardous situation has been remedied does manual release (pushbutton on the side of the enclosure) release the contacts again and the work process can be restarted by pressing the pedal as far as the pressure point.



Types with one-channel and two-channel safety function are available.

Ö	Normally-closed contact	**M**	Signalling contact
S	Normally-open contact	**SiPf**	Safety function on foot switches with mechanical lock
W	Changeover contact		



Description of safety function on foot switches with mechanical lock

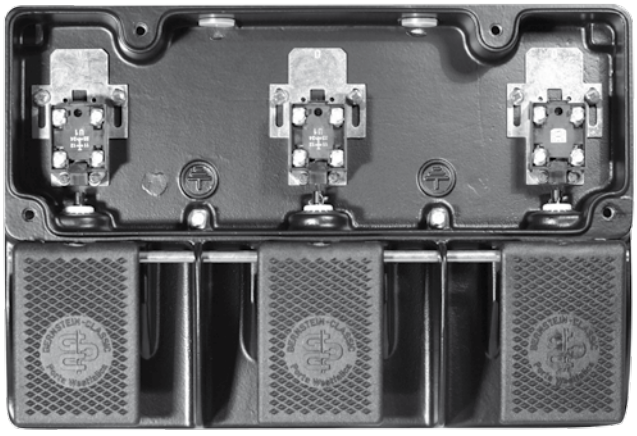
Technical data

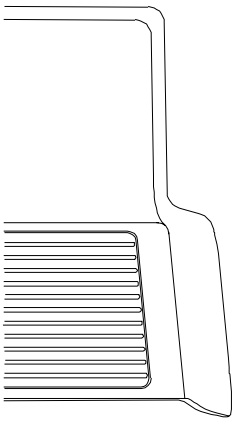
Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current	I_{the}	10 A
Utilization category		AC-15, U_e /I_e 240 V / 3 A
Mechanical data		
Switching frequency		max. 50/min.
Mechanical service life	Off-On (-Off) Off-On-Stop-Off	10 x 10^6 switching cycles 1 x 10^6
B10d		on request
Short-circuit protection		Fuse 10 A gL/gG (Slow-action contacts) Fuse 2 A gL/gG (Slow-action contacts)
Protection class		I
Ambient temperature		-30 °C to +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Contact screws
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²
Enclosure		AL
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

Ordering Instructions

Type	Pedal 1	Pedal 2	Pedal 3	Additional equipment
F1	– Switching element / Additional function			Equipment
F2	– Switching element / Additional function	Switching element / Additional function		Equipment
F3	– Switching element / Additional function	Switching element / Additional function	Switching element / Additional function	Equipment
FG	– Switching element / Additional function			Equipment

Example





F3	- U1	SU1 y	U2 D	UN

1-3 Pedal Foot Switches

Product selection

F1 Snap-action contacts

Article number	Designation	Switching contacts Pedal 1	Pressure point Pedal 1	Protective hood	Special feature
6061300011	F1-SU1Z	1NC/1NO	-	-	-
6061400061	F1-SU2Z	2NC/2NO	-	-	-
6161400493	F1-SU2ZD	2NC/2NO	30 N	-	-
6061800012	F1-SU1Z UN	1NC/1NO	-	UN	-
6161800073	F1-SU1ZD UN	1NC/1NO	200 N	UN	-
6061900062	F1-SU2Z UN	2NC/2NO	-	UN	-
6061900433	F1-SU2ZD UN	2NC2NO	200 N	UN	-
6161000487	F1-SU3 UN	3NC/3NO	-	UN	-

F1 Slow-action contacts

Article number	Designation	Switching contacts Pedal 1	Pressure point Pedal 1	Protective hood	Special feature
6061100005	F1-U1Z	1NC/1NO	-	-	-
6061200003	F1-U2Z	2NC2NO	-	-	-
6061200007	F1-U2ZD	2NC/2NO	200 N	-	-
6061600006	F1-U1Z UN	1NC/1NO	-	UN	-
6061600010	F1-U1ZD UN	1NC/1NO	200 N	UN	-
6061700004	F1-U2Z UN	2NC/2NO	-	UN	-
6061700008	F1-U2ZD UN	2NC/2NO	200 N	UN	-

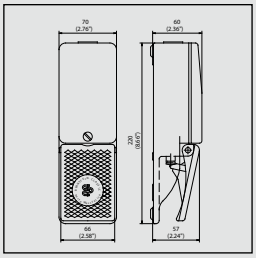
F1 with additional functions

Article number	Designation	Switching contacts Pedal 1	Pressure point Pedal 1	Protective hood	Special feature
6061000288	F1-SU1ZDA 1Z UN	1M/SiPf	460 N	UN	Latching
6161500557	F1-SU1Z/UV1ZD	SiPf	460 N	-	Latching, side sealed cable gland
6161000203	F1-SU1Z/UV1ZD UN	SiPf	200 N	UN	Latching, side sealed cable gland
6161000443	F1-UV1Z/UV1ZD	2 SiPf	200 N	-	Latching, side sealed cable gland
6161000532	F1-UV1Z/UV1ZD UN	2 SiPf	200 N	UN	Latching, side sealed cable gland
6161100554	F1-U1Z AT	1NC/1NO	-	-	Pedal lock
6161800482	F1-SU1Z AT UN	2NC/2NO	-	UN	Pedal lock
6161700483	F1-U2Z AT UN	2NC/2NO	-	UN	Pedal lock
6061100001	F1-U1Y	1NC/1NO	-	-	Bistable
6161000676	F1-A2 Y	2NC	-	-	Bistable
6161200506	F1-U2Y	2NC/2NO	-	-	Bistable
6161800247	F1-SU1Y UN	1NC/1NO	-	UN	Bistable
6161700213	F1-U2ZD UK	2NC/2NO	140 N	UK	Protective hood, hinged
6061800436	F1-SU1Z-LS22-UN	1NC/1NO	-	UN	Power contactor
6061800439	F1-SU1Y-LS22-UN	1NC/1NO	-	UN	Bistable and integrated power contactor
6061600435	F1-U1Z NA2 UN	1NC/1NO	-	UN	Emergency Stop button in cover
6161700091	F1-U2Z UN FST	2NC/2NO	-	UN	Footrest
6161300327	F1-SU1 MI RG 10K2W	1W	-	-	Potentiometer 10K2W
6161800662	F1-SU1 MI RG 5K0.5W UN	1W	-	UN	Potentiometer 5K0,5W
6161800645	F1-SU1 MI RG 10K0.5W UN	1W	-	UN	Potentiometer 10K0,5W

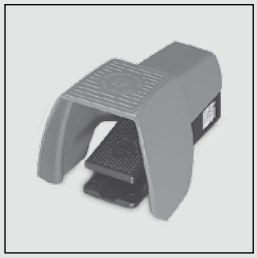
Slow-action and snap-action contacts are mixed in the special type table. The snap-action contacts are identified by the S in the contact element designation (e.g. SU1)!

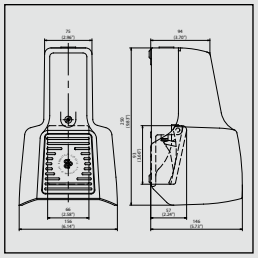
F1 – Foot switch with one pedal





F1 UN – Foot switch with two pedals and protective hood





Product selection

F2 Snap-action contacts

Article number	Designation	Switching contacts		Pressure point		Protective hood	Special feature
		Pedal 1	Pedal 2	Pedal 1	Pedal 2		
6062330021	F2-SU1Z/SU1Z	1NC/1NO	-	-	-	-	-
6062440065	F2-SU2Z/SU2Z	2NC/2NO	-	-	-	-	-
6162830531	F2-SU1Z/SU1Z UN	1NC/1NO	-	-	-	UN	-
6162000418	F2-SU1Z/SU2ZD UN	1NC/1NO	-	460 N	-	UN	-
6062830417	F2-SU1Z/SU2ZD UN	1NC/1NO	-	200 N	-	UN	-
6062940066	F2-SU2Z/SU2Z UN	2NC/2NO	-	-	-	UN	-
6162000503	F2-SU4ZD/SU4ZD UN	4NC/4NO	-	200 N	-	UN	-

F2 Slow-action contacts

Article number	Designation	Switching contacts		Pressure point		Protective hood	Special feature
		Pedal 1	Pedal 2	Pedal 1	Pedal 2		
6062110013	F2-U1Z/U1Z	1NC/1NO	1NC/1NO	-	-	-	-
6062220015	F2-U2Z/U2Z	2NC/2NO	2NC/2NO	-	-	-	-
6062220019	F2-U2ZD/U2ZD	2NC/2NO	2NC/2NO	200 N	200 N	-	-
6062610014	F2-U1Z/U1Z UN	1NC/1NO	1NC/1NO	-	-	UN	-
6162610253	F2-U1ZD/U1Z UN	1NC/1NO	1NC/1NO	149 N	-	UN	-
6062620086	F2-U1Z/U2ZD UN	1NC/1NO	2NC/2NO	-	200 N	UN	-
6162720675	F2-U2Z/U1Z UN	2NC/2NO	1NC/1NO	-	-	UN	-
6062710376	F2-U2ZD/U1Z UN	2NC/2NO	1NC/1NO	200 N	-	UN	-
6062720016	F2-U2Z/U2Z UN	2NC/2NO	2NC/2NO	-	-	UN	-
6062720020	F2-U2ZD/U2ZD UN	2NC/2NO	2NC/2NO	200 N	200 N	UN	-
6162000651	F2-SU1ZA2ZD/SU1Z UN	3NC/1NO	1NC/1NO	460 N	-	UN	-

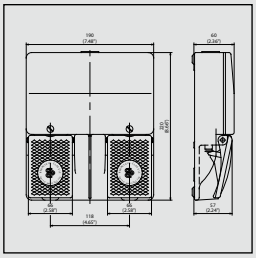
F2 with additional functions

Article number	Designation	Switching contacts		Pressure point		Protective hood	Special feature
		Pedal 1	Pedal 2	Pedal 1	Pedal 2		
6162000486	F2-SU1ZUV1ZD/SU1Z UN	1M/ SiPf	1NC/1NO	460 N	-	UN	Safety lock, pedal 1
6162000364	F2-SU1ZSU1ZD/SU1Z UN	2 SiPf	1NC/1NO	200 N	-	UN	Safety lock, pedal 1
6162000338	F2-SU1ZUV1D/SU1ZUV1D UN	SiPf	SiPf	200 N	200 N	UN	Safety lock, pedal 1 and 2
6162000583	F2-UV1ZD/UV1ZD UN RAST	SiPf	SiPf	200 N	200 N	UN	Safety lock, pedal 1 and 2, 2-piece
6062610047	F2-U1Y/U1Z UN	1NC/1NO	1NC/1NO	-	-	UN	Bistable, pedal 1
6162840655	F2-SU1Y/SU2Z UN	1NC/1NO	2NC/2NO	-	-	UN	Bistable, pedal 1
6062610018	F2-U1Y/U1Y UN	1NC/1NO	1NC/1NO	-	-	UN	Bistable, pedal 1 and 2
6162720623	F2-U2ZAT/U2Z UN	2NC/2NO	2NC/2NO	-	-	UN	Pedal lock pedal 1
6162830500	F2-SU1ZAT/SU1ZAT UN	1NC/1NO	1NC/1NO	-	-	UN	Pedal lock pedal 1 und 2
6162720435	F2-U2Z/U2Z NA2 UN	2NC/2NO	2NC/2NO	-	-	UN	Emergency Stop button in cover
6162940544	F2-SU2MIRG/SU2MIRG UN	2NC/2NO	2NC/2NO	-	-	UN	10K potentiometer on pedal 1 and 2
6162630452	F2-U2Z/SU1MIRG UN	2Ö/2NO	1NC/1NO	-	-	UN	10K potentiometer on pedal 2
6162610578	F2-U1D ÜBERHUB/U1Z UN	1NC/1NO	1NC/1NO	200 N	-	UN	Extended stroke, 1
6162830680	F2-SU1D ÜBERH/SU1D ÜBERH UN	1NC/1NO	1NC/1NO	200 N	200 N	UN	Extended stroke, 1 and 2

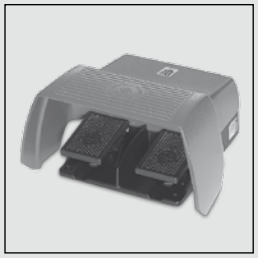
Slow-action and snap-action contacts are mixed in the special type table. The snap-action contacts are identified by the S in the contact element designation (e.g. SU1)!

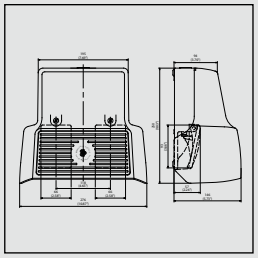
F2 – Foot switch with two pedals





F2 UN – Foot switch with two pedals and protective hood





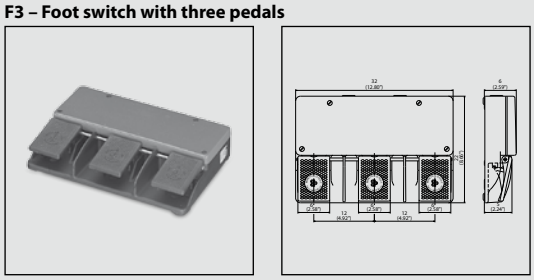
1-3 Pedal Foot Switches

Product selection

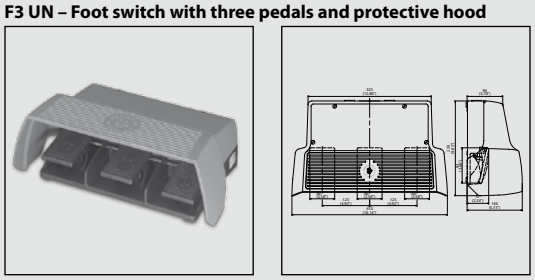
F3 Slow-action contacts

Article number	Designation	Switching contacts			Pressure point			Protective hood	Special feature
		Pedal 1	Pedal 2	Pedal 3	Pedal 1	Pedal 2	Pedal 3		
6063833045	F3-SU1Z/SU1Z/SU1Z UN	1NC/1NO	1NC/1NO	1NC/1NO	-	-	-	UN	-
6163015473	F3-SU1ZUV1D/U1/SU1Z UN	1NC/2NO	1NC/1NO	1NC/1NO	200 N	-	200 N	UN	-
6063111025	F3-U1Z/U1Z/U1Z	1NC/1NO	1NC/1NO	1NC/1NO	-	-	-	-	-
6063111025	F3-U1Z/U1Z/U1Z	1NC/1NO	1NC/1NO	1NC/1NO	-	-	-	-	-
6063611026	F3-U1Z/U1Z/U1Z UN	1NC/1NO	1NC/1NO	1NC/1NO	-	-	-	UN	-
6063612423	F3-U1Z/U1Z/U2Z UN	1NC/1NO	1NC/1NO	2NC/2NO	-	-	200 N	UN	-
6063721262	F3-U2ZD/U2ZD/U1Z UN	2NC/2NO	2NC/2NO	1NC/1NO	-	-	-	UN	-
6063722171	F3-U2ZD/U2ZD/U2ZD UN	2NC/2NO	2NC/2NO	2NC/2NO	200 N	200 N	200 N	UN	-
6163725445	F3-E2U1D/U2D/MIRGA1D UI	1NC/3NO	2NC/2NO	2 W/1Poti	200 N	-	200 N	UN	10K potentiometer on pedal 3

F3 – Foot switch with three pedals



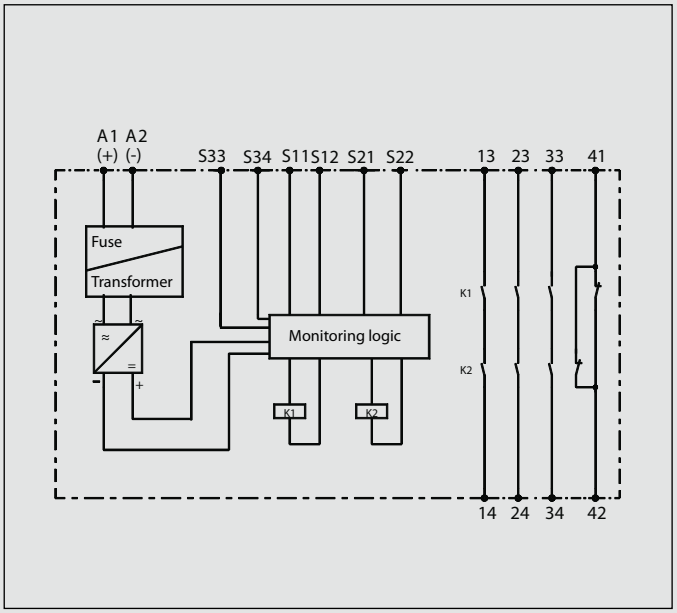
F3 UN – Foot switch with three pedals and protective hood



Notes

SCR – Safety Relay

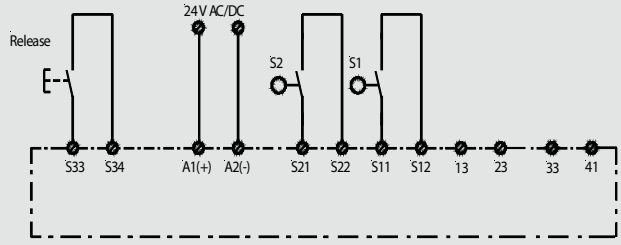




Whether it's safety switches or safety relays, BERNSTEIN has the complete range of products for your application. Our SCR safety relays are used to reliably evaluate signals, such as those generated by BERNSTEIN position switches, safety switches, safety latching devices, safety cable pull switches, safety sensors or 2-hand controllers.

With their compact standard mounting rail enclosure, BERNSTEIN SCR relays impress in a wide variety of applications up to performance level e as defined by EN 13849. Conforming to this standard, the SCR relays monitor the correct position and reliable operation of safety sensors and or contacts in safety switches. This evaluation function is used to actuate power elements such as power contactors or frequency converters and stop machines in the case of emergency.

Two positive opening normally-closed contacts are required as the signalling contacts for safety gate monitors. Virtually all BERNSTEIN switches feature these contacts. They can be identified by the ⊖ symbol.



Schematic representation of safety relay system

The product range includes switching relays for evaluating:

- Safety gate monitors with and without monitored start pushbutton
- Expansion module as auxiliary switching circuit for safety relays
- Two-hand controllers
- Auxiliary controller for safety light curtains/barriers

Product selection

Article number	Designation	Enable current paths (NO contact)	Signalling contact (NC contact)	Signalling contact (NC contact)	Monitored start	Start automatic/ pushbutton (manual)	Remarks
6075111009	SCR4-W22-3.5-D	e	3	1	No	Auto / pushbutton	-
6075111010	SCR4-W22-3.5-SD	e	3	1	Yes	Pushbutton	-
6075111012	SCR4-W22-4.6-DXT	e	4	0	-	-	Expansion module only used together with another SCR
6075111015	SCR2-W22-2.5	d	2	0	No	Auto / pushbutton	-
6075111016	SCR2-W22-2.5-S	d	2	0	No	Pushbutton	-
6075111018	SCR4-W22-2.6-D2H	e	2	1	-	-	SCT for two-hand controller
6075111020	SCR ON4-W22-3.6-S	e	3	0	Programmable	Pushbutton	Pushbutton SCR for safety light barrier

Technical data

Electrical data		
Supply voltage	U_e	24 V AC/DC (6075111020 24V DC)
Voltage range		0,90 ... 1,1 U_e
Frequency		50 ... 60 Hz
Power intake		24 V DC: 3 W, 24 V AC: 5 V A
Performance data		
Conductor cross section		2 x 1.5 mm^2 / 4 x 1.5 mm^2
Contact data		
Switching voltage		230 V AC, 24 V DC
Switching current		5 A
Max. switching power		1250 V A (ohmic load)
Mechanical service life		107 switching cycles
Environmental data		
Ambient temperature		-25 °C to +50 °C
Protection class, enclosure		IP40 DIN VDE 0470 Part 1
Protection class, terminals		IP20 DIN VDE 0470 Part 1
Mechanical data		
Enclosure material		Polyamide PA 6.6
Approvals		
TÜV		
UL		
C-UL		

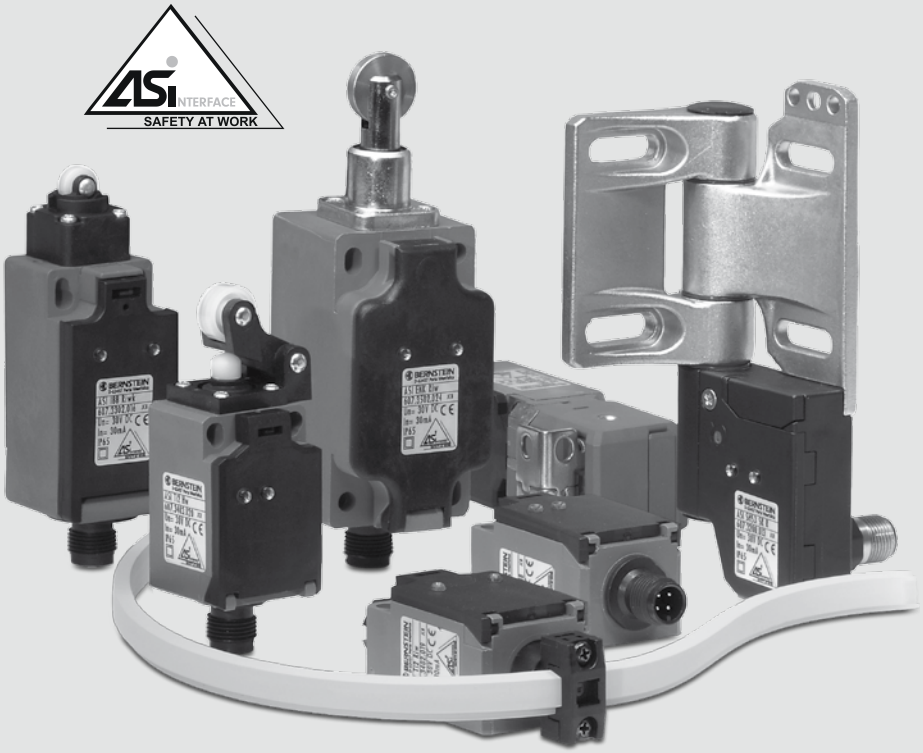
AS Interface – Safety at Work

The resounding success of the AS interface (actuator-sensor interface) that operates in accordance with the master-slave principle is attributed to its complete ease of use, its ability to be specifically adapted to the simplest elements in machine and system construction as well as the host of unparalleled application advantages it offers. The AS interface is particularly advantageous against the backdrop of the need to conform to the Machinery Directive 2006/42/EC since 29.12.2009. Performance level e and SIL 3 are achieved effortlessly. It is not always possible to set up safety systems with safety switches connected in series while conforming to EN 13849-1. Such configurations present no problems for the AS interface which provides effective solutions up to the highest performance level.

The unshielded two-wire line that carries data and power renders intricate parallel wiring between sensors and controller unnecessary, thus offering a considerably expanded range of functionality while reducing costs. With piercing technology corresponding field devices, i.e. up to 62 standard/31 safety devices or a mixed configuration, can be connected using the plug&play principle in any position on the yellow, two-core cable. The AS interface master, acting as an independent gateway to higher bus systems (e.g. Profibus), monitors the bus and cyclically polls the bus users.

As an open-ended standard, AS interface guarantees maximum compatibility while providing significant benefits in terms of overall cost considerations. These benefits are reflected in the substantial time and cost savings achieved for initial installation, retrofitting, converting and maintaining systems as well as significantly reducing hardware outlay.

The safety monitor makes the AS interface into a safety bus. It monitors communication between the slaves and the master. The safety monitor shuts down the up to 16 enable circuits as soon as it detects that a safety slave has switched or identifies a fault. A safety-oriented system can be built up by installing a safety monitor and corresponding slaves in an existing AS interface system.



The safety-oriented application is created using the ASIMON program and loaded into the monitor. Programming is carried out by means of simple drag and drop.

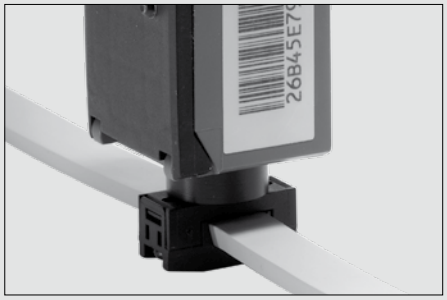
AS interface – from under one roof

All plastic-enclosed safety switches are available in the Safety at Work configuration and other products from the switch range are constantly being equipped with this functionality. With the SHS3, BERNSTEIN offers the first safety hinge switch with AS interface capabilities on the market. Integrated AS interfaces ensure BERNSTEIN components are designed with the smallest possible dimensions. For instance, the mini limit switch Ti2 is the only switch in its class on the market with AS interface capabilities. The safety switch with interlock (SLK) is, of course, also equipped with an AS interface. In addition to switches, gateway masters and terminal boxes, the BERNSTEIN product range also includes power supply units, safety monitors, hand-held programming units as well as an extensive assortment of accessories. The entire comprehensive spectrum makes it possible to offer complete systems solutions.

Master with gateways to following bus systems are available:

- Profibus
- Profinet
- Ethernet
- Powerlink
- EtherCat
- CanOpen
- DeviceNet
- Modbus
- Allen-Bradley ControlLogix

Quick-Connect Technology



Direct connection of AS interface shaped cable to BERNSTEIN AS interface switch.

The combination of the AS interface cable with ribbon cable terminals and M12 connecting lines guarantees enormous time-saving potentials in installation and connection.

This principle is supported by the direct connection technology of BERNSTEIN AS interface switches. These BERNSTEIN AS interface switches are connected directly to the AS interface cable by means of integrated ribbon cable terminals.

The use of the AS interface cable together with piercing technology ensures the ribbon cable terminal can be easily reposition-ed while retaining the cable's protection class.

Installation advantages

- Reduced installation time
- Easy installation thanks to piercing technology (in ribbon cables protected against polarity reversal)
- Safety circuits can be retrofitted and converted by simply plugging in individual slaves
- Changes to safety system can be quickly implemented by way of software
- Reduced cable requirements, consequently:
  - Small trailing cables
  - Small cable platforms
  - Easy to clean
  - Low fire load
- No terminal boxes
- No need to prepare enclosures, terminals and screw connections

Planning advantages

- Straightforward planning – intricate wiring documents are replaced by clearly arranged bus structure diagrams
  - Safety functions quickly created by drag and drop in ASIMON
  - Printout of safety configuration from programming tool

System advantages

- Uncomplicated interconnection of safety system in machines used in production lines
- Straightforward implementation of safety system cascading
- Faults in the safety system can be diagnosed with a laptop online
- Diagnostic facilities directly at the master and monitor for exact fault location
- System data/polling can be read out via higher-level bus system: Remote servicing
- Fewer I/Os at controller
- Takes up less space in control cabinet

Economic advantages

- Reduced costs through:
  - Faster installation
  - Fewer circuit diagrams need to be created
  - Faster commissioning
  - Fast troubleshooting
  - Extensive diagnostic facilities

User advantages through reduced:

- Machine downtimes thanks to extensive diagnosis and fast troubleshooting
- Commissioning costs
- Maintenance and servicing expenditure

Further advantages

- Direct connection – no need for M12 connection cable and connection adapters
- Great degrees of freedom in terms of network typology
- Tough even in harsh working environments
- Modularity and perfect integration in higher-level bus systems – an AS interface master can be integrated as a normal slave in a higher-level bus system

Technical data (for all saves, except coupling box)

Electrical data					
Voltage range	U	26.6 ... 31.6 V; via AS interface with polarity reversal pprotection			
Power intake	I	< 30 mA			
AS interface specification		Profile S-0.B			
		IO-Code: IO-Code1:	0 x 0 0 x F	ID-Code: ID-Code2:	0 x B 0 x E
AS interface inputs		Contact 1:	Data bits D0/D1 = static 00 or dynamic code transfer		
		Contact 2:	Data bits D2/D3 = static 00 or dynamic code transfer		
Parameter bits		No function			
Mechanical data					
Display		LEDs for indicating status of ASI slave and bus			
Contact type		2 Öffner (Slow-action contact, Zb)			
Type of connection		Connector M12 male			
Plug assignment 1		1: AS-i +	2: free		
		3: AS-i –	4: free		
Installation position		Any			
Protection class		IP65 conforming to EN 60529; DIN VDE 0470 T1			
Performance Level					
PL	Conforming to 13849-1	Up to e			
Standards					
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 EN 50295, EN ISO 13849-1					

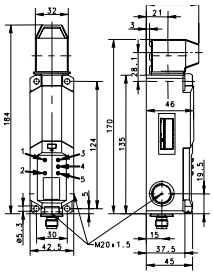
Please refer to the corresponding standard product for further technical data.

ASI SLK

With the ASI SLK BERNSTEIN offers a switch with interlock function and integrated Safety at Work interface.
You can choose the functional principle, i.e. spring and magnet latching device.
LED integrated in the switches indicate the bus status.
The inserted actuator and the status of the latching device are also indicated by LEDs.
The LEDs can also be optionally controlled via the PLC.

M12-connection	Direct connection
6073200058 ASI-SLK-F-R1	
6073200057 ASI-SLK-M-R0	



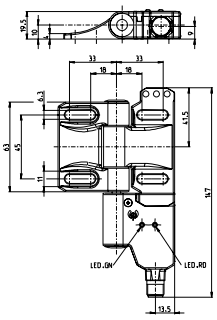


ASI SHS

With the SHS3 BERNSTEIN offers the only safety hinge switch with AS interface Safety at Work.
As on the standard hinge, after adjustment, the user can correct the switching point with the integrated fine adjustment system.
When converting a system you can redefine the switching point with the aid of a change kit.

M12-connection	Direct connection
6073200011 ASI SHS3 SA R	
6073200013 ASI SHS3 SR R	



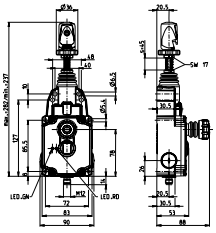


ASI SRM

Cable span lengths of up to 37.5 metres are possible with the SRM...175 (see information under Safety Cable Pull Switches).
As in the standard range, the QF variant features the quick-connect head that drastically reduces the cable installation time.

M12-connection	Direct connection
6073200007 ASI SRM-QF-175	
6073200008 ASI SRM-QF-300	
6073200009 ASI SRM-LU-175	

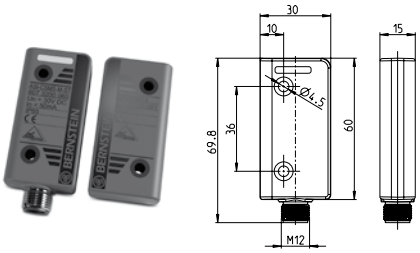




CSMS

The BERNSTEIN CSMS is a contactless safety sensor (transponder) with dynamically coded signal transmission for AS Interface – Safety at Work. With the unique allocation of the actuator to the safety switch, protection against tampering is already integrated in the CSMC, making it suitable for concealed installation in non-coded systems.

CSMS KIT	CSMS individual components
6073200062 ASI-CSMS-SET (kit contains: Read head and actuator)	**6073200060** ASI-CSMS-M-ST (Read head)
	6073200061 ASI-CSMS-S (Actuator)



ASI SKT

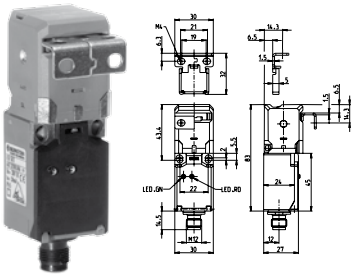
The ASI SKT with separate actuator for monitoring safety gates and guards is a Type 2 switch and is one of the smallest in its class.

The enclosure and cover are made from fibre glass-reinforced thermoplastic.

LEDs that indicate the status of the ASI slave and bus are integrated in the cover.

Protection class IP65 in accordance with IEC/EN 60529 is guaranteed.

M12-connection	Direct connection
6073200006 ASI SKT	**6073200029** ASI SKT D

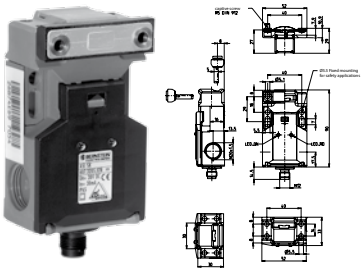


ASI SK

The ASI SK with separate actuator for monitoring safety gates and guards is a Type 2 switch.

The enclosure and cover are made from fibre glass-reinforced thermoplastic. LEDs that indicate the status of the ASI slave and bus are integrated in the cover. Protection class IP65 in accordance with IEC/EN 60529 is guaranteed.

M12-connection	Direct connection
6073205028 ASI SK M	**6073205039** ASI SK M D
6073205050 ASI SK F30 M	



ASI ENK

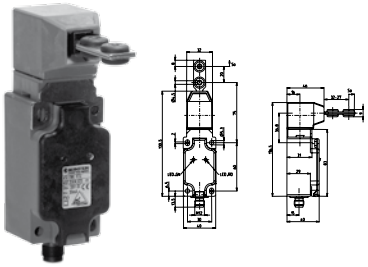
The ASI ENKK VTU with separate actuator is a very tough standard switch often used for monitoring safety gates and guards.

The enclosure and cover are made from fibre glass-reinforced thermoplastic.

LEDs that indicate the status of the ASI slave and bus are integrated in the cover.

Protection class IP65 in accordance with IEC/EN 60529 is guaranteed.

M12-connection	Direct connection
6073504025 ASI ENK VTU	**6073504038** ASI ENK VTU D

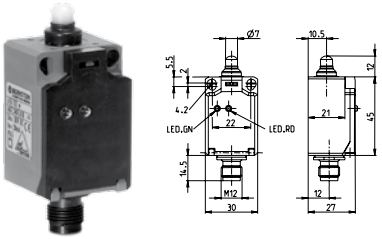


ASI Ti2

The Ti2 family with its extremely compact dimensions is the only ASI switch family in this class.

The captive snap-on cover contributes to the protection rating of IP65 in accordance with EN 60529, DIN VED 0470 T1.

M12-connection	Direct connection
6073401018 ASI Ti2 w	**6073401033** ASI TI2 W D
6073402019 ASI Ti2 Riw	**6073402034** ASI TI2 RIW D
6073403020 ASI Ti2 Hw	**6073403035** ASI TI2 HW D



ASI I88

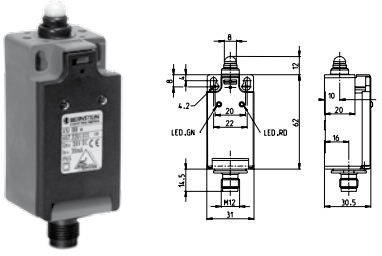
The ASI I88 conforming to EN 50047 is a standard switch used in a wide range of applications.

The enclosure and cover are made from fibre glass-reinforced thermoplastic.

LEDs that indicate the status of the ASI slave and bus are integrated in the cover.

Protection class IP65 in accordance with IEC/EN 60529 is guaranteed.

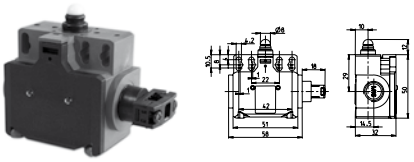
M12-connection	Direct connection
6073301015 ASI I88 w	**6073301030** ASI I88 W D
6073302016 ASI I88 RiwK	**6073302031** ASI I88 RIWK D
6073303017 ASI I88 Hw	**6073303032** ASI I88 HW D



ASI BI2

The AS interface version of the ASI Bi2 switch is designed as a very compact unit with a low overall height and side connection.

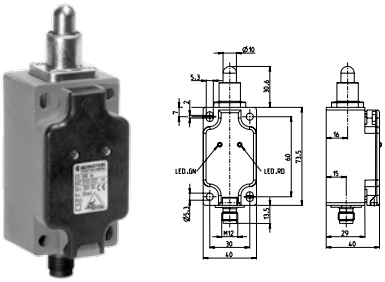
M12-connection	Direct connection
6073201052 ASI BI2 w	**6073201051** ASI BI2 w D



ASI ENK

The ASI ENK conforming to EN 50041 is an extremely sturdy standard switch used in a wide range of applications.
The enclosure and cover are made from fibre glass-reinforced thermoplastic.
LEDs that indicate the status of the ASI slave and bus are integrated in the cover.
Protection class IP65 in accordance with EN 60529, DIN VDE 0470 T1 is guaranteed.

M12-connection	Direct connection
6073501023 ASI ENK iw	**6073501036** ASI ENK IW D
6073502024 ASI ENK Riw	**6073502037** ASI ENK RIW D



ASI ANS

The standard connection box has an ASI address and integrates up to four non-safety sensors in the ASI system.
The connection box is equipped with LEDs that indicate the status of the connected user.

Connection box 6073201	
6073100027 ASI CONNECTION BOX 4 IN	



ASI MST

The ASI Master is the "head" of the AS interface system.

It organises communication on the bus and makes available all data to the higher-level system via the gateway.

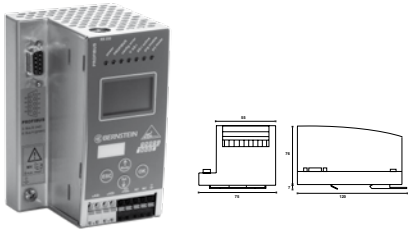
The master shown here is equipped with a Profibus gateway.

Gateways are available for following bus systems:

Profinet, Ethernet, Powerlink, EtherCat, CanOpen, Devicenet, Modbus, Allen-Bradley ControlLogix

Master

6073100001
ASI MST PROFIBUS



ASI SMO

The second generation safety monitor is an emergency stop switching device that features two integrated and a further 14 external enable circuits.

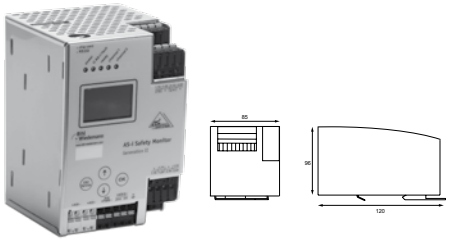
The second generation ASI safety monitor features a stainless steel enclosure and an LC display for showing slave addresses and error messages.

The safety monitor can be used in applications up to performance level e and SIL 3.

The safety application is created with the ASIMON program.

Safety monitor

6073100004
ASI SMON B+W

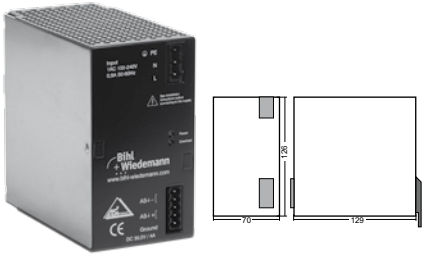


ASI NT

The primary clocked power supply unit for AS interface supplies a 4 amp current. Besides supplying power, the power supply unit is also responsible for data decoupling with respect to the feed source and balancing the two AXI output lines with respect to machine earth.

Power supply unit

6073100003
ASI NT 4A B+W



ASI HND

The ASI hand-held addressing device is a compact unit used for addressing ASI slaves (sensors, actuators and interface modules).

Electromechanical connection is made by the universal connection adapter.

ASI slaves can be addressed in accordance with ASI specifications 2.0, 2.1 and 3.0 with the ASI hand-held addressing device.

Hand-held addressing device

6073100005
ASI HND PRG



ASI PRO

The safety application of the safety monitor is created with the ASIMON software.

This program makes available a debug view for fast troubleshooting.

In addition, documentation of the safety application can be printed out.

It comes with a cable for connecting the safety monitor to a laptop.

Software

6073800021
ASI PROG SW + KBL

AS Interface Accessories

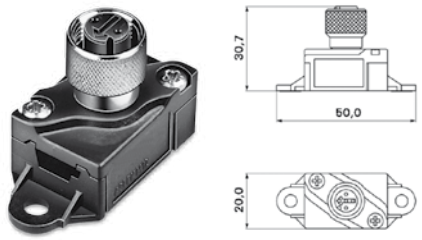
6073900040
ASI CABLE EPDM YELLOW



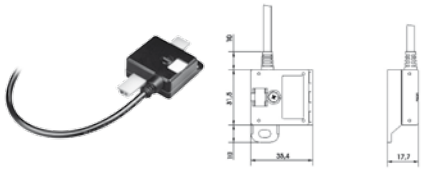
6073900041
ASI CABLE EPDM BLACK



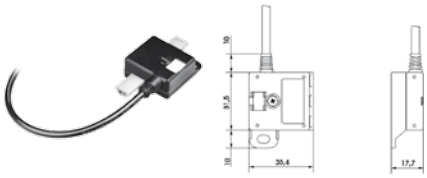
6073900042
ASI COUPLING MODULE
M12 SCREW



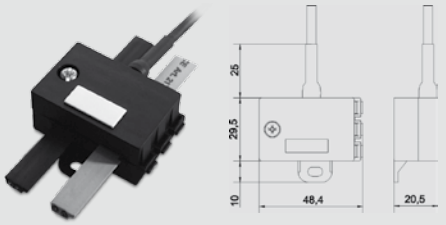
6073900043
ASI COUPLER
M. 0.3 RK U. M12 G



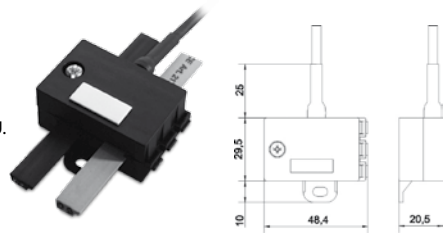
6073900044
ASI COUPLER M. 0.3 RK U.
M12 W



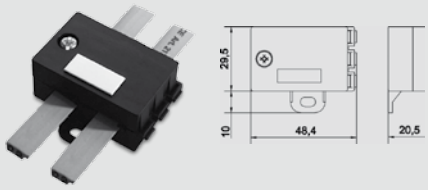
6073900045
ASI COUPLER 2F M.0.5RK
U.M12 G



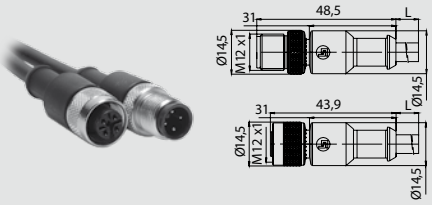
6073900046
ASI COUPLER 2F M.0.5RK U.
M12 W



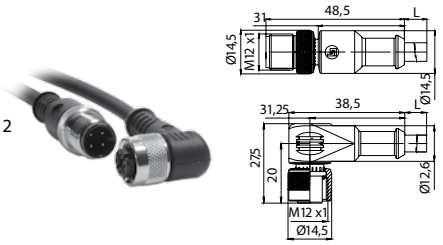
6073900047
ASI CABLE LINK



6073900048
ASI CONNECTING LEAD M12
1M G/G



6073900049
ASI CONNECTING LEAD M12
1M G/W



Notes

ATEX

ATEX-approved products for potentially explosive atmospheres

- Ex e, Ex ia and Ex e\ia terminal boxes made from polyester and aluminium
- Ex d limit switches, cable pull switches and foot switches
- Ex mb/Ex tD magnetic switches

Services, training, system solutions, project- and customer-specific solutions.



Terminal boxes and empty enclosures

Only materials that correspond to the temperature range T6 required for Ex enclosures are used in these enclosures and components.

The minimum type of protection rating of all enclosures and screw connections is IP64, other protection classes available on request.

The latching devices on the enclosures are optionally available as captive screw connections or quick-release fasteners.

Various CA versions are available with flange plates.

All built-in components must conform to the relevant approvals.



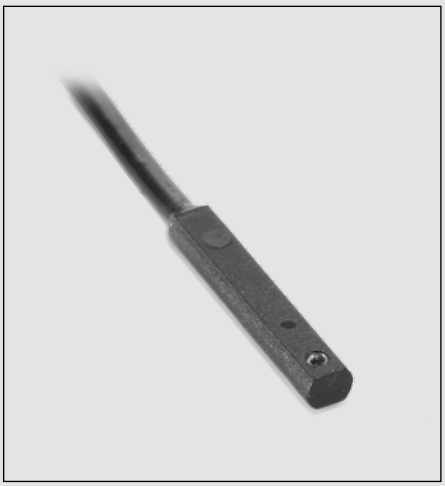
Momentary contact, cable pull and foot switches

An Ex d-certified switching element lies at the core of these Ex-approved switches.

It is mounted in the corresponding switch enclosures. The mechanical actuator and its installation are certified separately.

The approval of additional actuators and switch enclosures from other series is possi-ble on request.

All switches and momentary contact switches feature one NO contact and one NC contact.



Magnetic switches

The magnetic switches are fitted at the factory with an up to 7 m long connection cable.

The cable is permanently connected to the enclosure and is part of the approval.

All sensors are certified for a maximum ambient temperature of 80 °C.

Services offered by the BERNSTEIN-ATEX experts:

- Approval of a stainless steel enclosure with freely definable dimensions
- Approvals assistance for plant operators
- Approval of switching and control elements in all enclosures
- Approval of plug-in devices in all enclosures
- Component mounting and wiring of enclosures according to customer specifications
- Training courses for planners and plant operators
- Cross-product system solutions
- Customer-specific development and project management on request
- Gost (Russia) and NEC (North America) approvals on request

Explosion protection at a glance

	II2G	Ex	ia	IIC	T6	TÜV	2008	ATEX	1234	-
Type approval to RAL 94/9/EC	Application	Explosion protection	Protection class	Device group	Temperature class	Inspection authority	Year	As per Directive 94/9/EC	Consecutive number	Additional conditions

Types of protection for gas-explosion hazardous areas

Symbol		Type of protection	Standard
	Ex „d"	Flameproof encapsulation Switching devices, motors, transformers etc. IEC60079-1	IEC60079-1
	Ex „p"	Pressurised encapsulation Control cabinets px = Use in Zone 1, 2 py = Use in Zone 1, 2 pz = Use in Zone 2	IEC60079-2
	Ex „q"	Powder-filled encapsulation Transformers, capacitors	IEC60079-5
	Ex „o"	Oil immersion encapsulation Transformers, load resistors	IEC60079-6
	Ex „e"	Increased safety Terminal boxes, control cabinets, enclosures for installing devices of other protection class	IEC60079-7
	Ex „i"	Intrinsically safe Terminal boxes, control cabinets, sensors, measurement and control equipment ia = Use in Zone 0, 1, 2 ib = Use in Zone 1, 2	IEC60079-11
		Intrinsically safe systems	IEC60079-25
	Ex „n"	Non sparking Systems that, due to their design, cannot spark	IEC60079-15
	Ex „m"	Encapsulation Command and signalling devices, sensors, display/indicator devices ma = Use in Zone 0,1,2 mb = Use in Zone 1,2	IEC60079-18
	Ex „op"	Optical radiation op is = Intrinsically safe optical radiation op pr = Protected optical radiation op sh = Shutdown optical radiation	IEC60079-28

IP Protection Classes

IP 1st digit	Contact	Foreign bodies	IP 2nd digit	Water
0	No protection	No protection	0	No protection
1	Large body parts	Solid object > 50 mm	1	Water dripping vertically
2	Finger	Solid object > 12.5 mm	2	Water dripping at angle up to 15°
3	Tool > 2.5 mm	Solid object > 2.5 mm	3	Water sprayed at an angle up to 60°
4	Tool > 1 mm	Solid object > 1 mm	4	Spayed water 360°
5	Complete protection	Dust accumulation	5	Hose water 360°
6	Complete protection	Dust infiltration	6	Strong hose water 360°
			7	Temporary submersion
			8	Submersion

Device group I Mining

I M1	Safety provided by 2 safety measures, 2 faults
I M2	Shutdown on occurrence of explosive atmosphere

Device group II All potentially explosive atmospheres except mining

II 1	Zone 0	Zone 20	1 Zone 0 zone 20 Safety provided by 2 safety measures, 2 faults
II 2	Zone 1	Zone 21	2 Zone 1 Zone 21 Safety in the event of frequent equipment malfunctions, 1 fault
II 3	Zone 2	Zone 22	3 Zone 2 Zone 22 Safety in trouble-free operation

Zone categories, device group II

Hazard	Gas as per IEC	Dust as per IEC
Permanent or frequent	Zone 0	Zone 20
Occasional	Zone 1	Zone 21
Rare, temporarya no longer than 30 min per year	Zone 2	Zone 22

Max. permissible surface temperature	Temperature classes for gases
450°	T1
300°	T2
200°	T3
135°	T4
100°	T5
85°	T6

Explosion groups for gases

Group	Typical gas	Ignition energy
I	Methane	280 µJ
IIA	Propane	> 180 µJ
IIB	Ethylene	60...180 µJ
IIC	Hydrogen	< 60 µJ

Additional conditions

-	No restriction
X	Special conditions
U	Component certification Parts certification

ATEX Products

EX versions of the tried-and-tested BERNSTEIN switches with ATEX approval are also available for applications involving potentially gas and dust explosive atmospheres.

Approvals for gas "ii G"
in accordance with
DIN EN 60079-XX

Approvals for dust "ii D"
in accordance with
DIN EN 61241-XX

Make use of our Ex protection expertise for your applications.







What is ATEX?

ATEX = Atmosphère explosible.
The European Directive 94/4/EC governs the production and the circulation of devices and components for explosive at-mospheres in the European Union. The IEC Standards harmonised throughout the EU stipulate that ATEX products approved by a certification authority can be used anywhere throughout the EU.

In most aspects the certification authorities of non-European countries such as North America, Russia etc. closely follow ATEX-relevant standards so that various approvals can be acquired worldwide based on an ATEX approval. Corresponding national approvals are available on request.

Where are devices with ATEX approval used?

The fields of application for Ex-protected switches include mixing and processing machines in bakeries (flour dust explosion), processing machines in the food industry where spices are mixed (spice dust explosion), sewer manholes, pump stations and sewage treatment plant (explosive gases "fermentation/digester gas"), waste disposal and recycling industry (various sources of dust and gas explosion), automotive industry and wherever paints and lacquers are used (painting booth) in addition to the classic explosion-hazard branches of industry such as the chemical, petrochemical, pharmaceutical industries as well as the coal, gas and oil-producing and processing industries. Mobile equipment and systems such as vacuum cleaners, stacker lift trucks, fans etc. that are used in the above fields of application must exhibit a corresponding ATEX approval. ATEX products are therefore a part of our everyday lives..

Who is responsible for what in Ex applications?

The device or component manufacturer must obtain a type approval certificate (ATEX approval) for these devices and components. The machine manufacturer can acquire his system approval based on these approvals and the declaration of conformity.

The manufacturer of a machine or system that is used in Ex applications must obtain a corresponding system approval for the machines it markets. The entire system must be taken into consideration both from a mechanical as well as from an electrical aspect.

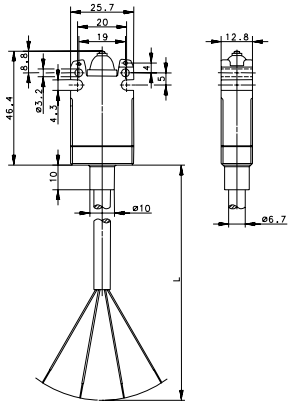
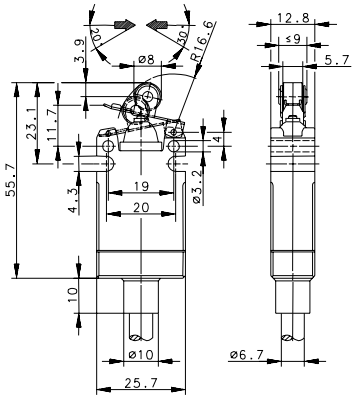
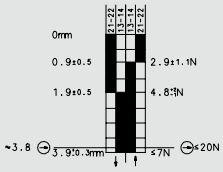
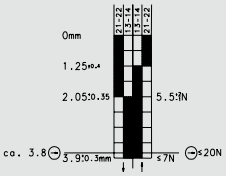
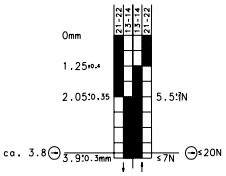
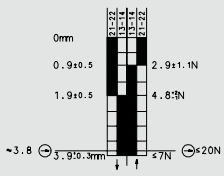
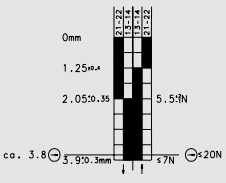
In accordance with the ATEX Operator Directive 1999/92/EC (ATEX137), the operator of technical facilities shall be responsible for avoiding or restricting the formation of explosive atmospheres (primary explosion protection), avoiding effective ignition sources (secondary or design explosion protection) and restricting the effect of an explosion to a safe level (tertiary explosion protection).An explosion protection document describing the implemented measures and hazard assessments is to be compiled.

In addition to foot switches and cable pull switches, our current ATEX-certified product range also includes various standard limit switches, limit switches and miniature limit switches.

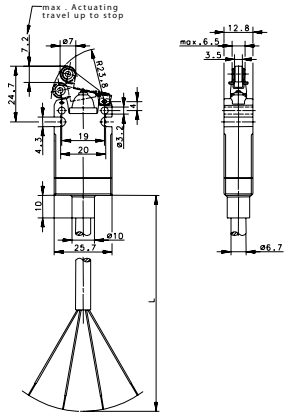
Customer-specific individual approvals or approvals for switches and components from the BERNSTEIN range not yet certified are available on request.

Technical data		EEX	GC	ENM2	F
Electrical data					
Rated insulation voltage	U_i max.	250 V	250 V	250 V	250 V
Rated operating voltage	U_e max.	230 V AC	230 V AC	230 V AC	230 V AC
Conventional thermal current	I_{the}	5 A	5 A	5 A	5 A
Utilization category: switching capacity		AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Mechanical data					
Mechanical Switching frequency		max. 120/min.	max. 50/min.	max. 50/min.	max. 50/min.
Mechanical service life		2 x 10^6 switching cycles	2 x 10^6 switching cycles	2 x 10^6 switching cycles	2 x 10^6 switching cycles
Contact type		1 NC /1 NO contact (Zb)	1 NC /1 NO contact (Zb)	1 NC /1 NO contact (Zb)	2 NC /2 NO contact (Zb)
B10d		4 mill.	4 mill.	4 mill.	4 mill.
Short-circuit protection		Fuse 4 A gL (Human protection function)	Fuse 4 A gL (Human protection function)	Fuse 4 A gL (Human protection function)	Fuse 4 A gL (Human protection function)
Protection class		II, Insulated	II, Insulated	II, Insulated	II, Insulated
Approval for Zone		II 2G (GAS)	II 2G (GAS)	II 2G (GAS)	II 2G (GAS)
Admissible ambient temperature		-20°C to +65°C	-20°C to +65°C	-20°C to +65°C	-20°C to +65°C
Protection class of built-in snap-action switch		IP66/IP67 conforming to IEC/EN 60529	IP66/IP67 conforming to IEC/EN 60529	IP66/IP67 conforming to IEC/EN 60529	IP66/IP67 conforming to IEC/EN 60529
Type of connection		Control line (with ferrules)	Control line (with ferrules)	Control line (with ferrules)	Control line (with ferrules)
Conductor cross sections		4 x 0,75 mm²	4 x 0,75 mm²	4 x 0,75 mm²	4 x 0,75 mm²
Enclosure		PEI	Aluminium pressure die-casting	Aluminium pressure die-casting	Aluminium pressure die-casting
Cable entry		Cast	1 x cable screw connection M20 x 1,5	1 x cable screw connection M20 x 1,5	1 x cable screw connection M20 x 1,5

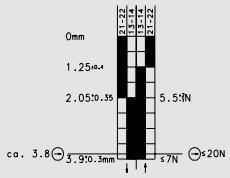
Technical data		SN2	SI2 U2Z AW	SI2 U2Z AK	
Electrical data					
Rated insulation voltage	U_i max.	400 V AC	400 V AC	400 V AC	
Rated operating voltage	U_e max.	240 V	240 V	240 V	
Conventional thermal current	I_{the}	10 A	10 A	10 A	
Utilization category: Switching capacity		AC 15, U_e /I_e 240 V / 3 A	AC 15, U_e /I_e 240 V / 3 A	AC 15, U_e /I_e 240 V / 3 A	
Mechanical data					
Mechanical Switching frequency		≤ 60/min.	≤ 10/min.	≤ 10/min.	
Mechanical service life		10 x 10^6 switching cycles	2 x 10^6 switching cycles	2 x 10^6 switching cycles	
Actuation		Achshebel (Zn-Al), Rolle (Termoplast)	Roller lever (St)	Lever (St)	
Ambient temperature		-20°C to +80°C	-20°C to +60°C	-20°C to +60°C	
Contact type		1 NC /1 NO contact	2 NC /2 NO contact (Zb)	2 NC /2 NO contact (Zb)	
B10d		20 mill.	4 mill.	4 mill.	
Short-circuit protection		Fuse 2 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG	
Protection class		I	I	I	
Approval for Zone		II 2D IP65 T85°C (STAUB)	II 3D IP65 T80°C (STAUB)	II 3D IP65 T80°C (STAUB)	
Surface temperature T		85°C	80°C	80°C	
Protection class of built-in snap-action switch		IP65 conforming to IEC/EN 60529	IP65 conforming to IEC/EN 60529	IP65 conforming to IEC/EN 60529	
Type of connection		Contact screws	Screw connections	Screw connections	
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²	Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²	Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²	
Enclosure		AL-Aluminium pressure die-casting	Cast iron	Cast iron	
Cable entry		3 x M20 x 1.5	3 x M20 x 1.5	3 x M20 x 1.5	
Standards					
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 EN 60079-0, DIN EN 60079-0 EN 60079-1, DIN EN 60079-1 Directive 94/9 EG (ATEX 95)					

	EEX W	EEX RH
		
2 meter connection cable	**6090153002** EEX-SU1Z W -2M- 	**6090148022** EEX-SU1Z RH -2M- 
5 meter connection cable		**6090148024** EEX-SU1Z RH -5M- 
9 meter connection cable	**6090153005** EEX-SU1Z W -9M- 	**6090148025** EEX-SU1Z RH -9M- 
EX certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

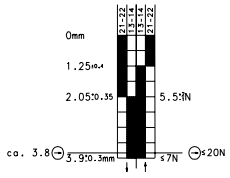
EEX RHL



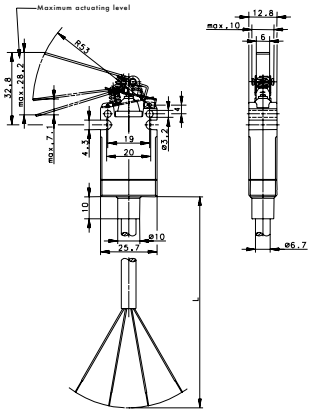
6090149027
EEX-SU1Z RHL -2M-



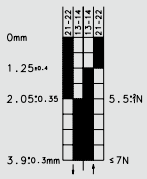
6090149029
EEX-SU1Z RHL -5M-



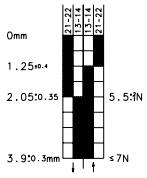
EEX UH



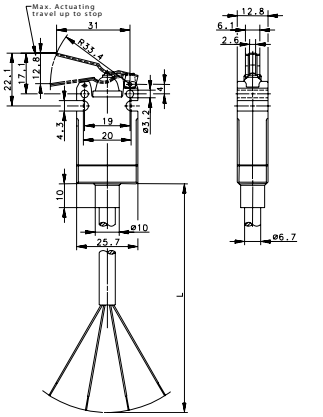
6090146012
EEX-SU1 UH -2M-



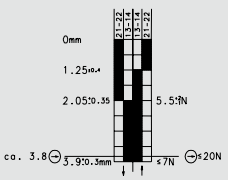
6090146014
EEX-SU1 UH -5M-



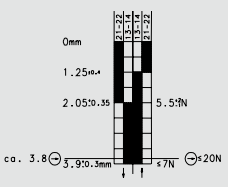
EEX FH



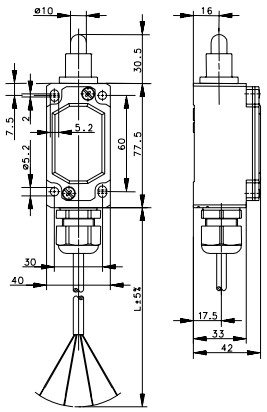
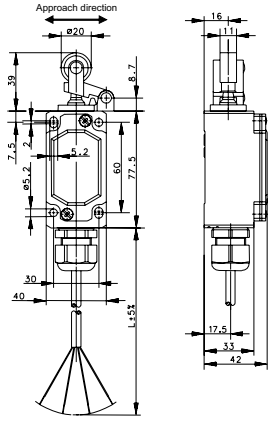
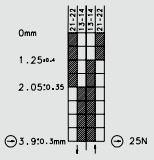
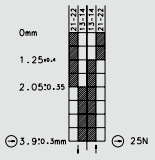
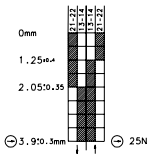
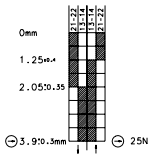
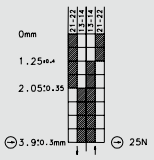
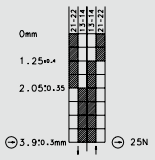
6090145007
EEX-SU1Z FH -2M-



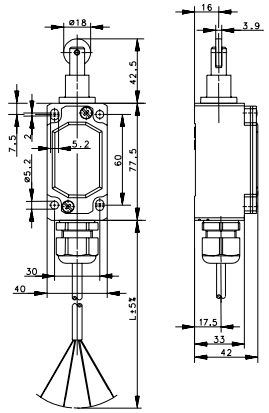
6090145010
EEX-SU1Z FH -9M-



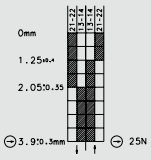
ATEX Products

	ENM2 IW	ENM2 HW
		
2 meter connection cable	**6097152052** ENM2-SU1Z EX IW -2M- 	**6097171072** ENM2-SU1Z EX HW -2M- 
5 meter connection cable	**6097152054** ENM2-SU1Z EX IW -5M- 	**6097171074** ENM2-SU1Z EX HW -5M- 
9 meter connection cable	**6097152055** ENM2-SU1Z EX IW -9M- 	**6097171075** ENM2-SU1Z EX HW -9M- 
EX certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

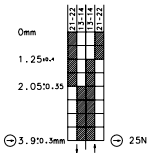
ENM2 RIW



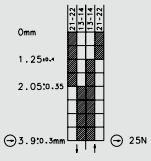
6097167062
ENM2-SU1Z EX RIW -2M-



6097167064
ENM2-SU1Z EX RIW -5M-

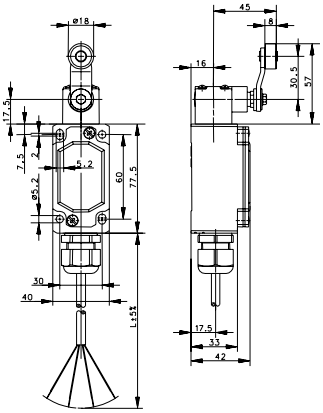


6097167065
ENM2-SU1Z EX RIW -9M-

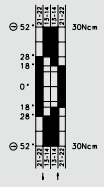


II 2 G EEx d IIC T6

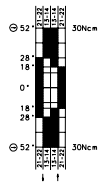
ENM2 AHT



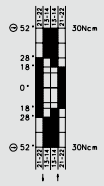
6097185082
ENM2-SU1Z EX AHT -2M-



6097185084
ENM2-SU1Z EX AHT -5M-

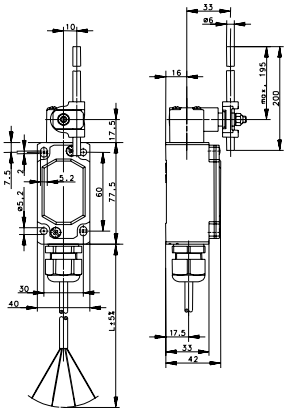


6097185085
ENM2-SU1Z EX AHT -9M-

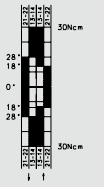


II 2 G EEx d IIC T6

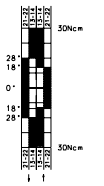
ENM2 AD



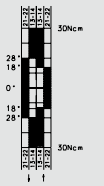
6097187092
ENM2-SU1 EX AD -2M-



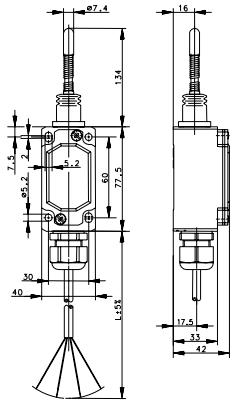
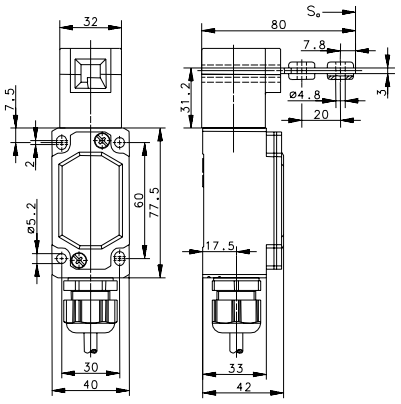
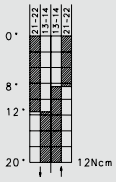
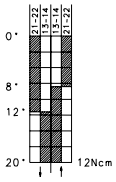
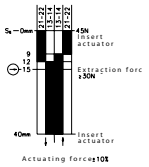
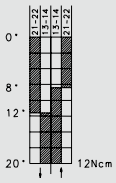
6097187094
ENM2-SU1 EX AD -5M-



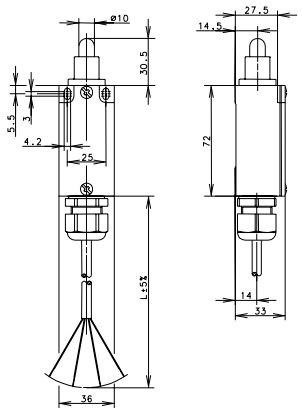
6097187095
ENM2-SU1 EX AD -9M-



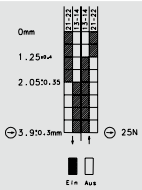
II 2 G EEx d IIC T6

	ENM2 FF	ENM2 VTW
		
2 meter connection cable	**6097190097** ENM2-SU1 EX FF -2M- 	
5 meter connection cable	**6097190099** ENM2-SU1 EX FF -5M- 	**6197100010** ENM2-SU1Z EX VTW -5M- 
9 meter connection cable	**6097190100** ENM2-SU1 EX FF -9M- 	
EX certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

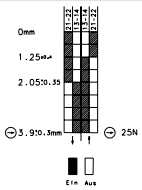
GC IW



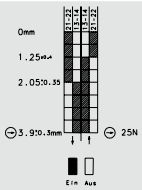
6092152002
GC-SU1Z EX IW -2M-



6092152004
GC-SU1Z EX IW -5M-

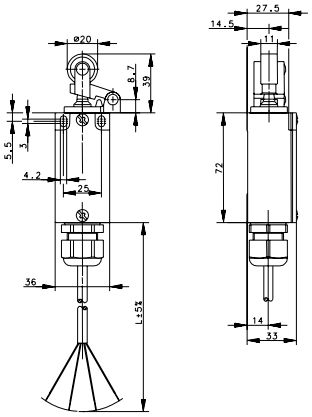


6092152005
GC-SU1Z EX IW -9M-

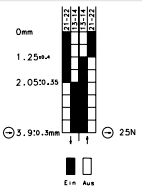


II 2 G EEx d IIC T6

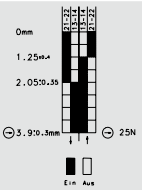
GC HW



6092171024
GC-SU1Z EX HW -5M-

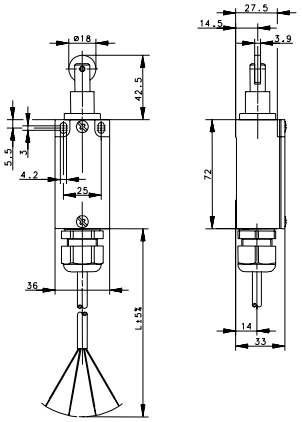


6092171025
GC-SU1Z EX HW -9M-

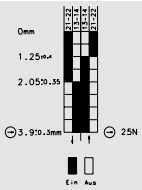


II 2 G EEx d IIC T6

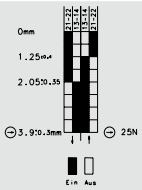
GC RIW



6092167012
GC-SU1Z EX RIW -2M-

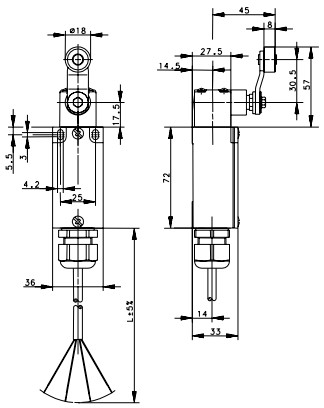
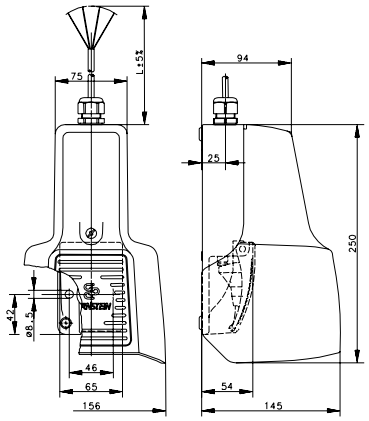
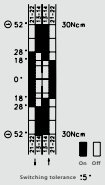
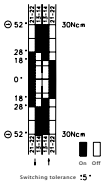
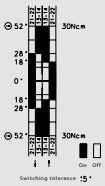


6092167015
GC-SU1Z EX RIW -9M-

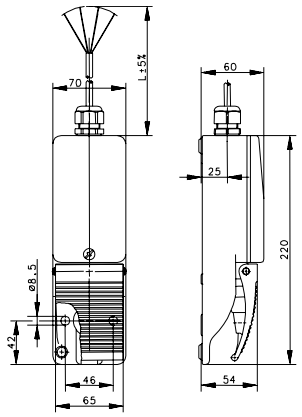


II 2 G EEx d IIC T6

ATEX Products

	GC AHT	F1 UN
		
2 meter connection cable	**6092185032** GC-SU1Z EX AHT -2M- 	**6096197017** F1-SU1Z EX UN -2M-
5 meter connection cable	**6092185034** GC-SU1Z EX AHT -5M- 	**6096197019** F1-SU1Z EX UN -5M-
9 meter connection cable	**6092185035** GC-SU1Z EX AHT -9M- 	
EX certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

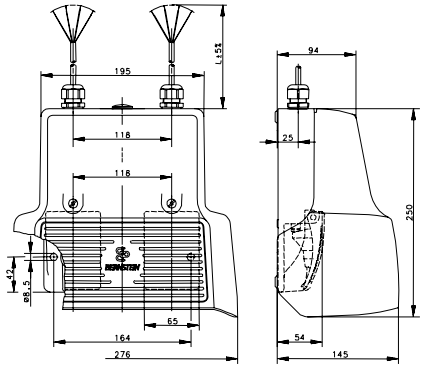
F1



6096198014
F1-SU1Z EX -5M-

II 2 G EEx d IIC T6

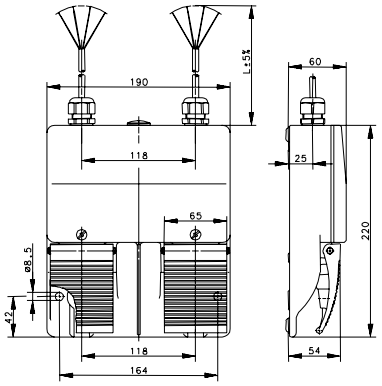
F2 UN



6096197029
F2-SU1Z/SU1Z EX UN -5M-

II 2 G EEx d IIC T6

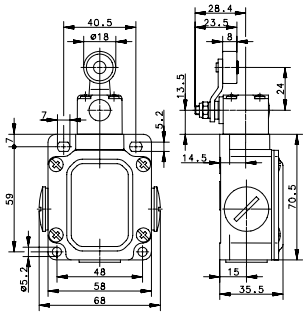
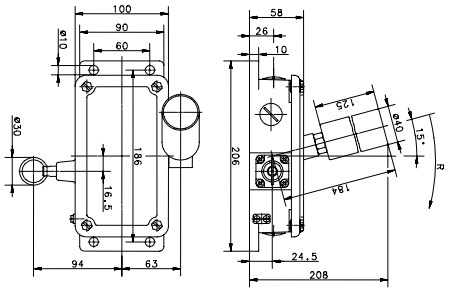
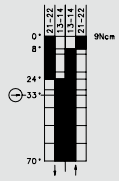
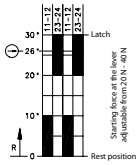
F2



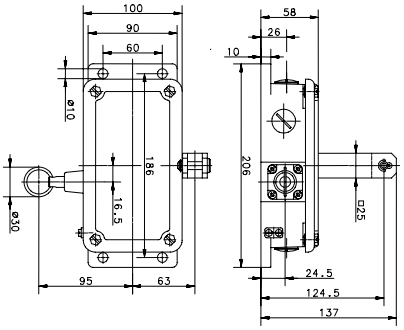
6096198022
F2-SU1Z/SU1Z EX -2M-

II 2 G EEx d IIC T6

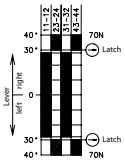
ATEX Products

	Explosion-protected metal-enclosed switch SN2	Series SI2
		
1 NC /1 NO contact	**6193285001** SN2-SU1Z AH EXD 180 Gr. 	
2 NC /2 NO contacts		**6091295025** SI2-U2Z AW EXD 
EX certification	II 2 D IP65 T 85 °C	II 3 D Ex tD A22 IP65 T 80°C

Series SI2



6091288024
SI2-U2Z AK EXD



II 3 D Ex tD A22 IP65 T 80°C

BERNSTEIN



Switch systems –
Economy meets safety



Sensor systems –
Compact intelligence



Enclosure systems –
Function and design

www.bernstein.eu

700 0000 897 . 02.2010 . We reserve the right to make changes

Contact

International Headquarters
BERNSTEIN AG
Tieloser Weg 6
32457 Porta Westfalica
Tel. +49 571 793-0
Fax +49 571 793-555
info@de.bernstein.eu
www.bernstein.eu

Denmark
BERNSTEIN A/S
Tel. +45 7020 0522
Fax +45 7020 0177
info@dk.bernstein.eu

France
BERNSTEIN S.A.R.L.
Tel. +33 1 64 66 32 50
Fax +33 1 64 66 10 02
info@fr.bernstein.eu

Netherlands
BERNSTEIN BV
Tel. +31 314 366088
Fax +31 314 361256
info@nl.bernstein.eu

Italy
BERNSTEIN S.r.l.
Tel. +39 035 4549037
Fax +39 035 4549647
info@it.bernstein.eu

United Kingdom
BERNSTEIN Ltd.
Tel. +44 1922 744999
Fax +44 1922 457555
info@uk.bernstein.eu

Austria
BERNSTEIN GmbH
Tel. +43 2256 62070-0
Fax +43 2256 62618
info@at.bernstein.eu

Switzerland
BERNSTEIN (Schweiz) AG
Tel. +41 44 775 71-71
Fax +41 44 775 71-72
info@ch.bernstein.eu

China
BERNSTEIN Safe Solutions
(Taicang) Co., Ltd.
Tel. +86 512 81608180
Fax +86 512 81608181
info@bernstein-safesolutions.cn

Hungary
BERNSTEIN Kft.
Tel. +36 1 4342295
Fax +36 1 4342299
info@hu.bernstein.eu

Service Hotlines:
For products: +49 571 793-3000
For orders: +49 571 793-3010

BERNSTEIN



Complete Range
Enclosure Systems

BERNSTEIN



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 system



**Switch system –
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 level switches, customers can choose from a wide range of inductive, capacitive, magnetic or optical sensors. Alongside the comprehensive 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
Enclosure Systems



Enclosure systems – Function and design

Functional design, high quality and durability are essential prerequisites for effective system integration. We incorporate customised wiring and specific component configurations in our expanded enclosure production process, which includes the preassembly of mounting rails or the installation of PLC/IPS solutions of all renowned manufacturers. In cooperation with our customers, this extremely pragmatic project planning results in fast and exceptionally reliable solutions.

In the modular aluminium control enclosure systems we combine state-of-the-art design with outstanding technical features to individually and efficiently encapsulate industrial controllers and operator panels. Our extensive range of suspension systems perfectly enhance this product portfolio. The same meticulous attention to detail is reflected in our range of stainless steel control enclosures.

These products are ideally suited for applications where the use of stainless steel is essential on account of special requirements and ambient conditions.
With special sizes, different surface finishes and the comprehensive range of stainless steel suspension systems we offer unlimited scope for individualisation.

All state-of-the-art BERNSTEIN suspension systems are characterised by variable layout, advanced design and ease of installation.

Integrated diversity

Modern industrial design, perfected ergonomics and a host of combinable components create innovative system solutions based on modular principles. BERNSTEIN standard enclosures with quick-release fasteners, flexible internal articulated hinges and international approvals give our customers ample scope in the choice of enclosures best suited



for their specfic application. With a range of materials such as plastic, metal and stainless steel, BERNSTEIN has the ideal solution for all applications. Backed by our quality manufacturing guarantee we will do whatever it takes to make sure that BERNSTEIN enclosures provide the perfect solution.

Services and standards

- Bespoke solutions
- Lower costs thanks to all-encompassing system
- Supply of complete systems and their project integration
- System components procured by BERNSTEIN
- Compliance with applicable product and industrial standards
- International approvals

System solutions/ATEX

	Type	Page
	**BERNSTEIN System solutions** Comprehensive range of services from BERNSTEIN enclosure systems	12
	**ATEX** ATEX-approved products for potentially explosive atmospheres	14
	Selection criteria and general technical information on enclosures (IP classification, chemical resistance, etc.)	16

Standard enclosures

	Type	Page
	**Aluminium enclosure Type CA** • High mechanical loading capacity • High corrosion resistance • IP65 • Accessories • Assembly, aluminium enclosures	24
	**Polycarbonate enclosure Type CT** • Medium mechanical loading capacity • Conditional suitability, for outdoor use • IP65 • Accessories • Assembly, polycarbonate and ABS enclosures	44
	ABS enclosures Type CT • Low mechanical loading capacity • Limited suitability for outdoor use • IP65 • Accessories	
	**Polyester enclosures Type CP** • High mechanical loading capacity • Very high corrosion resistance • Excellent suitability for outdoor use • IP65 • Accessories	58
	**Accessories Screwed cable glands**	70

Control enclosures

	Type	Page
	**Light-duty control enclosure Type CC-3000** • Modular, flat aluminium slimline concept • Direct installation of commercially available controllers • Different front panel installation options • Customer-specific dimensions	72
	**Control enclosures Type CC-4000/CC-4000 SL** • Modular aluminium enclosure concept • Direct installation of commercially available controllers • Different front panel installation options • Customer-specific dimensions • Stand	76
	**Accessories Control enclosures**	82
	Checklists	106

Workstation

	Type	Page
	**Industrial workstation Type WS-6000** • Easy-to-service design • FFlexible concept for tailor-made solutions	**94**

Suspension systems

	Type	Page
	Selection criteria for suspension systems	**112**
	**Mini suspension system CS-1000** • Complete suspension system for light loads • Horizontally/vertically and vertically adjustable systems	**114**
	**Light-duty suspension system Typw CS-2000 SL 45/60** • Modular suspension system concept in two colours for light mechanical loads • Aluminium connecting sections with/without cable ductl • Installation openings at joints	**116**
	**Medium-duty suspension system Typw CS-3000** • Modular suspension system concept for medium mechanical loads • Anodised aluminium tubing as connecting element and cable duct • Installation openings at joints	**130**
	Accessories CS-3000	**148**
	**Heavy-duty suspension system Type CS-2000 System 80** • Modular suspension system concept for heavy mechanical loads • Steel tubing as connecting element and cable duct • Installation openings at joints	**150**
	Accessories for suspension CS-2000 SL and System 80	**160**

Stainless steel range

	Type	Page
	**Stainless steel enclosure CC-800** • Material 1.4301 • Protection class IP65 • Modern design	**162**
	**Suspension system for light to medium loads Type CS-480 NR** • Material 1.4305 • Protection class IP66	**164**
	**Suspension system for medium to high loads Type CS-600 NR** • Material 1.4305 • Protection class IP66 • Modular system	**172**

Expertise from under one roof

Comprehensive range of services from BERNSTEIN enclosure systems

BERNSTEIN specialises in products that reliably protect your technical equipment from damage, the environment or unauthorised access.

Bespoke, individually designed system solutions are based on tried-and-tested enclosure technology combined with BERNSTEIN suspension systems.

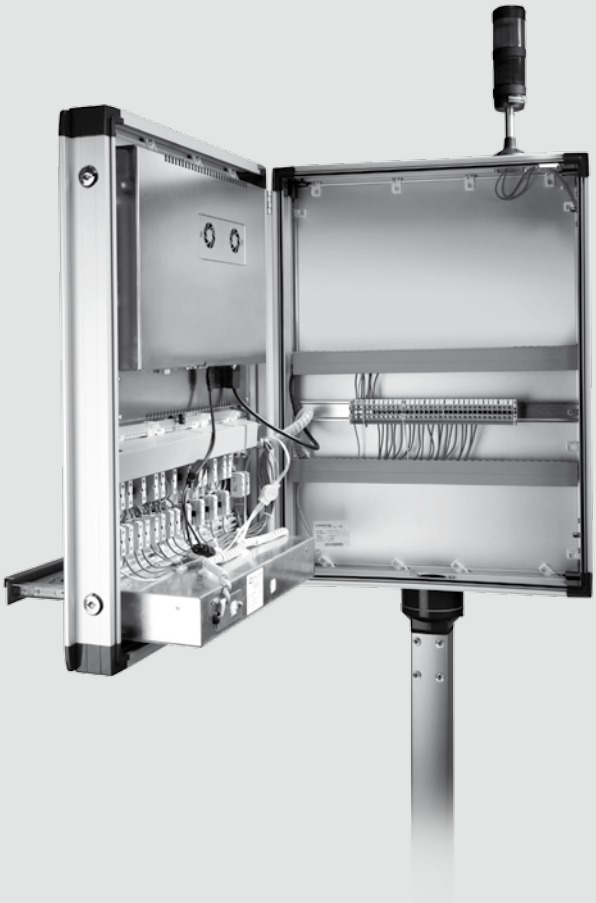
Tailored wiring and the installation of components can now be integrated directly in the expanded enclosure production process.

Starting with the preassembly of mounting rails and terminals through cable configuration to component mounting and complete wiring in the enclosure.

BERNSTEIN – Your solution specialist.

New system integration approaches such as the installation and preassembly of:

- Power supply systems
- Operating and control elements
- Membrane keypads
- Displays, power supply and data cables
- I/O assemblies
- Ethernet components
- PLC/IPC solutions of all renowned manufacturers



Your benefits:

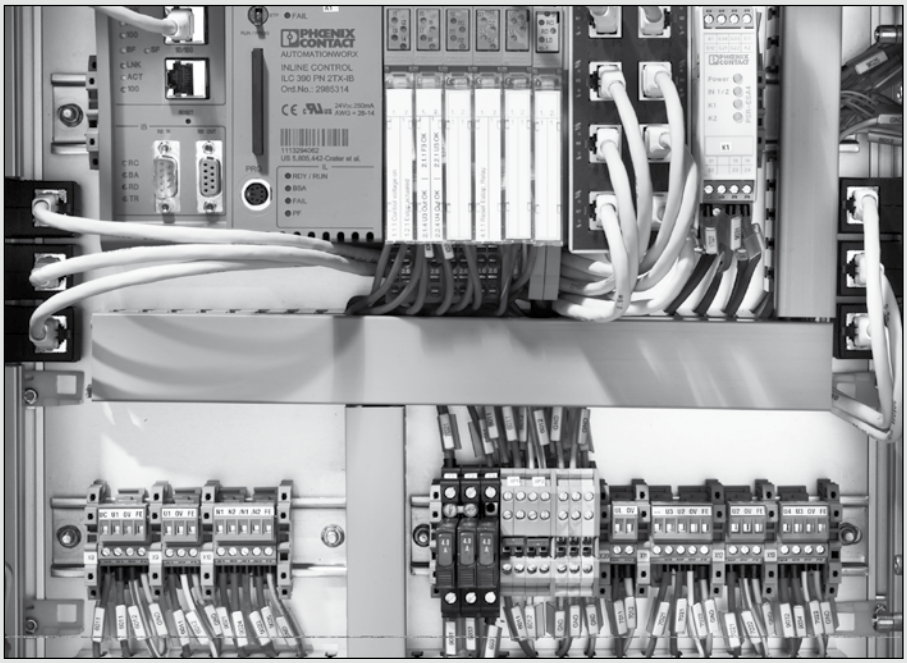
- **Solution specifically tailored** to customer requirements
- System solution phased directly into production process
- Compliance with **applicable product and industrial standards** (ATEX, IP-classes)
- Administration expenditure and costs reduced by
  - **Purchase and stockkeeping** of components by BERNSTEIN
  - No residual quantities of individual components
  - Use of standard components
  - No costs incurred for **assembling individual components** – delivery of complete systems
  - Acceptance of part projects by BERNSTEIN, therefore, reduced assembly and component mounting costs
- **Integration** of BERNSTEIN switch and sensor systems
- System components procured by BERNSTEIN

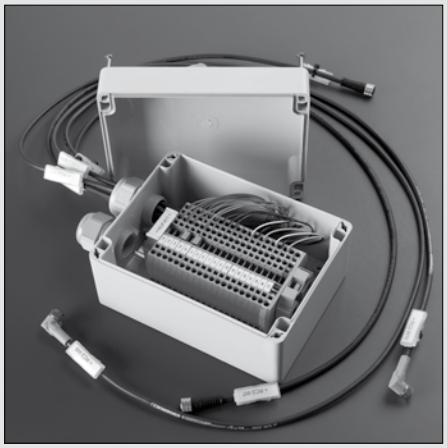


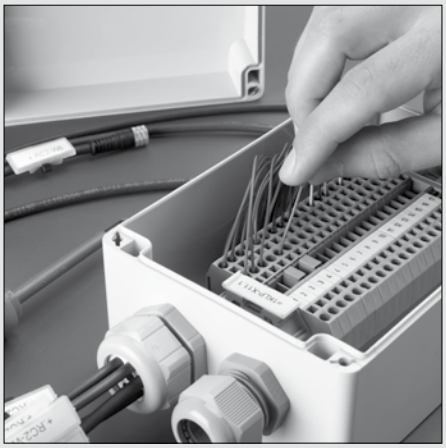
Combination of BERNSTEIN enclosures and customer technologies

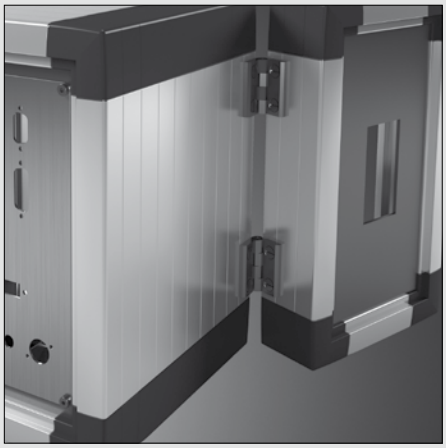
As a solution specialist, BERNSTEIN has available core expertise in mechanical applications and a comprehensive range of tools to suit the most diverse configuration requirements.

- **Customised enclosure modifications, freely selectable dimensions and configurations created by:**
  - Holes
  - Threads
  - Apertures
  - Pre-punched blanks
- **Preassembly, mounting and wiring of:**
  - Mounting panels and support rails
  - Hinges and mounting brackets
  - Terminals and screwed cable glands
  - Circular connectors
- **Individual powder coating also available in special colours in own production process**















ATEX

ATEX-approved products for potentially explosive atmospheres

- Exe, Ex ia and Ex e\ia terminal boxes made from polyester and aluminium
- Ex d limit switches, cable pull switches and foot switches
- Ex mb/Ex tD magnetic switches

Services, training, system solutions, project- and customer-specific solutions.



Terminal boxes and empty enclosures

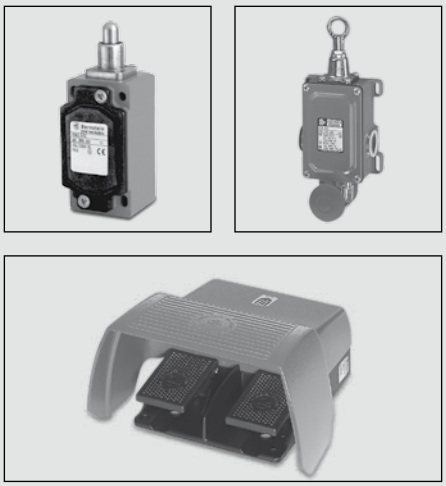
Only materials that correspond to the temperature range T6 required for Ex enclosures are used in these enclosures and components.

The minimum type of protection rating of all enclosures and screw connections is IP64, other protection classes available on request.

The latching devices on the enclosures are optionally available as captive screw connections or quick-release fasteners.

Various CA versions are available with flange plates.

All built-in components must conform to the relevant approvals.



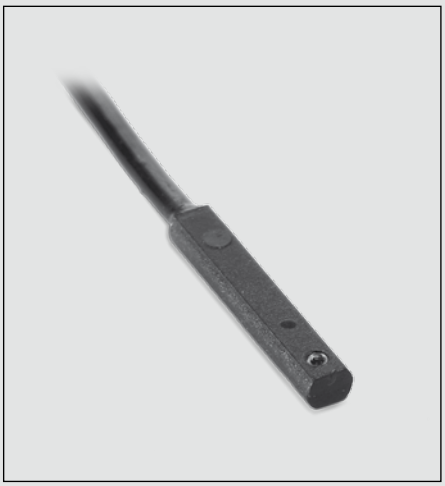
Momentary contact, cable pull and footswitches

An Ex d-certified switching element lies at the core of these Ex-approved switches.

It is mounted in the corresponding switch enclosures. The mechanical actuator and its installation are certified separately.

The approval of additional actuators and switch enclosures from other series is possible on request.

All switches and momentary contact switches feature one NO contact and one NC contact.



Magnetic switches

The magnetic switches are fitted at the factory with an up to 7 m long connection cable.

The cable is permanently connected to the enclosure and is part of the approval.

All sensors are certified for a maximum ambient temperature of 80°C.

Services offered by the BERNSTEIN-ATEX experts:

- Approval of a stainless steel enclosure with freely definable dimensions
- Approvals assistance for plant operators
- Approval of switching and control elements in all enclosures
- Approval of plug-in devices in all enclosures
- Component mounting and wiring of enclosures according to customer specifications
- Training courses for planners and plant operators
- Cross-product system solutions
- Customer-specific development and project management on request
- Gost (Russia) and NEC (North America) approvals on request

Explosion protection at a glance

Ex	II2G	Ex	ia	IIC	T6	TÜV	2008	ATEX	1234	-
Type approval in accordance RAL 94/9/EG	Application	Explosion protection	Type of protection	Device group	Tempera-ture class	Inspection authority	Year	As per Directive 94/9/EG	Consecuti-ve number	Additional conditions

Types of protection for gas-explosion hazardous areas

Symbol		Type of protection	Standard
	Ex „d"	Flameproof encapsulation Switching devices, motors, transformers etc.	IEC60079-1
	Ex „p"	Pressurised encapsulation Control cabinets px = Use in Zone 1, 2 py = Use in Zone 1, 2 pz = Use in Zone 2	IEC60079-2
	Ex „q"	Powder-filled encapsulation Transformers, capacitors	IEC60079-5
	Ex „o"	Oil immersion encapsulation Transformers, load resistors	IEC60079-6
	Ex „e"	Increased safety Terminal boxes, control cabinets, enclosures for installing devices of other protection class	IEC60079-7
	Ex „i"	Intrinsically safe Terminal boxes, control cabinets, sensors, measurement and control equipment ia = Use in Zone 0, 1, 2 ib = Use in Zone 1, 2	IEC60079-11
		Intrinsically safe systems	IEC60079-25
	Ex „n"	Non sparking Systems that, due to their design, cannot spark	IEC60079-15
	Ex „m"	Encapsulation Command and signalling devices, sensors, display/indicator devices ma = Use in Zone 0, 1, 2 mb = Use in Zone 1, 2	IEC60079-18
	Ex „op"	Optical radiation op is = Intrinsically safe optical radiation op pr = Protected optical radiation op sh = Shutdown optical radiation	IEC60079-28

IP Protection Classes

IP 1st digit	Contact	Foreign bodies	IP 2nd digit	Water
0	No protection	No protection	0	No protection
1	Large body parts	Solid object > 50 mm	1	Water dripping vertically
2	Finger	Solid object > 12.5 mm	2	Water dripping at angle up to 15°
3	Tool > 2.5 mm	Solid object > 2.5 mm	3	Water sprayed at an angle up to 60°
4	Tool > 1 mm	Solid object > 1 mm	4	Sprayed water 360°
5	Complete protection	Dust accumulation	5	Water jet 360°
6	Complete protection	Dust infiltration	6	Strong water jet 360°
			7	Temporary submersion
(see Page 17 for further information on IP Classes)			8	Submersion

Max. permissible surface temperature	Tempera-ture classes for gases
450°	T1
300°	T2
200°	T3
135°	T4
100°	T5
85°	T6

Device group I Mining

I M1	Safety provided by 2 safety measures, 2 faults
I M2	Shutdown on occurrence of explosive atmosphere

Device group II All potentially explosive atmospheres except mining

II 1	Zone 0	Zone 20	Safety provided by 2 safety measures, 2 faults
II 2	Zone 1	Zone 21	Safety in the event of frequent equipment malfunctions, 1 fault
II 3	Zone 2	Zone 22	Safety in trouble-free operation

Zone categories, device group II

Hazard	Gas as per IEC	Dust as per IEC
Permanent or frequent	Zone 0	Zone 20
Occasional	Zone 1	Zone 21
Rare, temporary no longer than 30 min per year	Zone 2	Zone 22

Explosion groups for gases

Group	Typical gas	Ignition energy
I	Methane	280 µJ
IIA	Propane	> 180 µJ
IIB	Ethylene	60...180 µJ
IIC	Hydrogen	< 60 µJ

Additional conditions

-	No restriction
X	Special conditions
U	Component certification, parts certification

ATEX-U certified standard aluminium CA enclosures

BERNSTEIN CA enclosures have been tested by an internationally recognised and certified inspection authority and certified through type approval testing for use in areas with potentially explosive dust and gas atmospheres. Used as terminal and control enclosures, the aluminium pressure die-cast enclosures are designed to accept corresponding mechanical and electrical equipment. The enclosures come with operating instructions, type identification plate, EU Type Approval Certificate and CE Declaration of Conformity. Either an EPDM or silicone seal can be used. The enclosures can be fitted at the factory with external hinges.

External dimensions in mm	Type	Art. No. with silicone seal	Art. No. with EPDM seal
58 x 64 x 36	CA-060	1064005000	1064000000
98 x 64 x 36	CA-080	1084005000	1084000000
150 x 64 x 36	CA-100	1104005000	1104000000
75 x 80 x 57	CA-130	1134005000	1134000000
75 x 80 x 57	CA-140	1144005000	1144000000
125 x 80 x 57	CA-150	1154005000	1154000000
125 x 80 x 57	CA-160	1164005000	1164000000
175 x 80 x 57	CA-170	1174005000	1174000000
175 x 80 x 57	CA-180	1184005000	1184000000
250 x 80 x 57	CA-190	1194005000	1194000000
122 x 122 x 80	CA-210	1214005000	1214000000
122 x 122 x 90	CA-215	1214005050	1214000050
122 x 122 x 80	CA-220	1224005000	1224000000
220 x 122 x 80	CA-230	1234005000	1234000000
220 x 122 x 90	CA-235	1234005050	1234000050
220 x 122 x 80	CA-240	1244005000	1244000000
360 x 122 x 80	CA-250	1254005000	1254000000
160 x 160 x 90	CA-270	1274005000	1274000000
160 x 160 x 90	CA-280	1284005000	1284000000
260 x 160 x 90	CA-290	1294005000	1294000000
260 x 160 x 90	CA-300	1304005000	1304000000
360 x 160 x 90	CA-310	1314005000	1314000000
560 x 160 x 90	CA-330	1334005000	1334000000
200 x 230 x 110	CA-350	1354005000	1354000000
200 x 230 x 180	CA-360	1364005000	1364000000
280 x 230 x 110	CA-370	1374005000	1374000000
330 x 230 x 110	CA-380	1384005000	1384000000
330 x 230 x 180	CA-390	1394005000	1394000000
400 x 230 x 110	CA-400	1404005000	1404000000
600 x 230 x 110	CA-420	1424005000	1424000000
402,5 x 310 x 110	CA-450	1454005000	1454000000
402,5 x 310 x 180	CA-460	1464005000	1464000000
600 x 310 x 110	CA-470	1474005000	1474000000
600 x 310 x 180	CA-480	1484005000	1484000000

Technical Data:

- Protection class depending on type of seal IP66 to DIN EN 60529
- Identification
  Ex II G Ex e II
  Ex II D Ex tD A21 IP65
- Impact strength > 7 Joules
- Enclosure colour RAL 7001 (silver grey)
- Powder-coating corrosion protection

ATEX-U certified standard polyester CP enclosures

BERNSTEIN CPG and CPS enclosures have been tested by an internationally recognised and certified inspection authority and certified through type approval testing for use in areas with potentially explosive dust and gas atmospheres. Used as terminal and control enclosures, the glass-fibre reinforced polyester enclosures are designed to accept corresponding mechanical and electrical equipment. The enclosures come with operating instructions, type identification plate, EU Type Approval Certificate and CE Declaration of Conformity. Either an EPDM or silicone seal can be used. The enclosures can be fitted at the factory with external hinges.

External dimensions in mm	Type	Art. No. with silicone seal	Art. No. with EPDM seal
80 x 75 x 55	CP-140	4144005000	4144000000
80 x 75 x 75	CP-145	4144005050	4144000050
110 x 75 x 55	CP-150	4154005000	4154000000
110 x 75 x 75	CP-155	4154005050	4154000050
160 x 75 x 55	CP-170	4174005000	4174000000
160 x 75 x 75	CP-175	4174005050	4174000050
190 x 75 x 55	CP-190	4194005000	4194000000
190 x 75 x 75	CP-195	4194005050	4194000050
122 x 120 x 90	CP-220	4224005000	4224000000
220 x 120 x 90	CP-240	4244005000	4244000000
160 x 160 x 90	CP-280	4284005000	4284000000
260 x 160 x 90	CP-300	4304005000	4304000000
360 x 160 x 90	CP-320	4324005000	4324000000
360 x 160 x 90	CP-320 with external articulated hinge	4324006000	4324001000
560 x 160 x 90	CP-330	4334005000	4334000000
560 x 160 x 90	CP-330 with external articulated hinge	4334006000	4334001000
255 x 250 x 120	CP-370	4374005000	4374000000
400 x 250 x 120	CP-400	4404005000	4404000000
400 x 250 x 120	CP-400 with external articulated hinge	4404006000	4404001000
400 x 405 x 120	CP-450	4454005000	4454000000
400 x 405 x 120	CP-450 with external articulated hinge	4454006000	4454001000
400 x 405 x 165	CP-460	4464005000	4464000000
400 x 405 x 165	CP-460 with external articulated hinge	4464006000	4464001000

Type	Art. No. with silicone seal	Art. No. with EPDM seal
CPS-140	5144005000	5144000000
CPS-145	5144005050	5144000050
CPS-150	5154005000	5154000000
CPS-155	5154005050	5154000050
CPS-170	5174005000	5174000000
CPS-175	5174005050	5174000050
CPS-190	5194005000	5194000000
CPS-195	5194005050	5194000050
CPS-220	5224005000	5224000000
CPS-240	5244005000	5244000000
CPS-280	5284005000	5284000000
CPS-300	5304005000	5304000000
CPS-320	5324005000	5324000000
CPS-320 with external articulated hinge	5324006000	5324001000
CPS-330	5334005000	5334000000
CPS-330 with external articulated hinge	5334006000	5334001000
CPS-370	5374005000	5374000000
CPS-400	5404005000	5404000000
CPS-400 with external articulated hinge	5404006000	5404001000
CPS-450	5454005000	5454000000
CPS-450 with external articulated hinge	5454006000	5454001000
CPS-460	5464005000	5464000000
CPS-460 with external articulated hinge	5464006000	5464001000

Technical Data:

- Protection class depending on type of seal IP66 to DIN EN 60529
- Identification
  Ex II 2 G Ex e II
  Ex II D Ex tD A21 IP64
- Up to CP 230 tested at 4 Joules
- As from CP 240 tested at 7 Joules
- Operating temperature depending on type of seal -55 °C to 100 °C
- Enclosure colour RAL 7000 (squirrel grey) CPG
- Enclosure colour RAL 9005 (jet black) CPS

Enclosure selection criteria

The following questions are designed to help you find the optimum enclosure for your specific application. In addition to the given criteria, your individual requirements are also of decisive importance.

1. How big should the enclosure be?

- PC-board size
- Number of terminals
- Number of screwed cable glands per side
- etc.

2. What ambient conditions should be taken into account?

- Moisture
- Climatic conditions
- Temperature
- Chemical exposure in the form of cleaning agents, oils, lubricants, etc.
- Electromagnetic compatibility
- etc.

3. What mechanical loads will the enclosure be subjected to?

- Impact
- Pressure
- Bending
- etc.

4. What additional features are required?

- Special coating:
- Special colour, special finish (chromalizing, EMC protective paint, etc.), screenprint and labels etc.
- Connectors
- Screw connections (number per side)
- Inspection window
- Preassembly with mounting panel, mounting rails, terminals, external and internal articulated hinges, etc.
- etc.

5. What other components can be install for you?

- Power supply systems
- Operating and control elements
- Membrane keypads
- Displays, power supply and data cables
- I/O assemblies
- Ethernet components
- PLC/IPC solutions of all renowned manufacturers
- etc.

You will find further details in Section "System Solutions" from Page 12 onwards.

6. What else can we install for you?

Talk to us, we will help you realise your challenge.

Definition of Protection Classes in accordance with IEC60529, VDE 470 T 1

The protection class of an enclosed device denotes the degree of protection. The degree of protection includes the protection of persons against contact with parts under voltage and the protection of equipment against the infiltration of foreign bodies and water.

BERNSTEIN standard enclosures largely correspond to protection class IP65.

Protection class designation

In accordance with IEC60529 the protection class designation consists of a two-digit codel.

Meaning of 1st digit:

Protection class against contact and infiltration of foreign bodies

Meaning of 2nd digit:

Protection class against infiltration of water

Example: Protection class IP65

1. Digit (6):

Complete protection against contact with components under voltage or with internal moving parts = protection against dust infiltration

2. Digit (5):

A water jet directed from all directions at the enclosure must not have damaging effects = protection against water jets (hoseproof)

Foreign body protection			**Moisture protection**		
1st digit	**Meaning**	**Explanation**	**2nd digit**	**Meaning**	**Explanation**
IP0X	No protection		IPX0	No protection	
IP1X	Protection against foreign bodies with a diameter of 50 mm or greater	Solid object (sphere, Ø 50 mm) must not fully penetrate	IPX1	Protection against dripping water	Vertically falling droplets must not have a damaging effect
IP2X	Protection against foreign bodies with a diameter of 12.5 mm or greater	Solid object (sphere, Ø 12.5 mm) must not fully penetrate	IPX2	Protection against dripping water when the enclosure is tilted at an angle of up to 15°	Vertically falling droplets must not have a damaging effect when the enclosure is tilted at an angle of up to 15° either side of the perpendicular
IP3X	Protection against foreign bodies with a diameter of 2.5 mm or greater	Solid object (sphere, Ø 2.5 mm) must not fully penetrate	IPX3	Protection against spray water	Water sprayed at an angle of up to 60° either side of the perpendicular must not have a damaging effect
IP4X	Protection against foreign bodies with a diameter of 1 mm or greater	Solid object (sphere, Ø 1 mm) must not fully penetrate	IPX4	Protection against splash water	Water sprayed against the enclosure from any direction must not have a damaging effect
IP5X	Protection against harmful dust deposits	Dust penetration is not completely prevented. However, the amount of penetration must not impair the function or safety of the device.	IPX5	Protection against hose water	Water sprayed in jet from against the enclosure from any direction must not have a damaging effect
IP6X	Protection against dust penetration, dustproof	No penetration of dust at a negative pressure of 20 mbar in the enclosure	IPX6	Protection against strong hose water	Water sprayed in strong jet from against the enclosure from any direction must not have a damaging effect
			IPX7	Protection against the effect when temporarily submerged in water	Water must not enter in harmful quantities when the enclosure is submerged under standardised pressure and time conditions
			IPX9K	Protection against water during high pressure/steam jet cleaning (as per DIN EN 40050, Part 9)	Water sprayed at greatly increased pressure against the enclosure from any direction must not have a damaging effect

Mechanical strength

Selection is based on the corresponding properties of the material to be used.
The table below provides an overview of the main material properties of aluminium, polycarbonate, ABS, polyester and stainless steel.

Material property	Standard	Unit	Aluminium	Polycarbonate	ABS	Polyester	Stainless steel
Density	DIN 53479	g/cm^3	2.65	1.2	1.05	1.8	7.9
Impact resistance	DIN 53453	mJ/mm^2	150 - 300	65	60	80	
Toughness	DIN 53453	mJ/mm^2	90 - 200	20	10	4	
Tensile strength	DIN 53455	N/mm^2	180 - 300	65	43	45	500 - 700
Elongation of break	DIN 53455	%	60 - 90	90	20	20	< 60
Modulus of elasticity (bending test)	DIN 53457	N/mm^2	75000	2300	2100	6500	200000
Flexural stress at given strain	DIN 53452	N/mm^2		95	90	100	
Flammability	UL 94	Class		V 2	HB	V 0	
Volume resistivity	DIN 53482	Ohm x cm		10^{15}	10^{13}	3×10^{14}	
Surface resistance	DIN 53482	Ohm x cm		$\geq 10^{15}$	4×10^{14}	$> 10^{12}$	
Dielectric strength	DIN 53481	kV/mm		25 - 40	24	25 - 40	
Thermal conductivity (20°C)	DIN 52612	W/mK	120 - 160	0.21	0.18	0.25	16.3
Electrical conductivity (20°C)		$m/Ohm\ mm^2$	15 - 22				

Chemical resistance

The table below provides an overview of the chemical resistance of BERNSTEIN aluminium, polycarbonate, ABS, polyester and stainless steel enclosures to chemicals commonly used. The specified values are reference values relating to different concentrations and ambient temperatures that have varying influences on materials. This also applies to simultaneous exposure to several chemicals. Corresponding trials are therefore recommended.

All tests were carried out at room temperature. The chemical resistance may change in combination with different media. Therefore, no responsibility can be accepted for the correctness of this information.

Chemical	ABS	Polycarbonate	Polyester	Aluminium	Stainless steel
Acetone	-	-	-	+	+
Formic acid	40%	-	+	o	+
Ammonia	25%	-	-	+	□
Benzine	-	o	+	+	+
Benzene	-	-	+	+	+
Brake fluid	o	-	+	□	(+)
Butane	+	+	+	+	(+)
Butanol	□	□	+	□	(+)
Calcium chloride	+	+	+	+	o
Chlorobenzene	-	-	+	+	+
Diesel oil	+	o	+	□	(+)
Acetic acid	25%	10%	5%	+	+
Formaldehyde	30%	□	30%	+	+
Freon 113	-	+	+	□	□
Fruit juice	+	+	+	□	+
Glycerine	+	o	+	+	+
Fuel oil	o	o	+	+	+
Hydraulic oil	□	+	+	□	+
Caustic potash solution	50%	-	-	□	□
Potassium chloride	□	+	+	o	o
Potassium hydroxide	< = 50 %	□	5%	-	+
Linseed oil	+	+	+	+	+
Methanol	+	-	+	+	+
Methylene chloride	-	-	+	+	□
Lactic acid	80%	+	+	+	o
Mineral oils	+	+	+	□	+
Engine oils	+	+	+	□	+
Sodium carbonate	+	+	10%	o	+
Sodium chloride	+	+	+	o	+
Sodium hydroxide	+	□	5%	+	+
Caustic soda	50%	-	40%	□	□
Nitric acid	-	10%	10%	+	+
Hydrochloric acid	o	20%	+	+	-
Lubricating oil	□	+	+	+	+
Carbon disulphide	-	-	-	+	+
Sulphuric acid	50%	50%	10%	o	+
Soap solution	□	o	+	□	□
Detergent	□	+	□	□	(+)
Turpentine oil	□	o	+	□	+
Carbon tetrachloride	-	-	+	+	+
Toluene	-	-	+	+	□
Trichloroethylene	-	-	+	+	+
Water (distilled water, river water, tap water, sea water)	+	+	+	□	+
Tartaric acid	+	+	+	□	+
Xylene	-	-	+	+	+
Zinc sulphate	+	+	+	o	+
Citric acid	+	10%	+	+	o

+: Resistant to all concentrations
%: Resistant to max. % concentrations
o: Conditionally resistant
–: Not resistant
□: No data
(): Estimated value

Chemical resistance of enclosure seals

The following table provides an overview of the chemical resistance of enclosure seals. The specified values are reference values relating to different concentrations and ambient temperatures. This also applies to simultaneous exposure to several chemicals. Corresponding trials are therefore recommended.

All tests were carried out at room temperature. The chemical resistance may change in combination with different media. Therefore, no responsibility can be accepted for the correctness of this information.

Chemical	CR	Silicone	EPDM	NBR	Polyurethane	PVC
Acetone	o	-	+	-	-	-
Formic acid	o	+	o	-	-	-
Ammonia	10%	+	+	o	-	o
Benzine	o	-	-	o	+	+
Benzene	-	-	-	-	-	-
Brake fluid	o	+	+	-	+	□
Butane	+	-	-	+	+	50%
Butanol	+	-	+	o	o	o
Calcium chloride	□	□	+	+	-	+
Chlorobenzene	-	-	-	-	-	-
Diesel oil	o	-	-	□	+	o
Acetic acid	-	o	-	-	□	+
Formaldehyde	□	+	40%	o	□	-
Freon 113	o	□	□	+	□	□
Fruit juice	+	+	+	o	-	+
Glycerine	+	+	+	+	+	+
Fuel oil	o	o	-	+	+	o
Hydraulic oil	□	o	-	o	□	□
Caustic potash solution	+	-	< 50%	o	-	+
Potassium chloride	+	+	+	+	-	+
Potassium hydroxide	o	o	+	+	-	□
Linseed oil	+	+	o	+	o	+
Methanol	+	+	+	o	□	+
Methylene chloride	-	-	-	-	-	-
Lactic acid	+	□	< 10%	o	< 10%	10%
Mineral oils	o	o	-	+	o	+
Engine oils	o	+	-	+	o	+
Sodium carbonate	□	+	+	+	□	□
Sodium chloride	+	+	+	+	+	+
Sodium hydroxide	50%	o	+	o	-	+
Caustic soda	50%	< 10%	+	o	□	60%
Nitric acid	-	< 10%	-	-	-	< 30%
Hydrochloric acid	o	< 10%	+	-	-	< 20%
Lubricating oil	o	+	o	+	+	+
Carbon disulphide	-	-	-	-	-	-
Sulphuric acid	50%	o	-	-	-	< 60%
Soap solution	□	+	□	+	o	o
Detergent	o	+	o	+	o	□
Turpentine oil	□	-	-	o	□	+
Carbon tetrachloride	-	-	-	-	-	-
Toluene	-	-	-	-	-	-
Trichloroethylene	-	-	-	-	-	-
Water (distilled water, river water, tap water, sea water)	+	+	+	80°C	-	40°C
Tartaric acid	o	+	+	+	+	+
Xylene	-	-	-	-	-	-
Zinc sulphate	+	+	+	+	□	+
Citric acid	+	+	+	+	□	10%

+: Resistant to all concentrations
%: Resistant to max. % concentrations
o: Conditionally resistant
–: Not resistant
□: No data

Quality manufacturing guarantee

Reliable, flexible, personal: BERNSTEIN System Solutions

Outsourcing is a matter of trust. You need a competent service provider who you can rely on, who is flexible and who is always prepared to listen.

BERNSTEIN is your dependable partner.

With more than 30 years of experience to look back on, we offer comprehensive know-how in enclosure technology and corresponding applications.

Take advantage of the BERNSTEIN system solution service for enclosures with personal on-site support.

Benefit from all the advantages offered by BERNSTEIN!

You will find further information on system solutions on Page 12.

Our range of services for standard enclosure modifications:

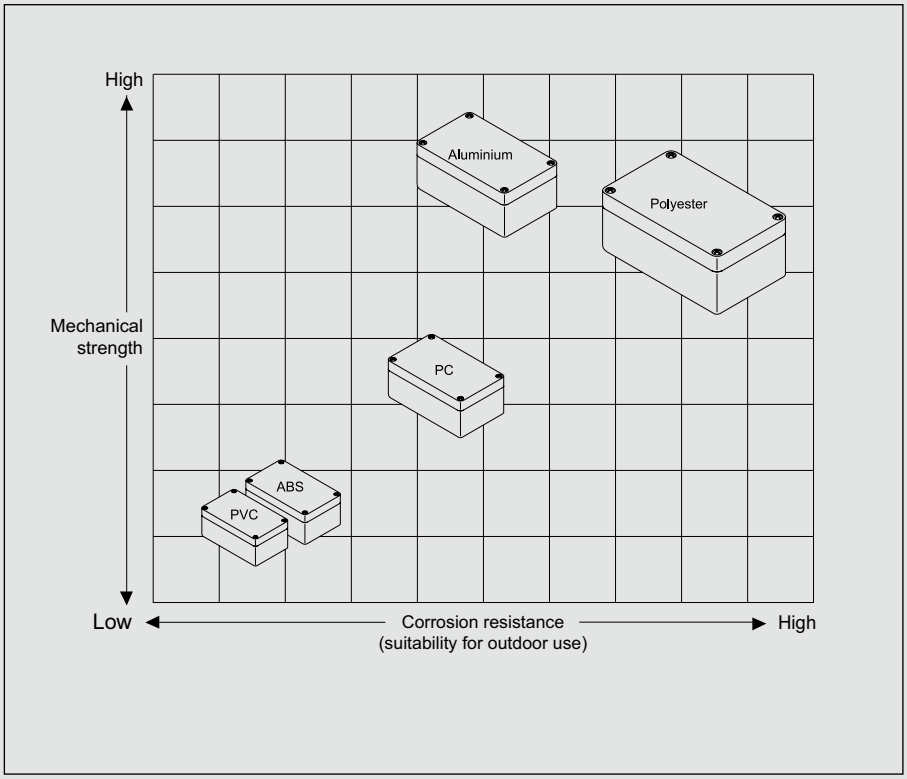
- Standard enclosures perfectly tailored to your requirements
- Mechanical machining (even complicated contours) by CNC machining centres
- RoHS-compliant surface treatment for use in corrosive environments
- Special coating in accordance with RAL specification
- Screen print or engraving of enclosure surface
- Special coating and conductive seal for HF-proof version
- Installation of individual components from the BERNSTEIN range of accessories as well as other customer-specific components
- Electrical wiring of components according to your specifications

Your benefits:

- Personal advice on site.
- Reduced vertical integration.
- The enclosure modified to your specification can be directly incorporated in your production process.

Mechanical strength of standard enclosures

The illustration shows the suitability of different enclosure materials (standard enclosure) in terms of mechanical stress and corrosive environments.



Manufacturing standard for standard enclosures

Technical information on enclosure manufacture

As an ISO-9001-2008-certified company, BERNSTEIN has defined a manufacturing standard that applies to all machining orders (unless other requirements are specified).

Dimensional tolerances

Per the clamping operation, tolerances in accordance with ISO 2768-mH apply to the dimensioning in the initial enclosure machining process, as illustrated in the machining example (position of mechanical stop).

Deviating dimensioning or reference edge result in the maximum general tolerances for the products as shown in the table on the right for initial enclosure machining (per clamping operation).

Machining tolerances of ±0.1 mm are maintained for varying dimensions.

General tolerances Standard range

Material/enclosure type	General tolerance
CA-020 to CA-480	
Cast aluminium	DIN 1688
CT-50 to CT-91	
PC/ABS	DIN 16901
CP-140 to CP-460	
Polyester mats	DIN 16901

Minimum purchase quantities

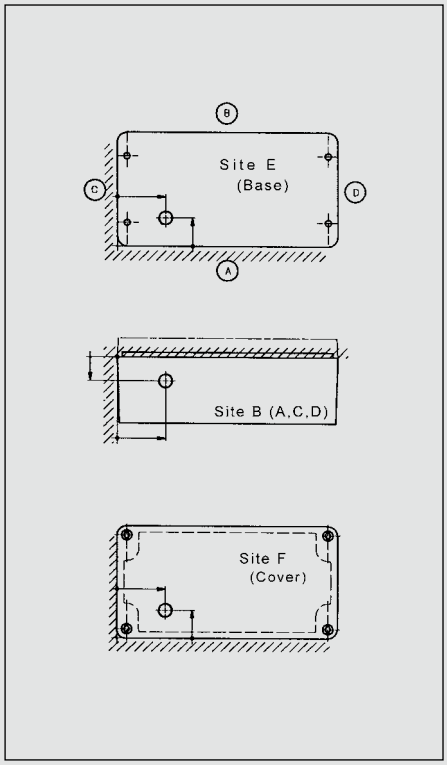
In order to keep enclosure machining as cost-effective for the user as possible, the following minimum purchase quantities are suggested:

Designation	Minimum purchase quantity
CA-020 ... CA-080	20 pieces
CA-100 ... CA-190	10 pieces
CA-210 ... CA-310	10 pieces
CA-330 ... CA-480	5 pieces
CP-140 ... CP-195	20 pieces
CP-220 ... CP-320	10 pieces
CP-330 ... CP-460	5 pieces
CT-50 ... CT-76	20 pieces
CT-78 ... CT-89	10 pieces

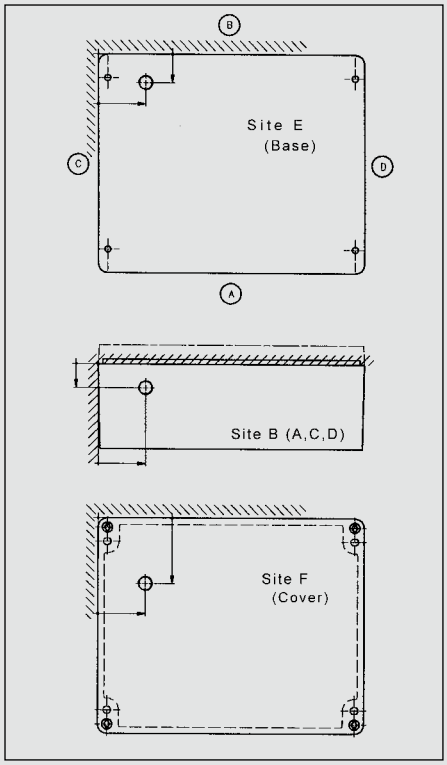
These quantities should be regarded as the minimum, if the customised enclosures are to be produced economically. Production includes mechanical machining, special coating, screen-printing, engraving or assembly of accessories. BERNSTEIN distributors will of course be pleased to advise you

Reference edges for manufacturing standard

Series
CA-020 to CA-240, CA-270 to CA-300
CT-50 to CT-82, CP-140 to CP-300

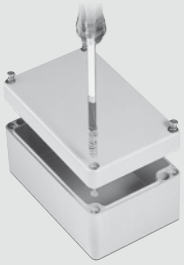


Series
CA-250, CA-310 to CA-480
CT-84 to CT-91, CP-320 to CPS-590



The BERNSTEIN quick-release fastener and flexible internal articulated hinge

Invented and patented by BERNSTEIN – the quick-release fastener and its internal articulated hinge



- Reduced time and costs
- Easy to use

1. Press and turn by 90°
- Easy opening and closing

2. Simple connection check
- No need for mechanical testing

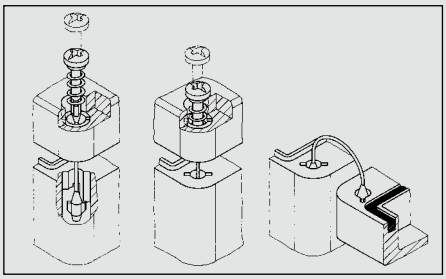
3. Safe
- Quick-release fastener is tensioned and snaps firmly in. Cover will not open when subjected to shaking and vibration.

4. Effortless mounting
- Self-latching and locking function ensures straightforward mounting or retrofit.

Quick-release fastener/internal articulated hinge – for securing covers to enclosure bodies.

- Subsequent mounting possible without the need for mechanical machining.
- Strain relief and captive mounting of the cover are guaranteed.

The flexible internal articulated hinges can be easily fitted in the enclosures without the need for mechanical machining and reliably hold the enclosure cover after opening.
The hinges provide effective strain relief and captive mounting of the enclosure cover



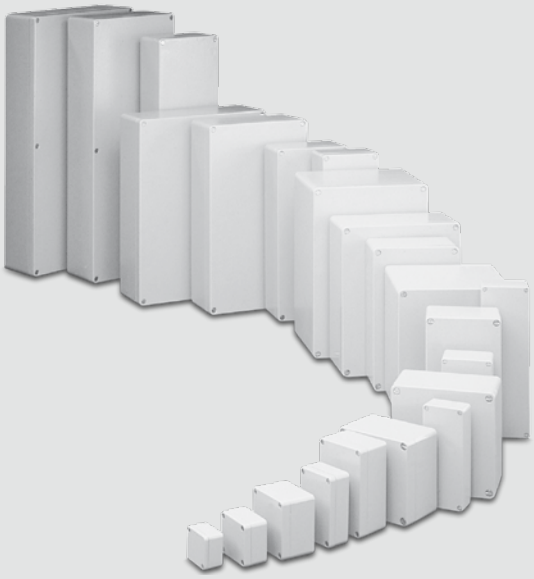
Aluminium Enclosure Series CA

BERNSTEIN aluminium enclosures have a well proven record of success in encapsulating electrical, electronic or pneumatic components, while also being ideally suited for applications in potentially explosive atmospheres. All enclosures achieve protection class IP65 in accordance with IEC529 (optionally IP67).

BERNSTEIN aluminium enclosures feature earthing screws (copper-plated, M4 or M6) in the body and in the cover for connecting PE conductors. The surfaces under the earthing screws are left blank. The screws for mounting the covers on BERNSTEIN enclosures are made from stainless steel and are held captive by the self-latching hinge integrated in the cover. The protection class (on the standard enclosure) is ensured by a factory-fitted seal. BERNSTEIN aluminium enclosures are finished as standard in RAL 7001 (silver grey).

BERNSTEIN uses pressure die-casting or gravity die-casting moulds to manufacture the aluminium enclosures.

The mounting flanges or even the earthing socket on the inside of the enclosure can be used for mounting and securing built-in components (mounting rail, mounting plate, pc board etc.). These mounting points on the inside of the enclosures are located at different levels and in different positions. The dimensioned drawings on the following pages show the relevant positions.



Technical data

Material

Aluminium pressure die-casting or gravity die-casting

Seal

Neoprene (CR) round cord (siliconized)

alternatively:

Neoprene (CR) round cord (silicone-free), silicone round cord, EPDM round cord

Cover screws

Stainless steel, captive, cross recessed head alternativ:

- Stainless steel, captive hexagon socket head cap screws
- Sealed cover screws, steel (9 S 20 K), slot head (on request)

Coating

Standard: RAL 7001 (silver grey)

optionally:

- Special RAL colours
- Special coatings
- The standard coating is salt spray resistant in accordance with IEC60068-2-52, severity level 1. A chromalized surface finish is additionally available on request.

Temperature range of CA enclosures, standard powder-coated finish

-30°C to +80°C

(Please contact us for higher temperature ranges.)

Temperature range of seals

-30°C to +80°C (Neoprene seal)

alternatively:

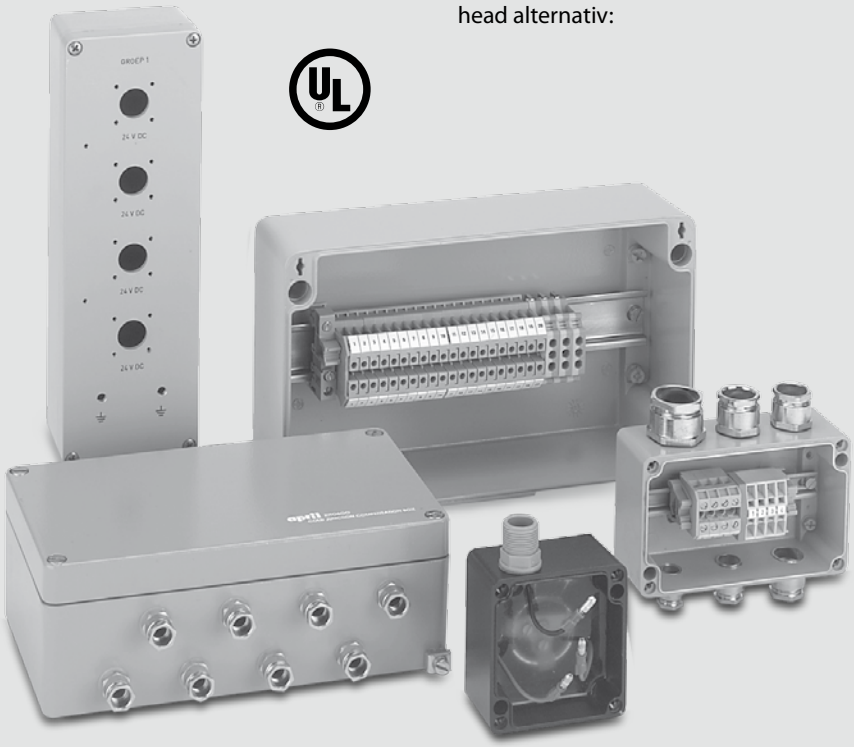
-60 °C to +130°C (silicone seal)
bzw. -35°C to +100°C (EPDM seal)

Protection class

IP66
IP67 on request

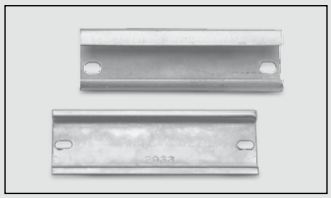
Approbations

Germanischer Lloyd
UL

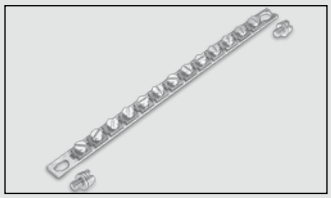




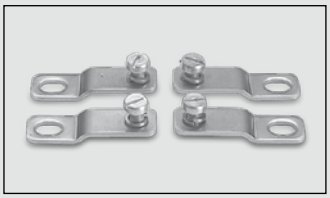
Mounting plates
made from galvanised steel plate (thickness: CA-060 to CA-310, CA-350 to CA-400: 1.5 mm; CA-330, CA-420 to CA-480: 2.5 mm) for versatile mounting of built-in components.



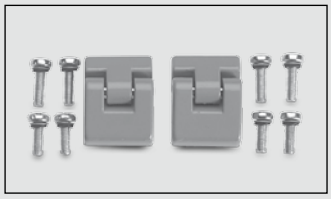
Mounting rails
conforming to Standards TS 15 or TS32 and TS 35 made from steel; surface treated for accepting terminal blocks.



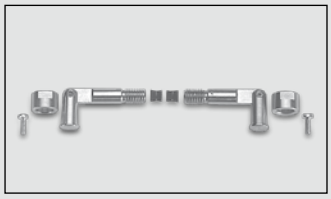
Earthing bars
made from galvanised steel for combining and connecting PE conductors.



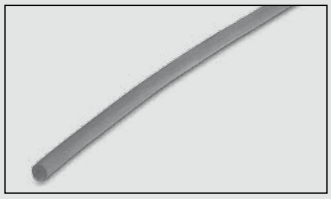
External mounting brackets
made from stainless steel for mounting enclosures without opening the covers. Variable mounting in 90°-steps thanks to contour in base of enclosure.



External articulated hinges
for hinged mounting of enclosure cover. Opening range of cover approx. 155°. Cast aluminium, painted in RAL 7001. Machining is required for mounting on enclosures. Supplied with drilling template.



Internal articulated hinges
for hinged mounting of enclosure cover. Opening range of cover approx. 95°. Stainless steel. Machining is required for mounting on enclosures.



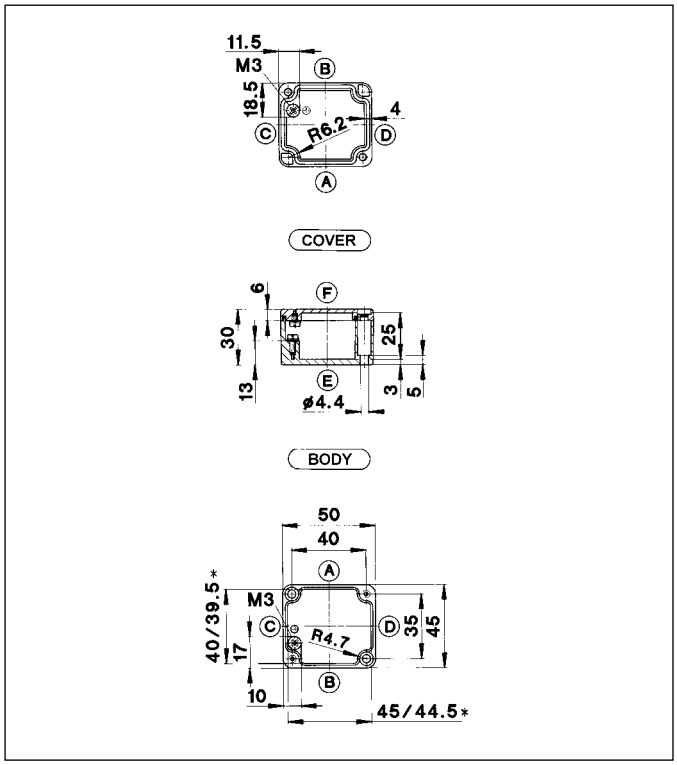
Silicone cover seal
with increased temperature resistance for subsequent fitting or for replacing standard cover seal. Expanded silicone by the metre.

Aluminium enclosure

Dimensions/mm L	x	B	x	H	Article number	Type
50	x	45	x	30	**1020000000**	CA-020
58	x	64	x	36	**1060000000**	CA-060
98	x	64	x	36	**1080000000**	CA-080
150	x	64	x	36	**1100000000**	CA-100
75	x	80	x	57	**1130000000**	CA-130
75	x	80	x	57	**1140000000**	CA-140
125	x	80	x	57	**1150000000**	CA-150
125	x	80	x	57	**1160000000**	CA-160
175	x	80	x	57	**1170000000**	CA-170
175	x	80	x	57	**1180000000**	CA-180
250	x	80	x	57	**1190000000**	CA-190
122	x	122	x	80	**1210000000**	CA-210
122	x	122	x	90	**1210000050**	CA-215
122	x	122	x	80	**1220000000**	CA-220
220	x	122	x	80	**1230000000**	CA-230
220	x	122	x	90	**1230000050**	CA-235
220	x	122	x	80	**1240000000**	CA-240
360	x	122	x	80	**1250000000**	CA-250
160	x	160	x	90	**1270000000**	CA-270
160	x	160	x	90	**1280000000**	CA-280
260	x	160	x	90	**1290000000**	CA-290
260	x	160	x	90	**1300000000**	CA-300
360	x	160	x	90	**1310000000**	CA-310
560	x	160	x	90	**1330000000**	CA-330
200	x	230	x	110	**1350000000**	CA-350
200	x	230	x	180	**1360000000**	CA-360
280	x	230	x	110	**1370000000**	CA-370
330	x	230	x	110	**1380000000**	CA-380
330	x	230	x	180	**1390000000**	CA-390
401	x	230	x	110	**1400000000**	CA-400
600	x	230	x	110	**1420000000**	CA-420
402	x	310	x	110	**1450000000**	CA-450
402	x	310	x	180	**1460000000**	CA-460
600	x	310	x	110	**1470000000**	CA-470
600	x	310	x	180	**1480000000**	CA-480

50 x 45 x 30 mm

CA-020
Aluminium enclosure



* Smaller dimension at mounting plate support

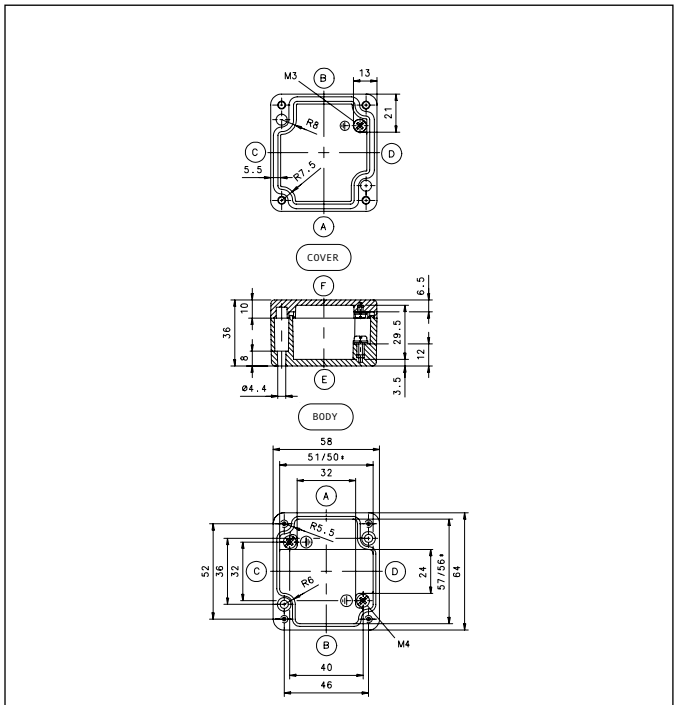
Type	**CA-020**
Weight (g)	70
External dimension (mm)	50 x 45 x 30
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1020000000**
with hexagon socket head cap screws	–
Silicone seal and cover screws	–
HF seal and cover screws	–
Unwashed, not painted, loose accessories	**1020034000**
Accessories (individual part or installation kit)	
Mounting plate	–
Mounting rail TS 15	–
Mounting rail TS 32	–
Mounting rail TS 35	–
Earthing rail	–
External mounting brackets	–
External articulated hinges	–
Internal articulated hinges with cover guide**	–
Silicone seal for extended temperature range (by the metre)	–

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	1	0	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0

** Enclosure preparation required

58 x 64 x 36 mm

CA-060
Aluminium enclosure



* Smaller dimension at mounting plate support

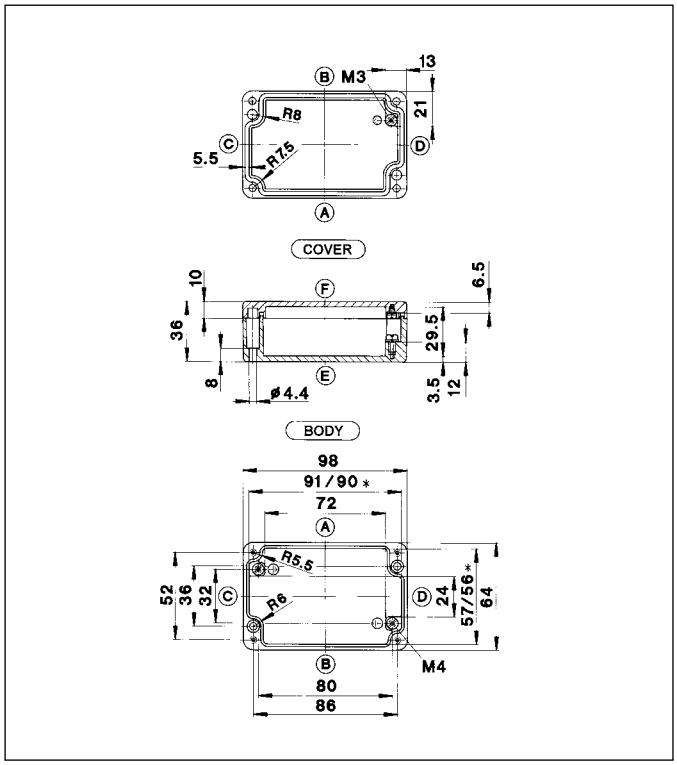
Type	**CA-060**
Weight (g)	160
External dimension (mm)	58 x 64 x 36
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1060000000**
with hexagon socket head cap screws	–
Silicone seal and cover screws	**1060094000**
HF seal and cover screws	**1060008000**
Unwashed, not painted, loose accessories	**1060038000**
Accessories (individual part or installation kit)	
Mounting plate	**9511001000**
Mounting rail TS 15	**9820000000**
Mounting rail TS 32	–
Mounting rail TS 35	–
Earthing rail	–
External mounting brackets	–
External articulated hinges	–
Internal articulated hinges with cover guide**	–
Silicone seal for extended temperature range (by the metre)	**9231005000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	2	1	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0

** Enclosure preparation required

98 x 64 x 36 mm

CA-080
Aluminium enclosure



* Smaller dimension at mounting plate support

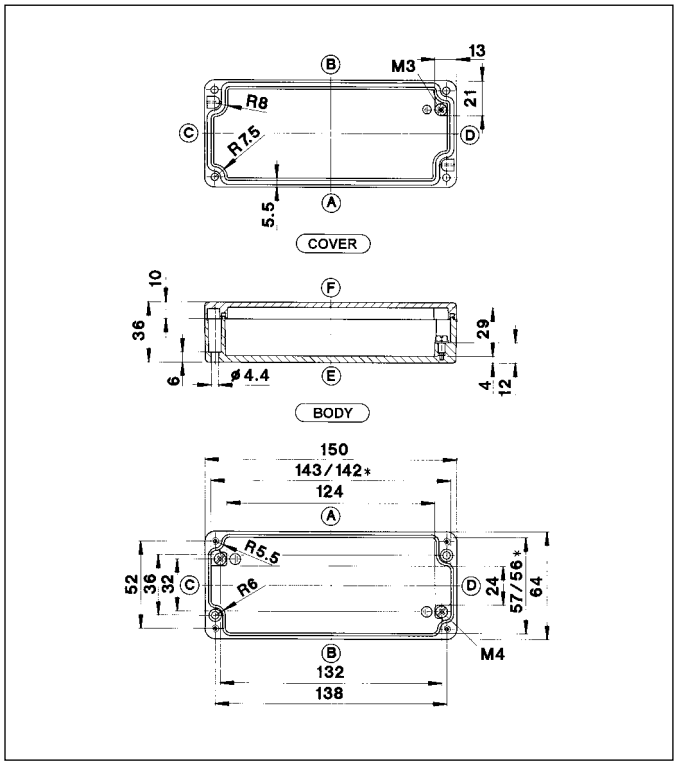
Type	**CA-080**
Weight (g)	220
External dimension (mm)	98 x 64 x 36
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1080000000**
with hexagon socket head cap screws	–
Silicone seal and cover screws	**1080009000**
HF seal and cover screws	**1080008000**
Unwashed, not painted, loose accessories	**1080042000**
Accessories (individual part or installation kit)	
Mounting plate	**9511002000**
Mounting rail TS 15	**9820005000**
Mounting rail TS 32	–
Mounting rail TS 35	–
Earthing rail	–
External mounting brackets	–
External articulated hinges	–
Internal articulated hinges with cover guide**	–
Silicone seal for extended temperature range (by the metre)	**9231005000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	4	3	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0

** Enclosure preparation required

150 x 64 x 36 mm

CA-100
Aluminium enclosure



* Smaller dimension at mounting plate support

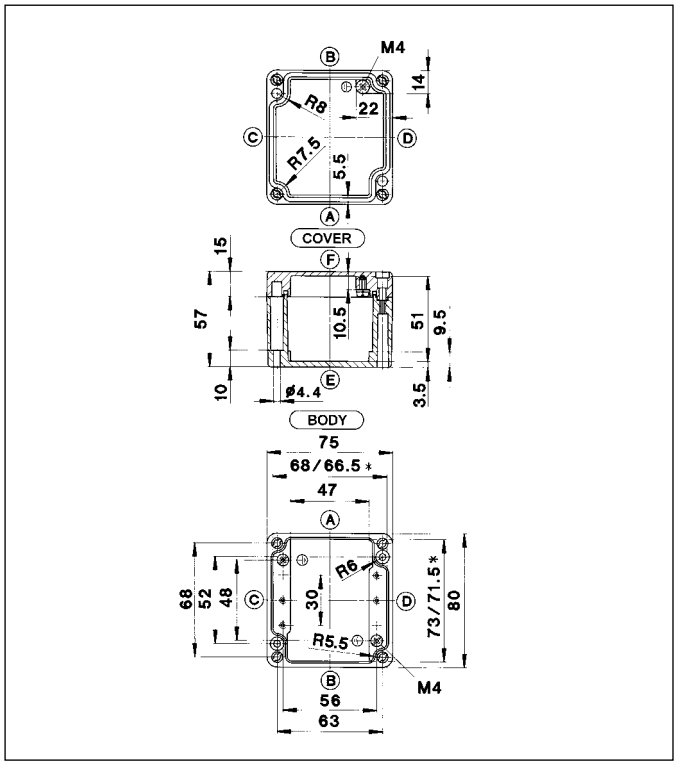
Type	**CA-100**
Weight (g)	330
External dimension (mm)	150 x 64 x 36
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1100000000**
with hexagon socket head cap screws	–
Silicone seal and cover screws	**1100076000**
HF seal and cover screws	**1100008000**
Unwashed, not painted, loose accessories	**1100053000**
Accessories (individual part or installation kit)	
Mounting plate	**9511003000**
Mounting rail TS 15	**9820011000**
Mounting rail TS 32	–
Mounting rail TS 35	–
Earthing rail	–
External mounting brackets	–
External articulated hinges	–
Internal articulated hinges with cover guide**	–
Silicone seal for extended temperature range (by the metre)	**9231005000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	6	4	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0

** Enclosure preparation required

75 x 80 x 57 mm

CA-130
Aluminium enclosure



* Smaller dimension at mounting plate support

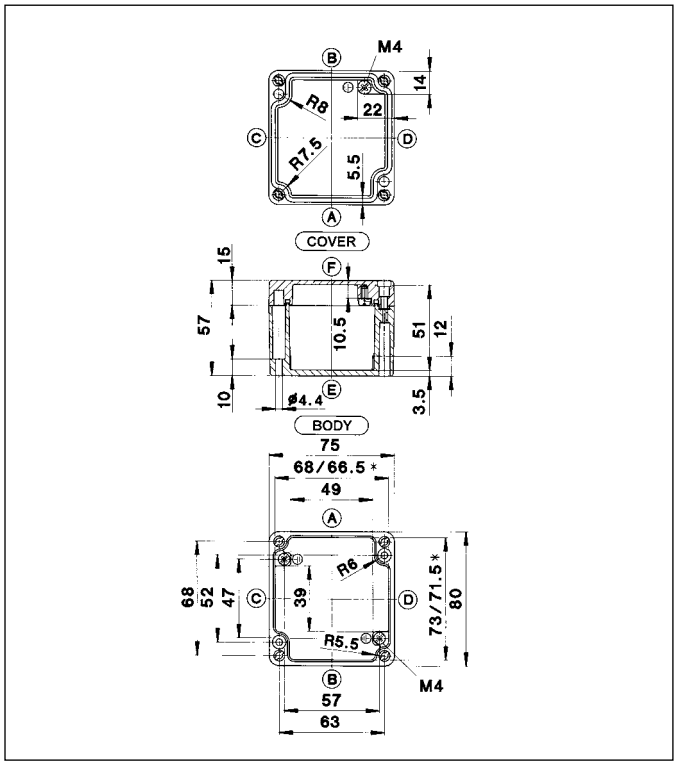
Type	**CA-130**
Weight (g)	280
External dimension (mm)	75 x 80 x 57
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1130000000**
with hexagon socket head cap screws	–
Silicone seal and cover screws	**1130082000**
HF seal and cover screws	**1130008000**
Unwashed, not painted, loose accessories	**1130057000**
Accessories (individual part or installation kit)	
Mounting plate	**9823015000**
Mounting rail TS 15	**9820002000**
Mounting rail TS 32	–
Mounting rail TS 35	–
Earthing rail	–
External mounting brackets	–
External articulated hinges	**9801044000**
Internal articulated hinges with cover guide**	–
Silicone seal for extended temperature range (by the metre)	**9231005000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	5	2	1	0	0	0	0	0
Side C/D	3	2	1	0	0	0	0	0

** Enclosure preparation required

75 x 80 x 57 mm

CA-140
Aluminium enclosure



* Smaller dimension at mounting plate support

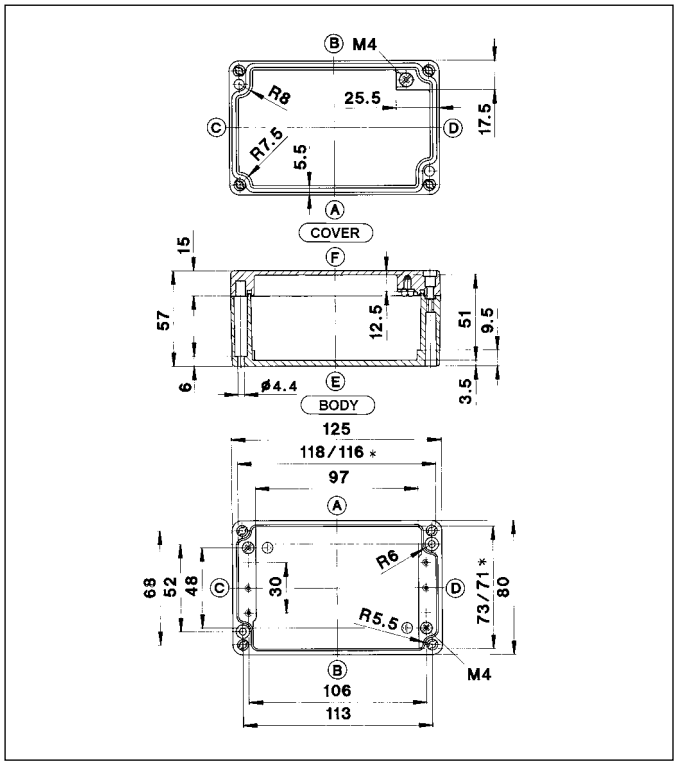
Type	**CA-140**
Weight (g)	280
External dimension (mm)	75 x 80 x 57
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1140000000**
with hexagon socket head cap screws	–
Silicone seal and cover screws	**1140086000**
HF seal and cover screws	**1140008000**
Unwashed, not painted, loose accessories	**1140080000**
Accessories (individual part or installation kit)	
Mounting plate	**9511004000**
Mounting rail TS 15	**9820035000**
Mounting rail TS 32	–
Mounting rail TS 35	–
Earthing rail	–
External mounting brackets	–
External articulated hinges	**9801044000**
Internal articulated hinges with cover guide**	–
Silicone seal for extended temperature range (by the metre)	**9231005000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	5	2	1	1	0	0	0	0
Side C/D	3	2	1	1	0	0	0	0

** Enclosure preparation required

125 x 80 x 57 mm

CA-150
Aluminium enclosure



* Smaller dimension at mounting plate support

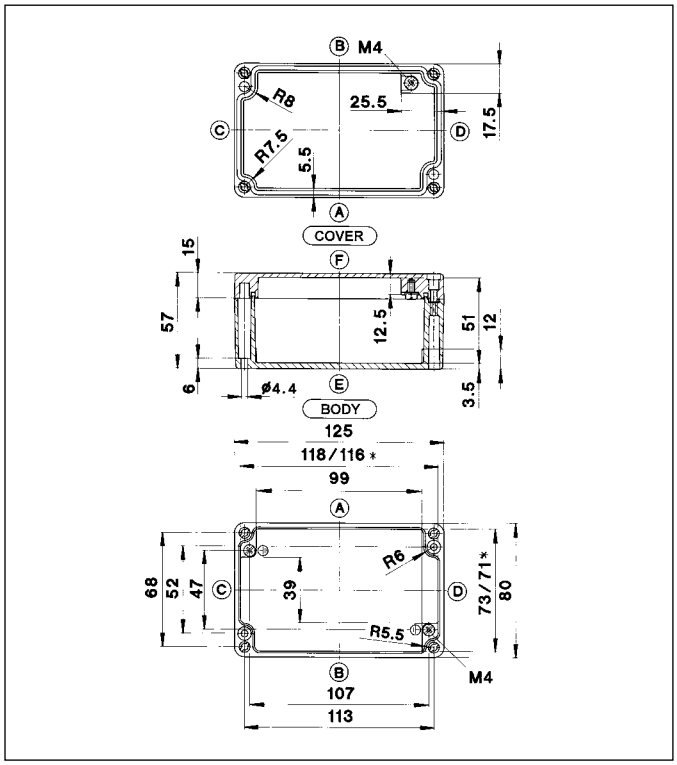
Type	**CA-150**
Weight (g)	435
External dimension (mm)	125 x 80 x 57
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1150000000**
with hexagon socket head cap screws	–
Silicone seal and cover screws	**1150009000**
HF seal and cover screws	**1150008000**
Unwashed, not painted, loose accessories	**1150019000**
Accessories (individual part or installation kit)	
Mounting plate	**9823016000**
Mounting rail TS 15	**9820010000**
Mounting rail TS 32	–
Mounting rail TS 35	–
Earthing rail	–
External mounting brackets	–
External articulated hinges	**9801044000**
Internal articulated hinges with cover guide**	–
Silicone seal for extended temperature range (by the metre)	**9231005000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	10	4	3	2	0	0	0	0
Side C/D	3	2	1	0	0	0	0	0

** Enclosure preparation required

125 x 80 x 57 mm

CA-160
Aluminium enclosure



* Smaller dimension at mounting plate support

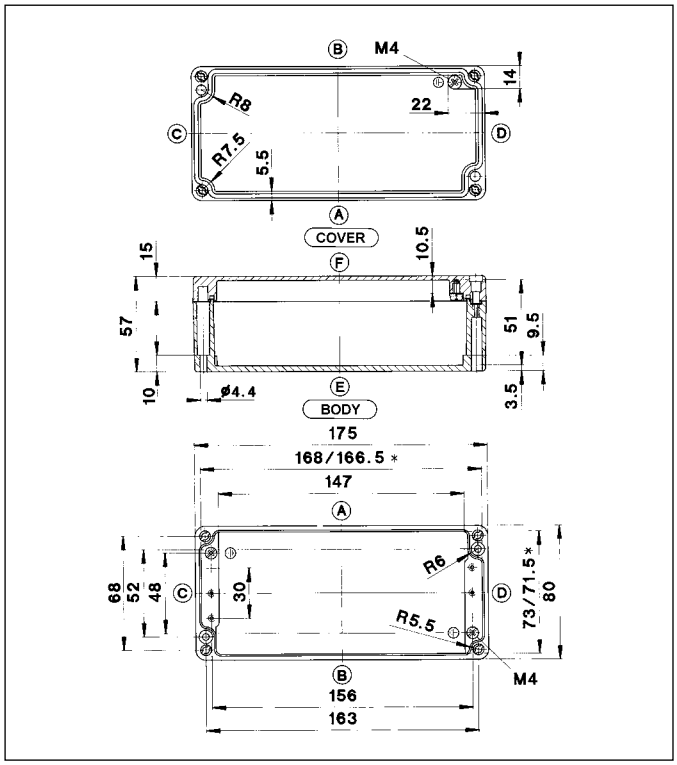
Type	**CA-160**
Weight (g)	435
External dimension (mm)	125 x 80 x 57
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1160000000**
with hexagon socket head cap screws	–
Silicone seal and cover screws	**1160138000**
HF seal and cover screws	**1160008000**
Unwashed, not painted, loose accessories	**1160045000**
Accessories (individual part or installation kit)	
Mounting plate	**9511005000**
Mounting rail TS 15	**9820036000**
Mounting rail TS 32	–
Mounting rail TS 35	–
Earthing rail	–
External mounting brackets	–
External articulated hinges	**9801044000**
Internal articulated hinges with cover guide**	–
Silicone seal for extended temperature range (by the metre)	**9231005000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	10	4	3	2	0	0	0	0
Side C/D	4	2	1	1	0	0	0	0

** Enclosure preparation required

175 x 80 x 57 mm

CA-170
Aluminium enclosure



* Smaller dimension at mounting plate support

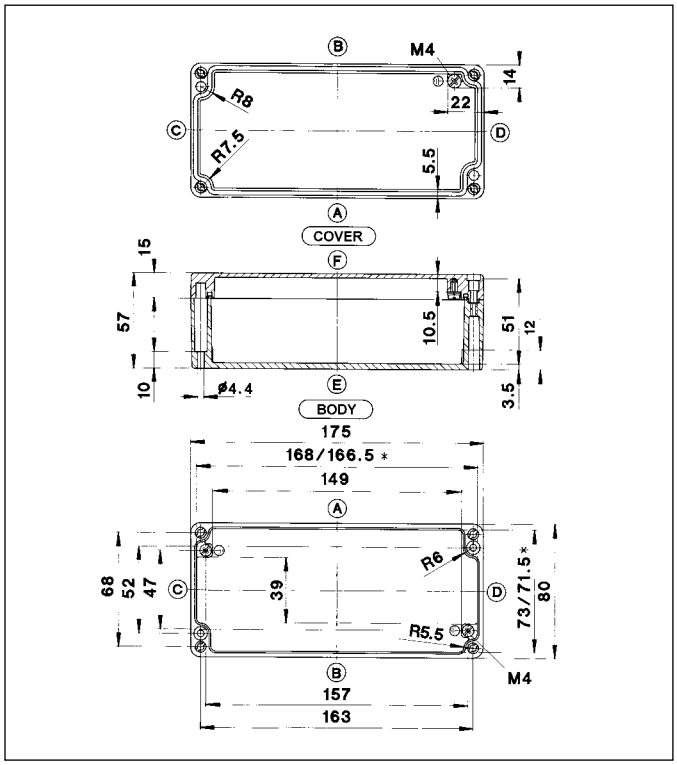
Type	**CA-170**
Weight (g)	530
External dimension (mm)	175 x 80 x 57
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1170000000**
with hexagon socket head cap screws	–
Silicone seal and cover screws	**1170009000**
HF seal and cover screws	**1170008000**
Unwashed, not painted, loose accessories	**1170016000**
Accessories (individual part or installation kit)	
Mounting plate	**9823017000**
Mounting rail TS 15	**9820014000**
Mounting rail TS 32	–
Mounting rail TS 35	–
Earthing rail	–
External mounting brackets	–
External articulated hinges	**9801044000**
Internal articulated hinges with cover guide**	–
Silicone seal for extended temperature range (by the metre)	**9231005000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	14	6	4	4	0	0	0	0
Side C/D	3	2	1	0	0	0	0	0

** Enclosure preparation required

175 x 80 x 57 mm

CA-180
Aluminium enclosure



* Smaller dimension at mounting plate support

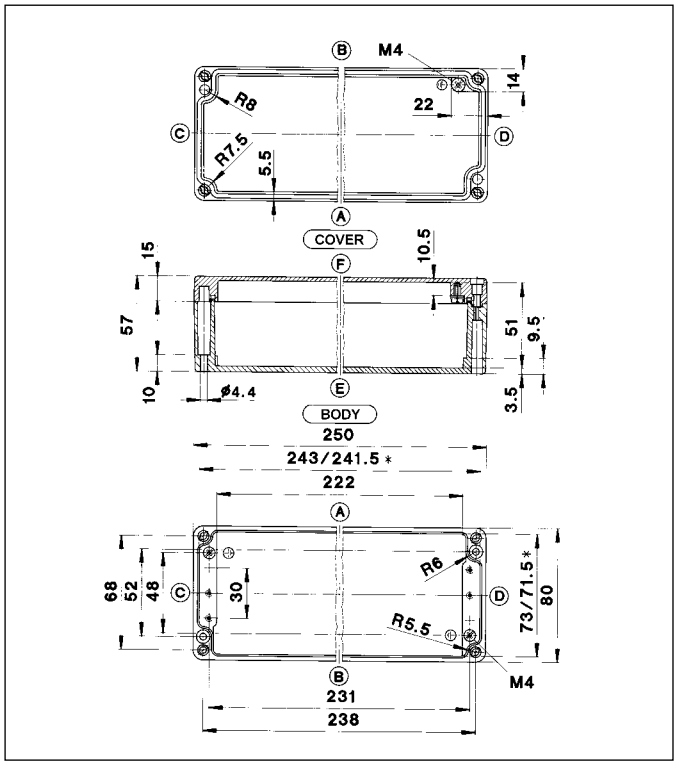
Type	**CA-180**
Weight (g)	530
External dimension (mm)	175 x 80 x 57
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1180000000**
with hexagon socket head cap screws	–
Silicone seal and cover screws	**1180044000**
HF seal and cover screws	**1180008000**
Unwashed, not painted, loose accessories	**1180040000**
Accessories (individual part or installation kit)	
Mounting plate	**9511006000**
Mounting rail TS 15	**9820037000**
Mounting rail TS 32	–
Mounting rail TS 35	–
Earthing rail	–
External mounting brackets	–
External articulated hinges	**9801044000**
Internal articulated hinges with cover guide**	–
Silicone seal for extended temperature range (by the metre)	**9231005000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	14	6	4	4	0	0	0	0
Side C/D	4	2	1	1	0	0	0	0

** Enclosure preparation required

250 x 80 x 57 mm

CA-190
Aluminium enclosure



* Smaller dimension at mounting plate support

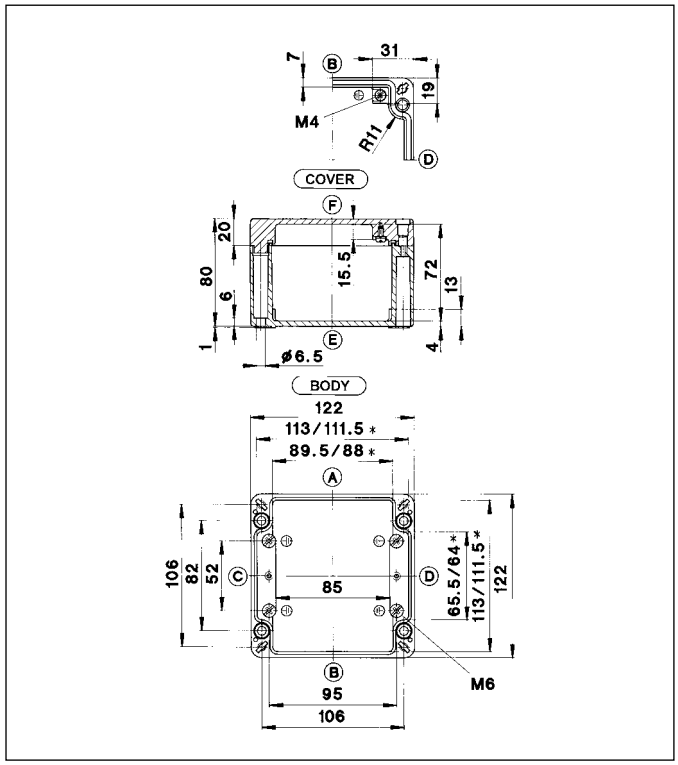
Type	**CA-190**
Weight (g)	710
External dimension (mm)	250 x 80 x 57
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1190000000**
with hexagon socket head cap screws	–
Silicone seal and cover screws	**1190048000**
HF seal and cover screws	**1190008000**
Unwashed, not painted, loose accessories	**1190026000**
Accessories (individual part or installation kit)	
Mounting plate	**9823021000**
Mounting rail TS 15	**9820019000**
Mounting rail TS 32	–
Mounting rail TS 35	–
Earthing rail	–
External mounting brackets	–
External articulated hinges	**9801044000**
Internal articulated hinges with cover guide**	–
Silicone seal for extended temperature range (by the metre)	**9231005000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	22	9	7	5	0	0	0	0
Side C/D	3	2	1	0	0	0	0	0

** Enclosure preparation required

122 x 122 x 80 mm

CA-210
Aluminium enclosure



* Smaller dimension at mounting plate support

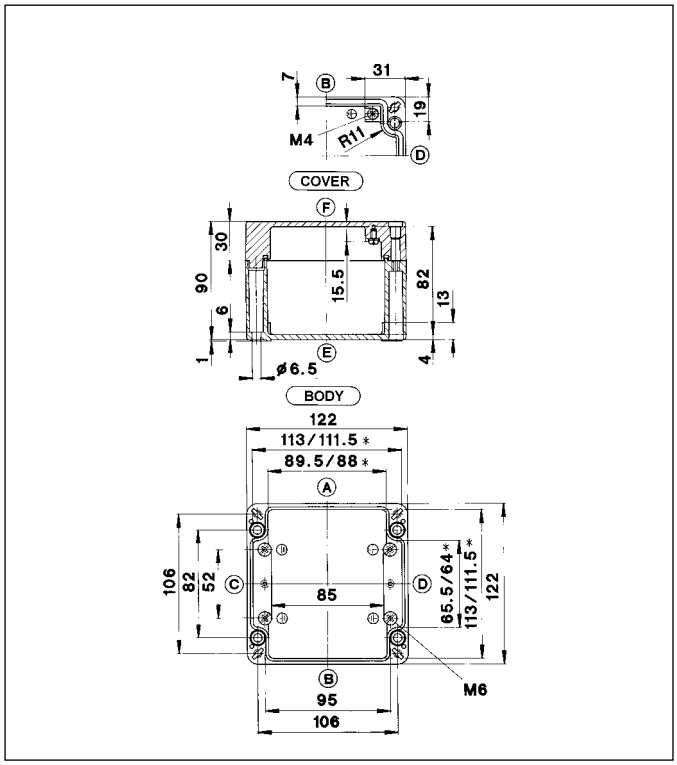
Type	**CA-210**
Weight (g)	940
External dimension (mm)	122 x 122 x 80
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1210000000**
with hexagon socket head cap screws	**1210001000**
Silicone seal and cover screws	**1210015000**
HF seal and cover screws	**1210008000**
Unwashed, not painted, loose accessories	**1210016000**
Accessories (individual part or installation kit)	
Mounting plate	**9511150000**
Mounting rail TS 15	**9820019000**
Mounting rail TS 32	**9821000000**
Mounting rail TS 35	**9822001000**
Earthing rail	**9810002000**
External mounting brackets	**9824024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801031000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	12	6	4	2	2	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** Enclosure preparation required

122 x 122 x 90 mm

CA-215
Aluminium enclosure



* Smaller dimension at mounting plate support

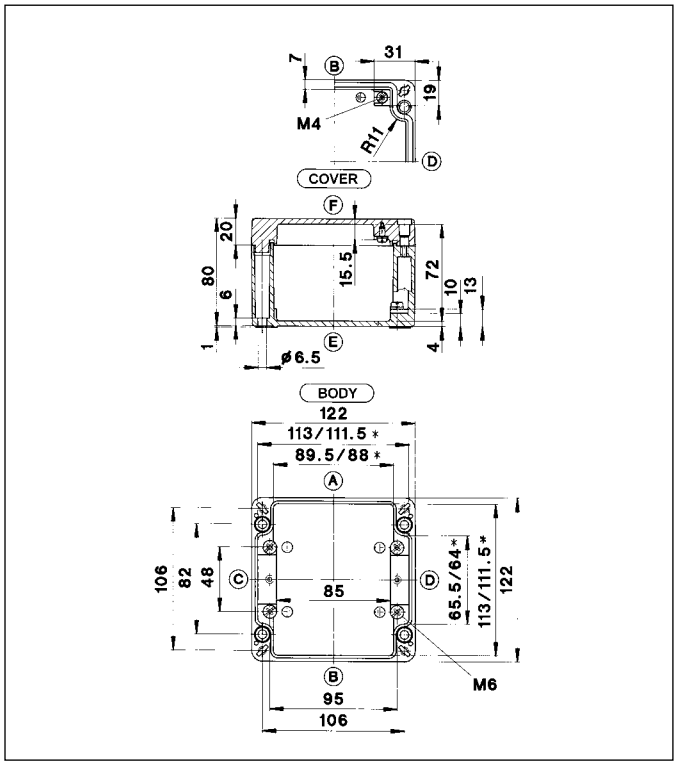
Type	**CA-215**
Weight (g)	940
External dimension (mm)	122 x 122 x 90
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1210000050**
with hexagon socket head cap screws	**1210001050**
Silicone seal and cover screws	**1210011050**
HF seal and cover screws	**1210008050**
Unwashed, not painted, loose accessories	**1210012050**
Accessories (individual part or installation kit)	
Mounting plate	**9511150000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821000000**
Mounting rail TS 35	**9822001000**
Earthing rail	**9810002000**
External mounting brackets	**9824024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801031000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	12	6	4	2	2	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** Enclosure preparation required

122 x 122 x 80 mm

CA-220
Aluminium enclosure



* Smaller dimension at mounting plate support

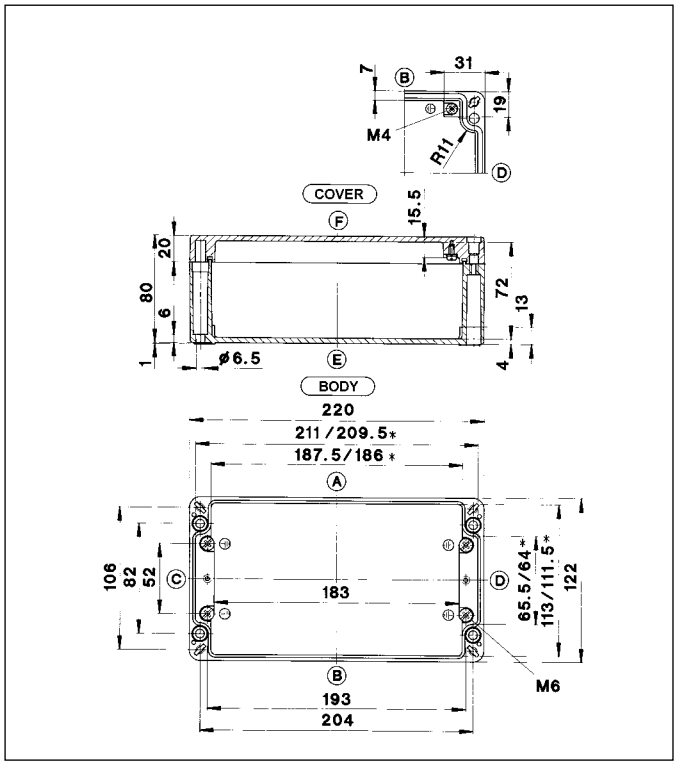
Type	**CA-220**
Weight (g)	940
External dimension (mm)	122 x 122 x 80
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1220000000**
with hexagon socket head cap screws	**1220001000**
Silicone seal and cover screws	**1220027000**
HF seal and cover screws	**1220008000**
Unwashed, not painted, loose accessories	**1220061000**
Accessories (individual part or installation kit)	
Mounting plate	**9511008000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821000000**
Mounting rail TS 35	**9822001000**
Earthing rail	**9810002000**
External mounting brackets	**9824024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801031000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	12	6	4	2	2	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** Enclosure preparation required

220 x 122 x 80 mm

CA-230
Aluminium enclosure



* Smaller dimension at mounting plate support

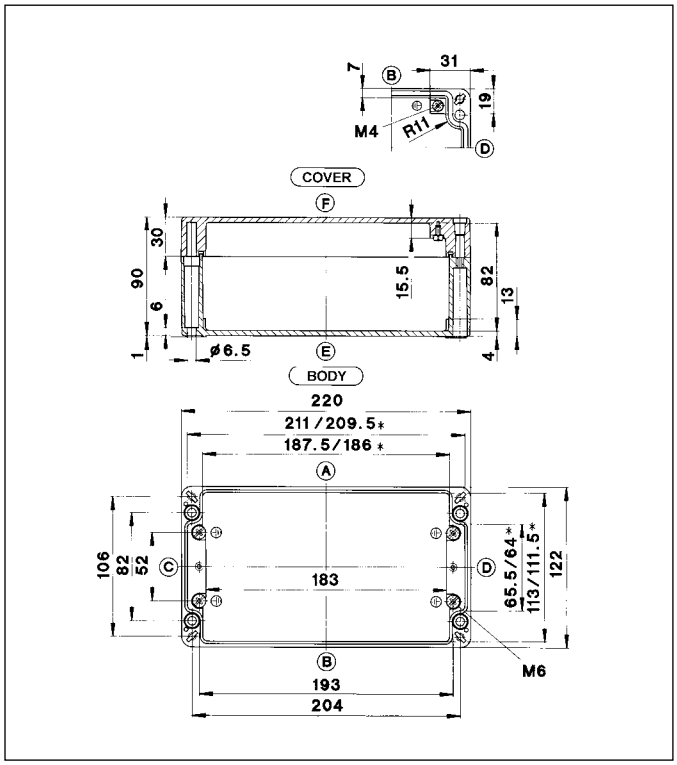
Type	**CA-230**
Weight (g)	1410
External dimension (mm)	220 x 122 x 80
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1230000000**
with hexagon socket head cap screws	**1230001000**
Silicone seal and cover screws	**1230016000**
HF seal and cover screws	**1230008000**
Unwashed, not painted, loose accessories	**1230015000**
Accessories (individual part or installation kit)	
Mounting plate	**9511095000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821005000**
Mounting rail TS 35	**9822007000**
Earthing rail	**9810008000**
External mounting brackets	**9824024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801031000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	27	12	8	5	4	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** Enclosure preparation required

220 x 122 x 90 mm

CA-235
Aluminium enclosure



* Smaller dimension at mounting plate support

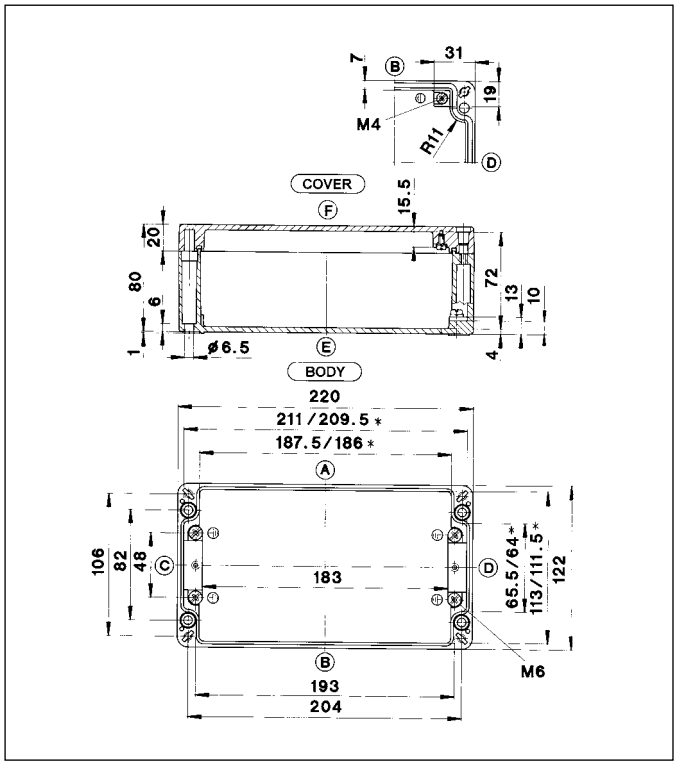
Type	**CA-235**
Weight (g)	1410
External dimension (mm)	220 x 122 x 90
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1230000050**
with hexagon socket head cap screws	**1230001050**
Silicone seal and cover screws	**1230011050**
HF seal and cover screws	**1230008050**
Unwashed, not painted, loose accessories	**1230012050**
Accessories (individual part or installation kit)	
Mounting plate	**9511095000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821005000**
Mounting rail TS 35	**9822007000**
Earthing rail	**9810008000**
External mounting brackets	**9824024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801031000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	27	12	8	5	4	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** Enclosure preparation required

220 x 122 x 80 mm

CA-240
Aluminium enclosure



* Smaller dimension at mounting plate support

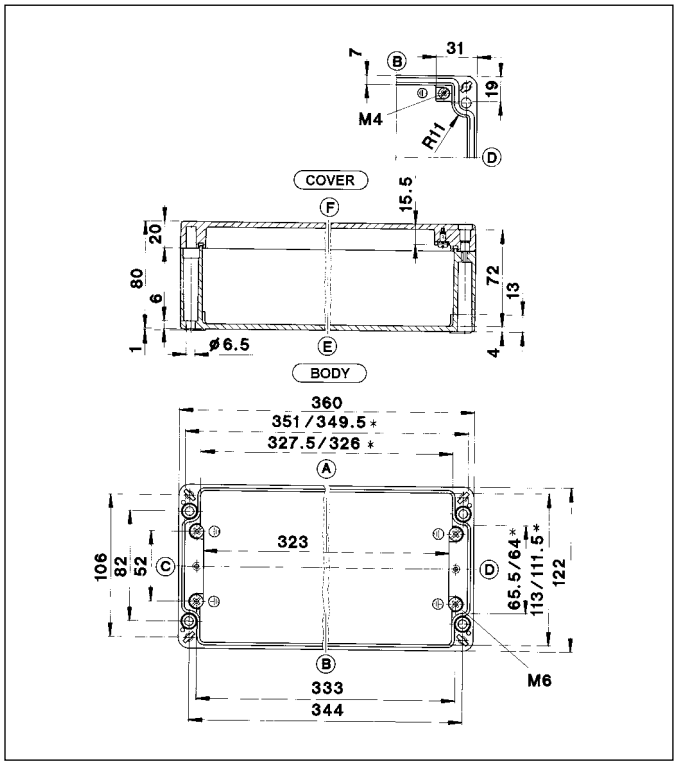
Type	**CA-240**
Weight (g)	1410
External dimension (mm)	220 x 122 x 80
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1240000000**
with hexagon socket head cap screws	**1240001000**
Silicone seal and cover screws	**1240097000**
HF seal and cover screws	**1240008000**
Unwashed, not painted, loose accessories	**1240082000**
Accessories (individual part or installation kit)	
Mounting plate	**9511009000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821005000**
Mounting rail TS 35	**9822007000**
Earthing rail	**9810008000**
External mounting brackets	**9820024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801031000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	27	12	8	5	4	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** Enclosure preparation required

360 x 122 x 80 mm

CA-250
Aluminium enclosure



* Smaller dimension at mounting plate support

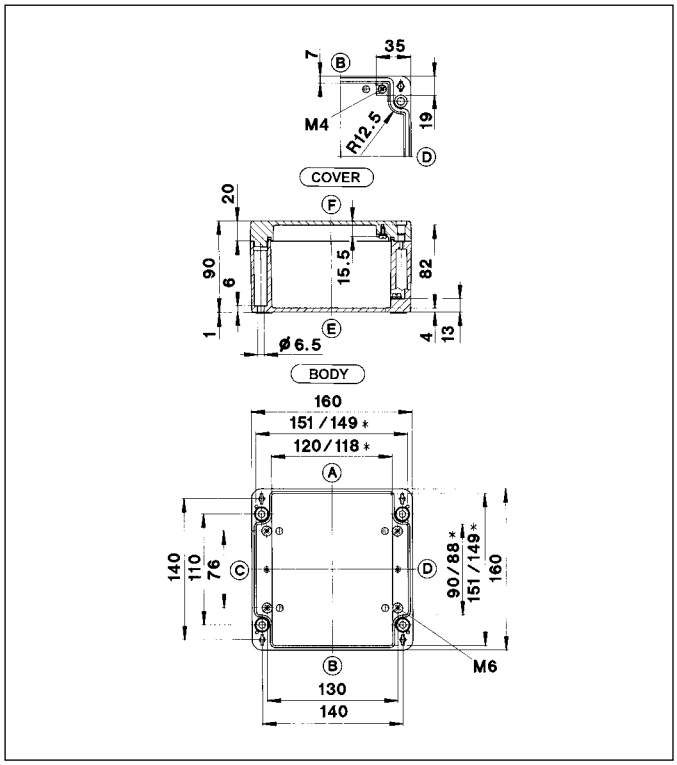
Type	**CA-250**
Weight (g)	1860
External dimension (mm)	360 x 122 x 80
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1250000000**
with hexagon socket head cap screws	**1250001000**
Silicone seal and cover screws	**1250124000**
HF seal and cover screws	**1250008000**
Unwashed, not painted, loose accessories	**1250011000**
Accessories (individual part or installation kit)	
Mounting plate	**9511174000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821012000**
Mounting rail TS 35	**9822015000**
Earthing rail	**9810014000**
External mounting brackets	**9824024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801031000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	48	21	16	9	6	0	0	0
Side C/D	5	2	2	1	0	0	0	0

** Enclosure preparation required

160 x 160 x 90 mm

CA-270
Aluminium enclosure



* Smaller dimension at mounting plate support

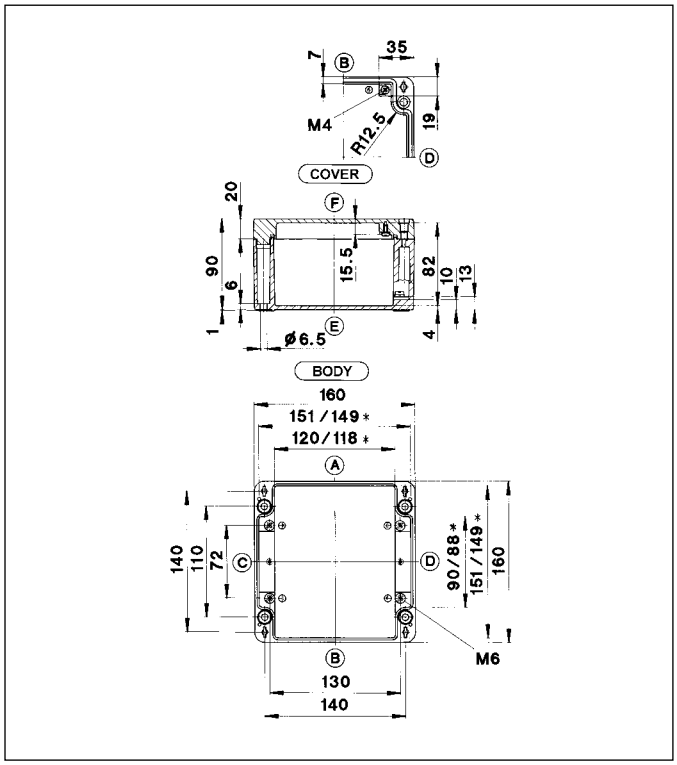
Type	**CA-270**
Weight (g)	1410
External dimension (mm)	160 x 160 x 90
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1270000000**
with hexagon socket head cap screws	**1270001000**
Silicone seal and cover screws	**1270012000**
HF seal and cover screws	**1270008000**
Unwashed, not painted, loose accessories	**1270013000**
Accessories (individual part or installation kit)	
Mounting plate	**9511149000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821002000**
Mounting rail TS 35	**9822003000**
Earthing rail	**9810004000**
External mounting brackets	**9824024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	20	9	6	4	2	2	1	0
Side C/D	8	4	3	2	2	0	0	0

** Enclosure preparation required

160 x 160 x 90 mm

CA-280
Aluminium enclosure



* Smaller dimension at mounting plate support

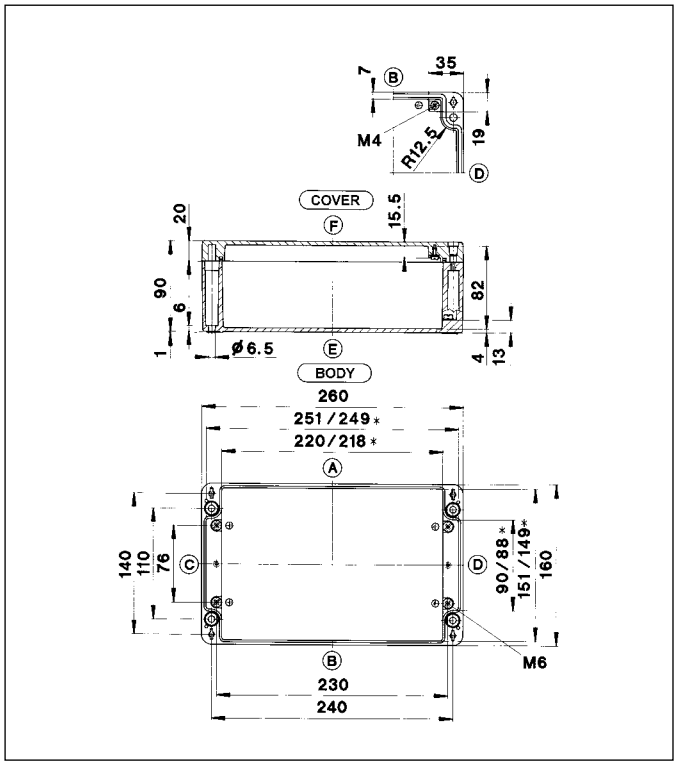
Type	**CA-280**
Weight (g)	1410
External dimension (mm)	160 x 160 x 90
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1280000000**
with hexagon socket head cap screws	**1280001000**
Silicone seal and cover screws	**1280059000**
HF seal and cover screws	**1280008000**
Unwashed, not painted, loose accessories	**1280033000**
Accessories (individual part or installation kit)	
Mounting plate	**9511011000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821002000**
Mounting rail TS 35	**9822003000**
Earthing rail	**9810004000**
External mounting brackets	**9824024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	20	9	6	4	2	2	1	0
Side C/D	8	4	3	2	2	0	0	0

** Enclosure preparation required

260 x 160 x 90 mm

CA-290
Aluminium enclosure



* Smaller dimension at mounting plate support

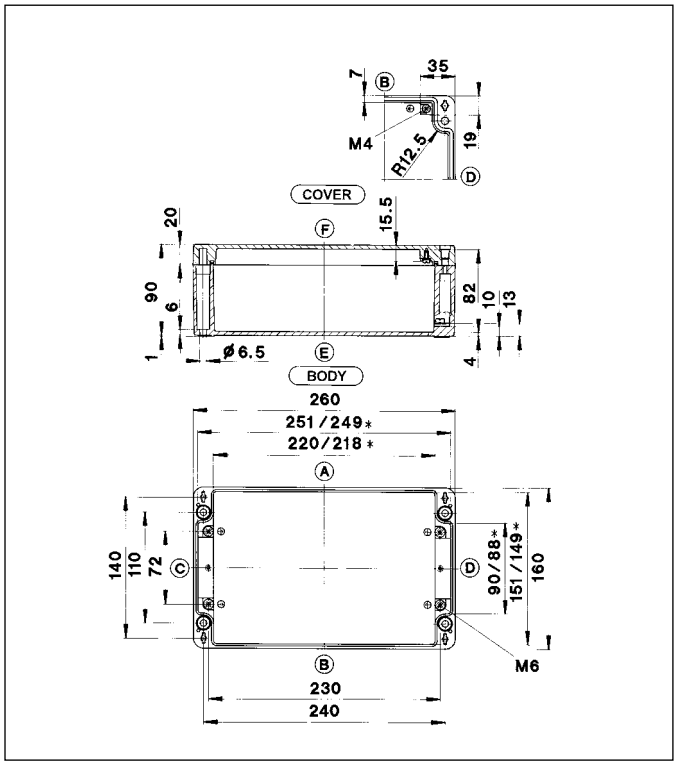
Type	**CA-290**
Weight (g)	1960
External dimension (mm)	260 x 160 x 90
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1290000000**
with hexagon socket head cap screws	**1290001000**
Silicone seal and cover screws	**1290047000**
HF seal and cover screws	**1290008000**
Unwashed, not painted, loose accessories	**1290011000**
Accessories (individual part or installation kit)	
Mounting plate	**9511096000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821008000**
Mounting rail TS 35	**9822011000**
Earthing rail	**9810010000**
External mounting brackets	**9824024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	36	17	12	7	4	3	3	0
Side C/D	8	4	3	2	2	0	0	0

** Enclosure preparation required

260 x 160 x 90 mm

CA-300
Aluminium enclosure



* Smaller dimension at mounting plate support

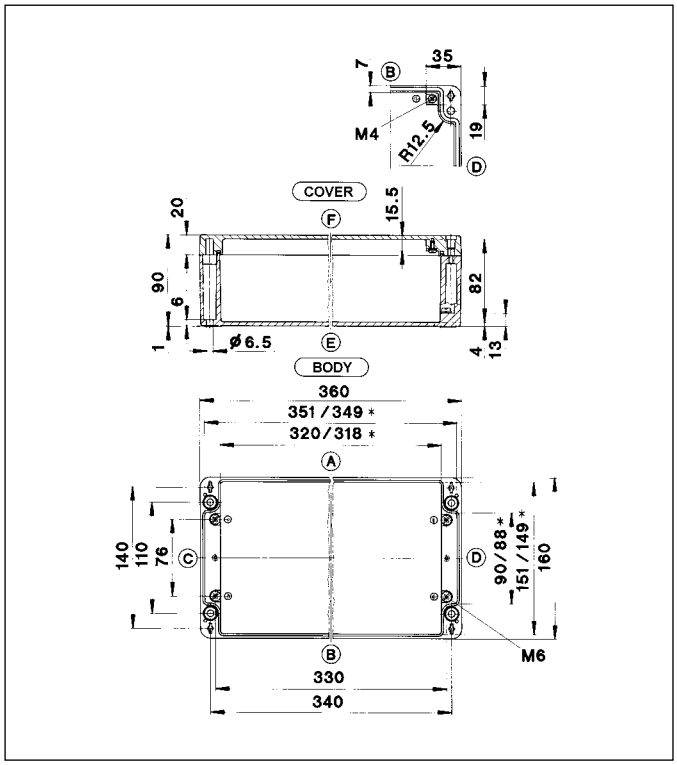
Type	**CA-300**
Weight (g)	1960
External dimension (mm)	260 x 160 x 90
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1300000000**
with hexagon socket head cap screws	**1300001000**
Silicone seal and cover screws	**1300064000**
HF seal and cover screws	**1300008000**
Unwashed, not painted, loose accessories	**1300041000**
Accessories (individual part or installation kit)	
Mounting plate	**9511012000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821008000**
Mounting rail TS 35	**9822011000**
Earthing rail	**9810010000**
External mounting brackets	**9824024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	36	17	12	7	4	3	3	0
Side C/D	8	4	3	2	2	0	0	0

** Enclosure preparation required

360 x 160 x 90 mm

CA-310
Aluminium enclosure



* Smaller dimension at mounting plate support

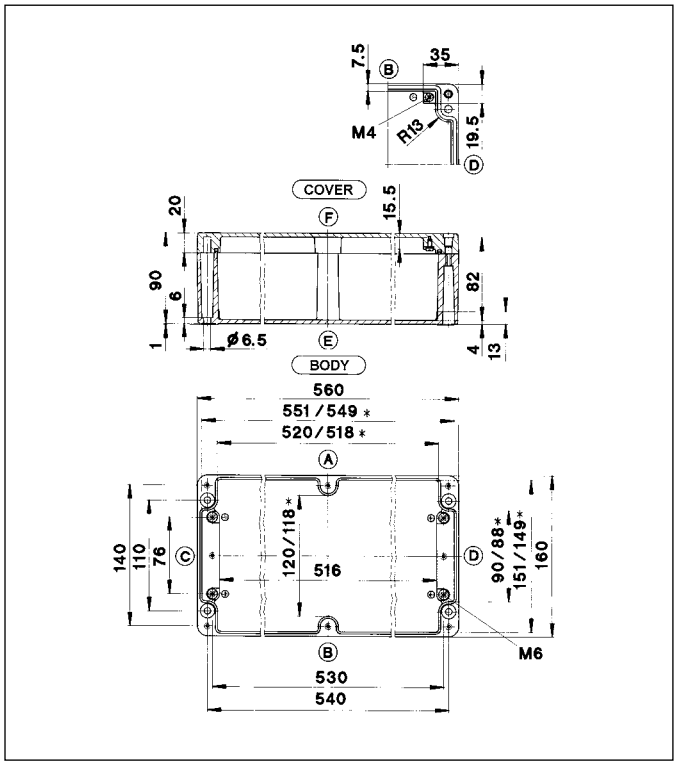
Type	**CA-310**
Weight (g)	2550
External dimension (mm)	360 x 160 x 90
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1310000000**
with hexagon socket head cap screws	**1310001000**
Silicone seal and cover screws	**1310158000**
HF seal and cover screws	**1310008000**
Unwashed, not painted, loose accessories	**1310071000**
Accessories (individual part or installation kit)	
Mounting plate	**9511175000**
Mounting rail TS 15	–
Mounting rail TS 32	**9821012000**
Mounting rail TS 35	**9822015000**
Earthing rail	**9810042000**
External mounting brackets	**9824024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	54	26	18	11	6	5	4	0
Side C/D	8	4	3	2	2	0	0	0

** Enclosure preparation required

560 x 160 x 90 mm

CA-330
Aluminium enclosure



* Smaller dimension at mounting plate support

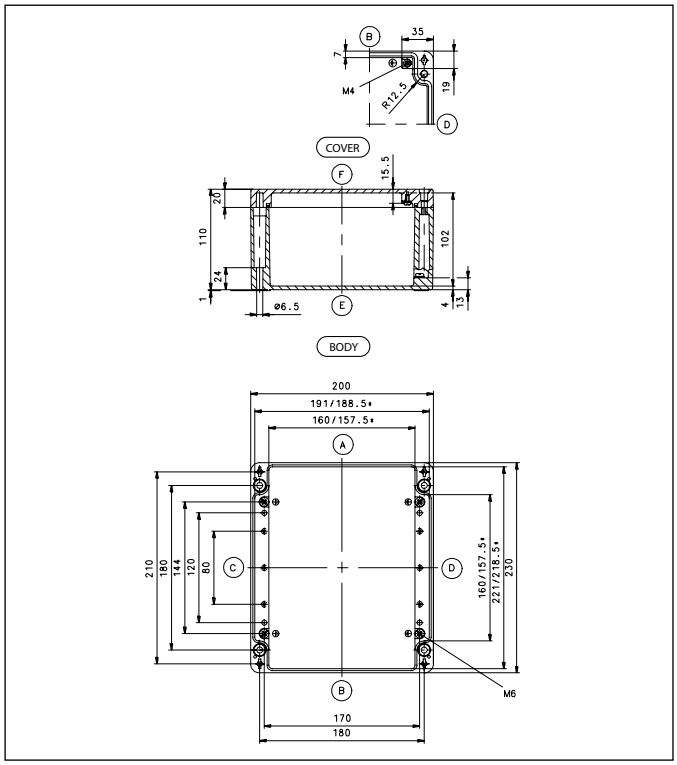
Type	**CA-330**
Weight (g)	4310
External dimension (mm)	560 x 160 x 90
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1330000000**
with hexagon socket head cap screws	**1330001000**
Silicone seal and cover screws	**1330056000**
HF seal and cover screws	**1330008000**
Unwashed, not painted, loose accessories	**1330022000**
Accessories (individual part or installation kit)	
Mounting plate	**9511014000**
Mounting rail TS 15	–
Mounting rail TS 32	**9821015000**
Mounting rail TS 35	**9822018000**
Earthing rail	**9810016000**
External mounting brackets	**9824024000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231009000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	84	40	28	16	10	8	6	0
Side C/D	8	4	3	2	2	0	0	0

** Enclosure preparation required

200 x 230 x 110 mm

CA-350
Aluminium enclosure



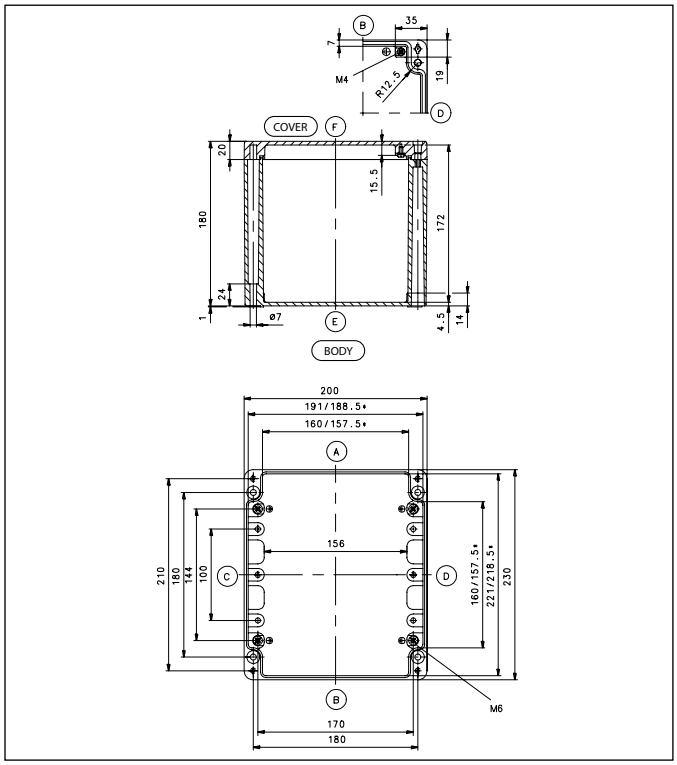
Type	**CA-350**
Weight (g)	2730
External dimension (mm)	200 x 230 x 110
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1350000000**
with hexagon socket head cap screws	**1350001000**
Silicone seal and cover screws	**1350078000**
HF seal and cover screws	**1350008000**
Unwashed, not painted, loose accessories	**1350017000**
Accessories (individual part or installation kit)	
Mounting plate	**9511015000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821003000**
Mounting rail TS 35	**9822005000**
Earthing rail	**9810007000**
External mounting brackets	**9824023000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	35	15	12	8	4	3	2	2
Side C/D	26	12	8	5	3	2	2	1

** Enclosure preparation required

200 x 230 x 180 mm

CA-360
Aluminium enclosure



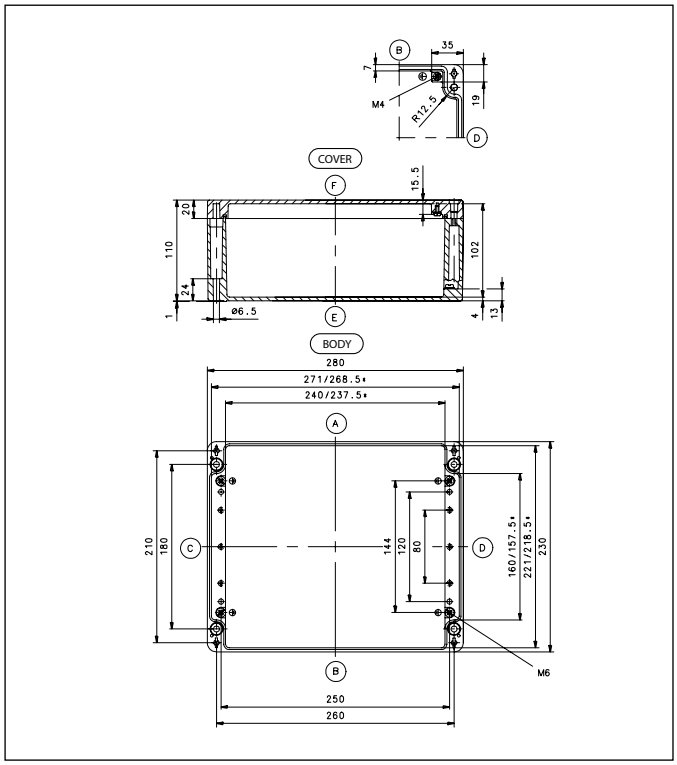
Type	**CA-360**
Weight (g)	3680
External dimension (mm)	200 x 230 x 180
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1360000000**
with hexagon socket head cap screws	**1360001000**
Silicone seal and cover screws	**1360044000**
HF seal and cover screws	**1360008000**
Unwashed, not painted, loose accessories	**1360043000**
Accessories (individual part or installation kit)	
Mounting plate	**9511015000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821003000**
Mounting rail TS 35	**9822005000**
Earthing rail	**9810007000**
External mounting brackets	**9824023000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	56	32	20	13	9	5	4	4
Side C/D	52	27	18	12	8	5	3	3

** Enclosure preparation required

280 x 230 x 110 mm

CA-370
Aluminium enclosure



* Smaller dimension at mounting plate support

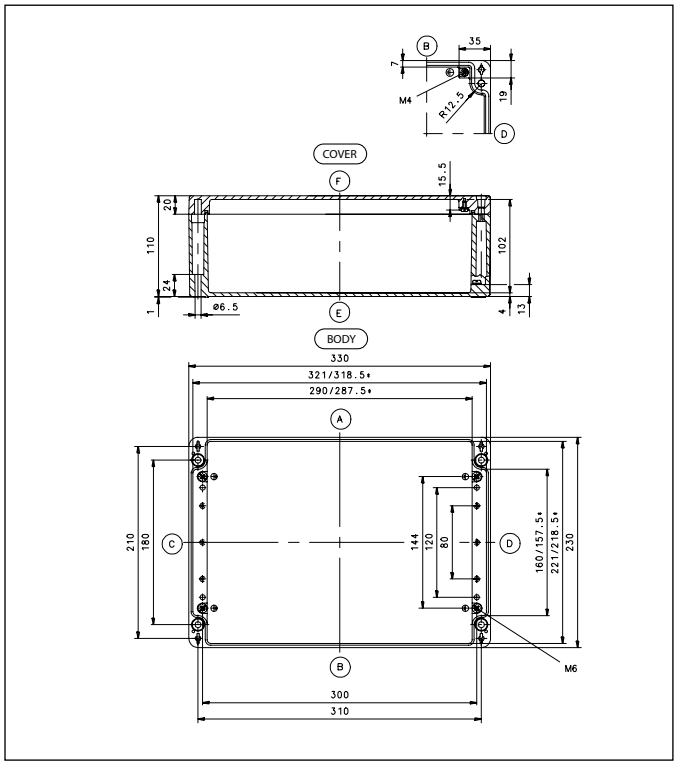
Type	**CA-370**
Weight (g)	3840
External dimension (mm)	280 x 230 x 110
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1370000000**
with hexagon socket head cap screws	**1370001000**
Silicone seal and cover screws	**1370073000**
HF seal and cover screws	**1370008000**
Unwashed, not painted, loose accessories	**1370015000**
Accessories (individual part or installation kit)	
Mounting plate	**9511016000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821009000**
Mounting rail TS 35	**9822012000**
Earthing rail	**9810011000**
External mounting brackets	**9824023000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	53	25	18	11	7	4	3	3
Side C/D	26	12	8	5	3	2	2	1

** Enclosure preparation required

330 x 230 x 110 mm

CA-380
Aluminium enclosure



* Smaller dimension at mounting plate support

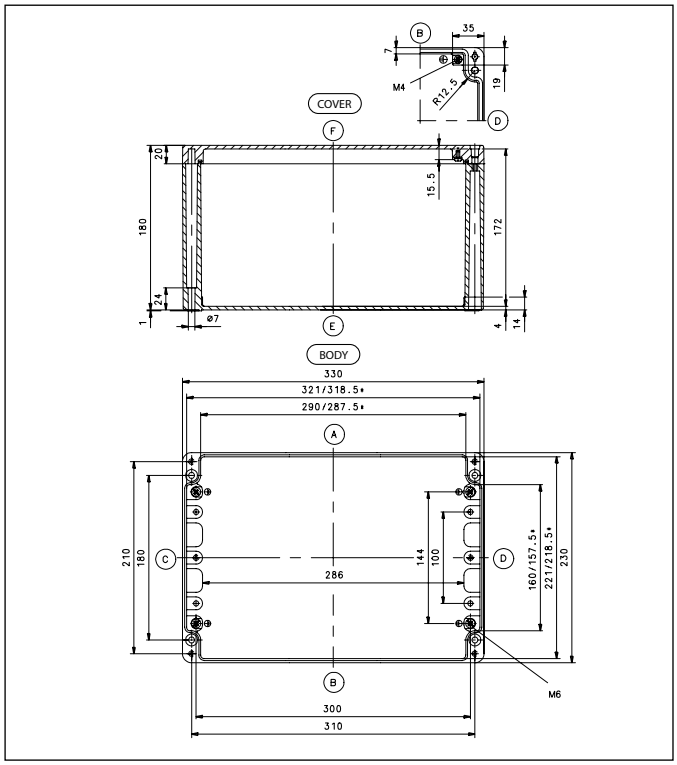
Type	**CA-380**
Weight (g)	4270
External dimension (mm)	330 x 230 x 110
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1380000000**
with hexagon socket head cap screws	**1380001000**
Silicone seal and cover screws	**1380052000**
HF seal and cover screws	**1380008000**
Unwashed, not painted, loose accessories	**1380014000**
Accessories (individual part or installation kit)	
Mounting plate	**9511017000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821011000**
Mounting rail TS 35	**9822014000**
Earthing rail	**9810013000**
External mounting brackets	**9824023000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	65	30	23	12	9	5	4	3
Side C/D	24	12	8	5	3	2	2	1

** Enclosure preparation required

330 x 230 x 180 mm

CA-390
Aluminium enclosure



* Smaller dimension at mounting plate support

Type	**CA-390**
Weight (g)	5300
External dimension (mm)	330 x 230 x 180
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1390000000**
with hexagon socket head cap screws	**1390001000**
Silicone seal and cover screws	**1390020000**
HF seal and cover screws	**1390008000**
Unwashed, not painted, loose accessories	**1390012000**
Accessories (individual part or installation kit)	
Mounting plate	**9511017000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821011000**
Mounting rail TS 35	**9822014000**
Earthing rail	**9810013000**
External mounting brackets	**9824023000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	108	54	40	25	15	9	8	6
Side C/D	52	27	18	12	8	5	3	3

** Enclosure preparation required

400 x 230 x 110 mm

CA-400
Aluminium enclosure

* Smaller dimension at mounting plate support

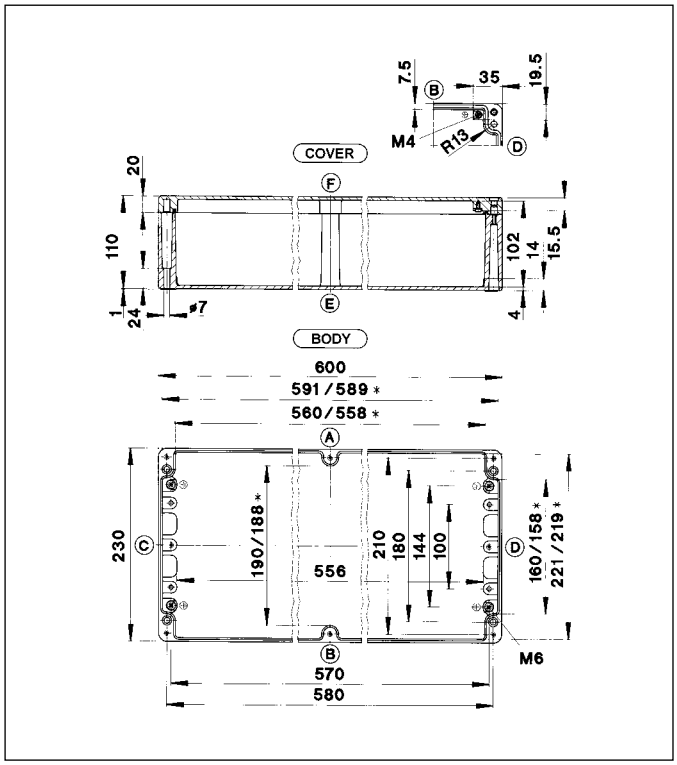
Type	**CA-400**
Weight (g)	4870
External dimension (mm)	400 x 230 x 110
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1400000000**
with hexagon socket head cap screws	**1400001000**
Silicone seal and cover screws	**1400062000**
HF seal and cover screws	**1400008000**
Unwashed, not painted, loose accessories	**1400013000**
Accessories (individual part or installation kit)	
Mounting plate	**9511294000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821014000**
Mounting rail TS 35	**9822017000**
Earthing rail	**9810015000**
External mounting brackets	**9824023000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	80	38	27	17	11	6	5	4
Side C/D	26	12	8	5	3	2	2	1

** Enclosure preparation required

600 x 230 x 110 mm

CA-420
Aluminium enclosure



* Smaller dimension at mounting plate support

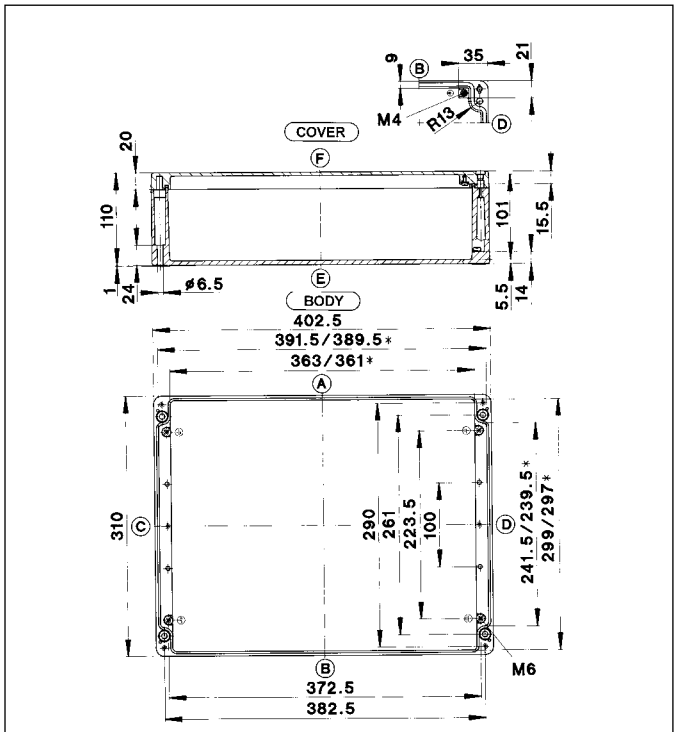
Type	**CA-420**
Weight (g)	6380
External dimension (mm)	600 x 230 x 110
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1420000000**
with hexagon socket head cap screws	**1420001000**
Silicone seal and cover screws	**1420055000**
HF seal and cover screws	**1420008000**
Unwashed, not painted, loose accessories	**1420011000**
Accessories (individual part or installation kit)	
Mounting plate	**9511019000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821016000**
Mounting rail TS 35	**9822019000**
Earthing rail	**9810017000**
External mounting brackets	**9824023000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231006000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	120	56	42	24	16	8	8	6
Side C/D	28	13	8	5	3	2	2	1

** Enclosure preparation required

402,5 x 310 x 110 mm

CA-450
Aluminium enclosure



* Smaller dimension at mounting plate support

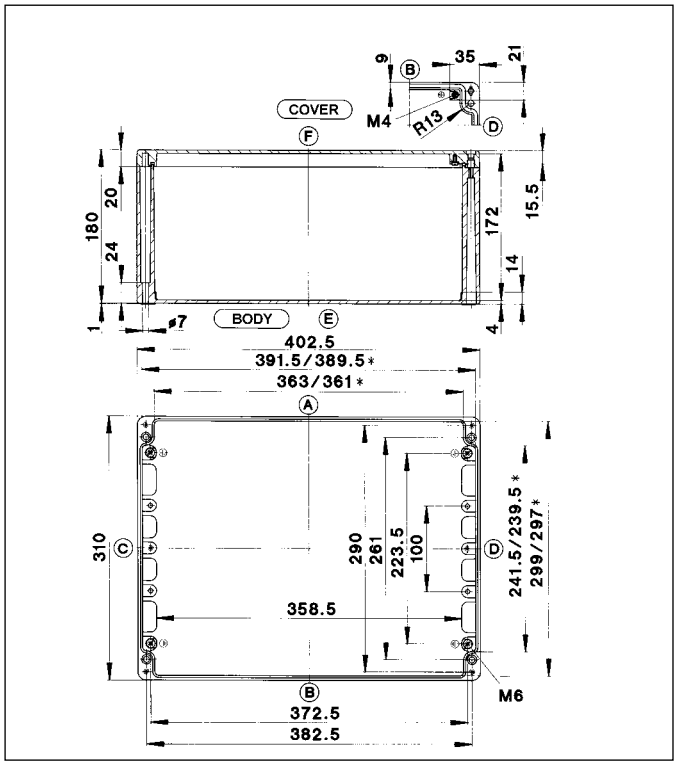
Type	**CA-450**
Weight (g)	5810
External dimension (mm)	402,5 x 310 x 110
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1450000000**
with hexagon socket head cap screws	**1450001000**
Silicone seal and cover screws	**1450052000**
HF seal and cover screws	**1450008000**
Unwashed, not painted, loose accessories	**1450025000**
Accessories (individual part or installation kit)	
Mounting plate	**9511020000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821014000**
Mounting rail TS 35	**9822017000**
Earthing rail	**9810015000**
External mounting brackets	**9824023000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231009000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	80	38	27	17	11	6	5	4
Side C/D	38	21	13	7	5	4	3	2

** Enclosure preparation required

402,5 x 310 x 180 mm

CA-460
Aluminium enclosure



* Smaller dimension at mounting plate support

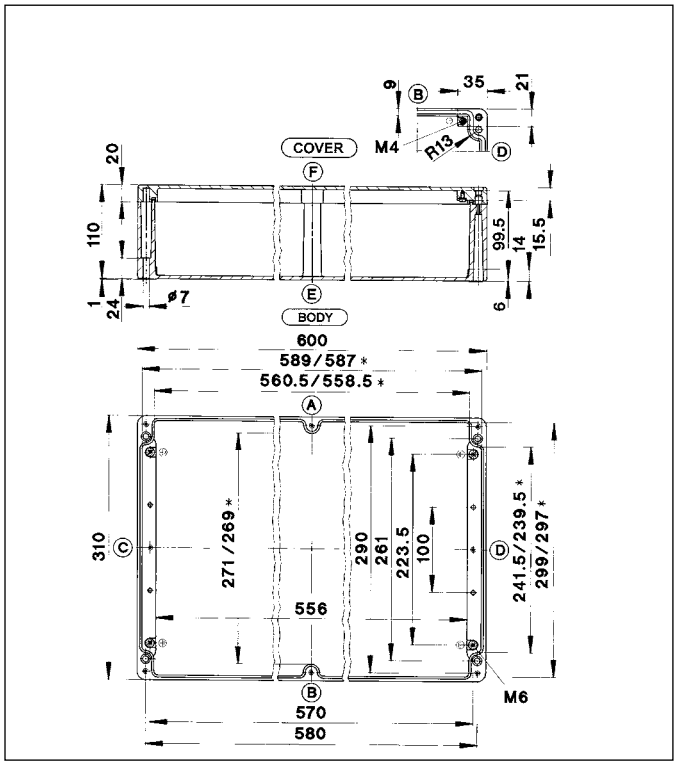
Type	**CA-460**
Weight (g)	7420
External dimension (mm)	402,5 x 310 x 180
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1460000000**
with hexagon socket head cap screws	**1460001000**
Silicone seal and cover screws	**1460013000**
HF seal and cover screws	**1460008000**
Unwashed, not painted, loose accessories	**1460049000**
Accessories (individual part or installation kit)	
Mounting plate	**9511020000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821014000**
Mounting rail TS 35	**9822017000**
Earthing rail	**9810015000**
External mounting brackets	**9824023000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231009000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	136	68	50	30	21	12	10	8
Side C/D	74	38	28	18	12	8	6	3

** Enclosure preparation required

600 x 310 x 110 mm

CA-470
Aluminium enclosure



* Smaller dimension at mounting plate support

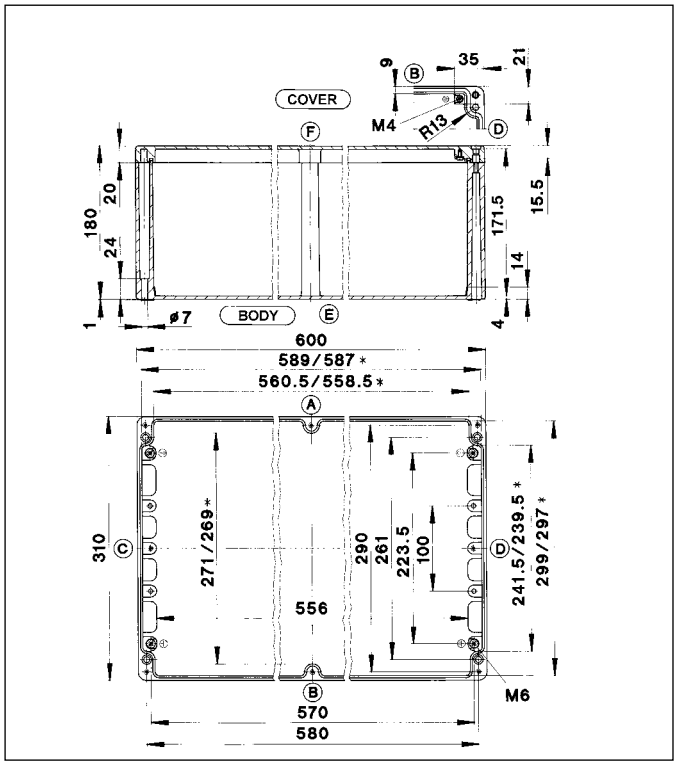
Type	**CA-470**
Weight (g)	8480
External dimension (mm)	600 x 310 x 110
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1470000000**
with hexagon socket head cap screws	**1470001000**
Silicone seal and cover screws	**1470056000**
HF seal and cover screws	**1470008000**
Unwashed, not painted, loose accessories	**1470062000**
Accessories (individual part or installation kit)	
Mounting plate	**9511021000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821016000**
Mounting rail TS 35	**9822019000**
Earthing rail	**9810017000**
External mounting brackets	**9824023000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231009000**

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	120	56	42	24	16	8	8	6
Side C/D	38	17	13	7	5	4	3	2

** Enclosure preparation required

600 x 310 x 180 mm

CA-480
Aluminium enclosure



* Smaller dimension at mounting plate support

Type	**CA-480**
Weight (g)	10840
External dimension (mm)	600 x 310 x 180
Ordering data Enclosure (painted) with seal (CR)	**Part number**
with cover screws	**1480000000**
with hexagon socket head cap screws	**1480001000**
Silicone seal and cover screws	**1480045000**
HF seal and cover screws	**1480008000**
Unwashed, not painted, loose accessories	**1480017000**
Accessories (individual part or installation kit)	
Mounting plate	**9511021000**
Mounting rail TS 15	**–**
Mounting rail TS 32	**9821016000**
Mounting rail TS 35	**9822019000**
Earthing rail	**9810017000**
External mounting brackets	**9824023000**
External articulated hinges	**9801047000**
Internal articulated hinges with cover guide**	**9801030000**
Silicone seal for extended temperature range (by the metre)	**9231009000**
Maximum possible number of threads	

ISO M	12	16	20	25	32	40	50	63
Side A/B	200	100	76	46	30	18	14	12
Side C/D	74	38	28	18	12	8	6	5

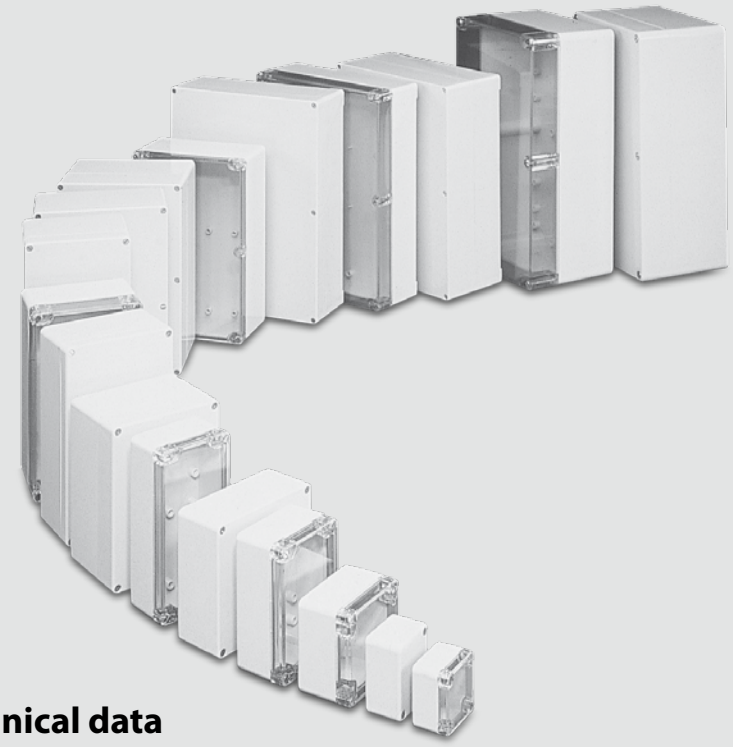
** Enclosure preparation required

Polycarbonate and ABS Enclosures – Series CT

BERNSTEIN Series CT plastic enclosures are manufactured from high-grade polycarbonate or ABS. They are particularly suitable for encapsulating electrical and electronic components as well as complete small-scale controllers. All enclosures are available with a transparent polycarbonate cover. The enclosures correspond to protection class IP65 in accordance with IEC529.

Attachment bosses are provided on the base of the plastic enclosures for mounting built-in components. The components can be simply secured with the self-tapping mounting screws that come with the enclosure. With their attachment bosses in the base, BERNSTEIN plastic enclosures offer many direct mounting options. Mounting rails can be installed without mounting plates on the central bosses.

BERNSTEIN Series CT enclosures are supplied as standard with the quick-release fastener developed and patented by BERNSTEIN. The quick-release fasteners that come with the enclosure are simply pressed and locked into the holes in the cover. They are made from stainless steel. The protection class (on the standard enclosure) is ensured by a factory-fitted seal. BERNSTEIN polycarbonate and ABS enclosures are produced as standard in the colour RAL 7035 (light grey). On account of its material properties, the polycarbonate version offers specific advantages in terms of impact strength, UV resistance and operating temperature range. Thanks to the many attachment bosses in the body, both versions provide many direct mounting options.



Technical data

Material

Polycarbonate, transparent polycarbonate or ABS

Seal

Neoprene (CR) round cord (siliconized)

alternatively:

Neoprene (CR) round cord (silicone-free)
Silicone round cord

Quick-release fastener

Stainless steel, self-locking, cross recessed head

alternatively:

Stainless steel cover screw, cross recessed head
Sealed cover screws, galvanised steel, (9 S 20 K), slot head

Colour

RAL 7035 (light grey)

Alternatively for large quantities:
Other colours (dyeing) available on request

Temperature range of CT enclosures

-40°C to +120°C (Polycarbonate)
-40°C to +80°C (ABS)

Temperature range of seals

-30°C to +80°C (Neoprene seal)

alternatively:

-60°C to +130°C (silicone seal)

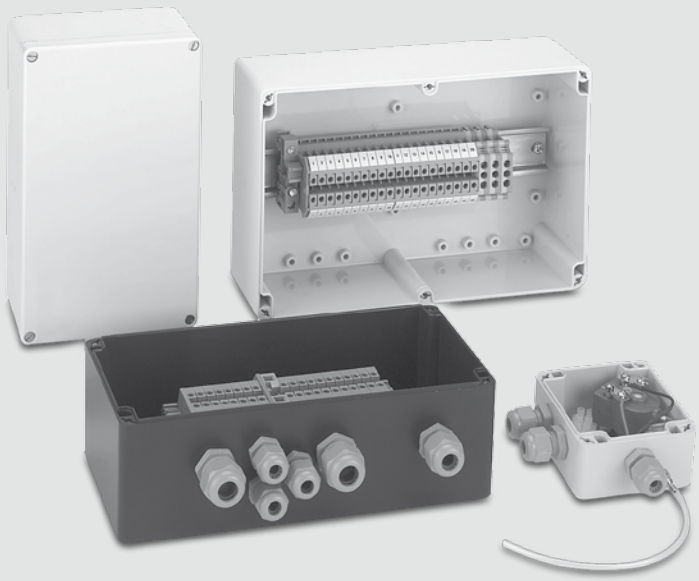
Protection class

IP65

Approbations

UL (only polycarbonate enclosures)

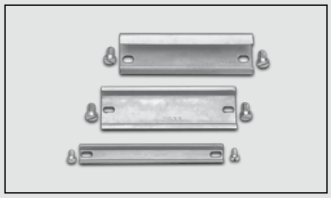
c CSA us (Enclosure NEMA Type 1, 4, 4X Indoor, 12 and 13)
(only polycarbonate enclosures)





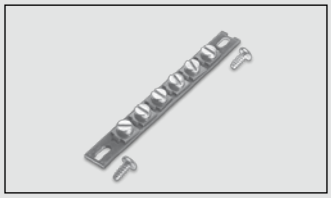
Mounting plates

Made from laminated paper (Pertinax) (thickness: CT-50 to CT-60: 1.5 mm; CT-62 to CT-78: 2.0 mm; CT-80 to CT-91; 2.5 mm) for versatile mounting of built-in components



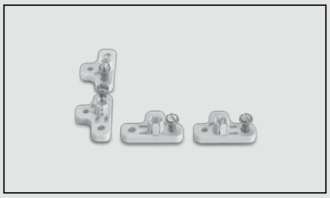
Mounting rails

conforming to Standards TS15 or TS32 and TS 35 made from steel; surface treated for accepting terminal blocks.



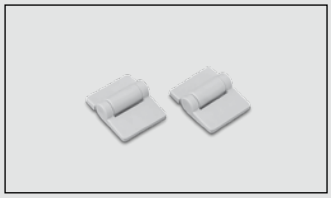
Earthing bars

made from galvanised steel for combining and connecting PE conductors.



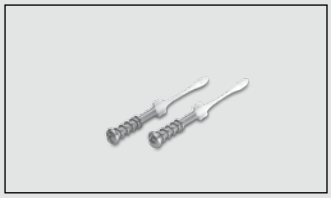
External mounting brackets

made from polycarbonate for mounting enclosures without opening the covers. Different bracket arrangement options offset by 90°. Colour RAL 7035.



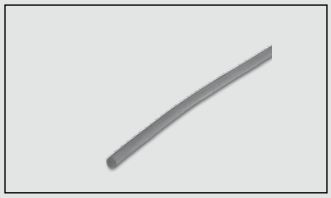
External articulated hinges

made from polycarbonate for hinged mounting of enclosure cover. Opening range of cover approx. 195°, latching at 170°, articulated hinges are simply pressed into holes (CT-88: secured by screws).



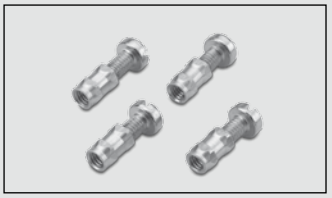
Flexible quick-release fastener/internal articulated hinges

for captive mounting and strain relief for enclosure cover. Cover opening range > 180°. Stainless steel with injection-moulded polyamide ends.



Silicone cover seal

with increased temperature resistance for subsequent fitting or for replacing standard cover seal. Expanded silicone by the metre.



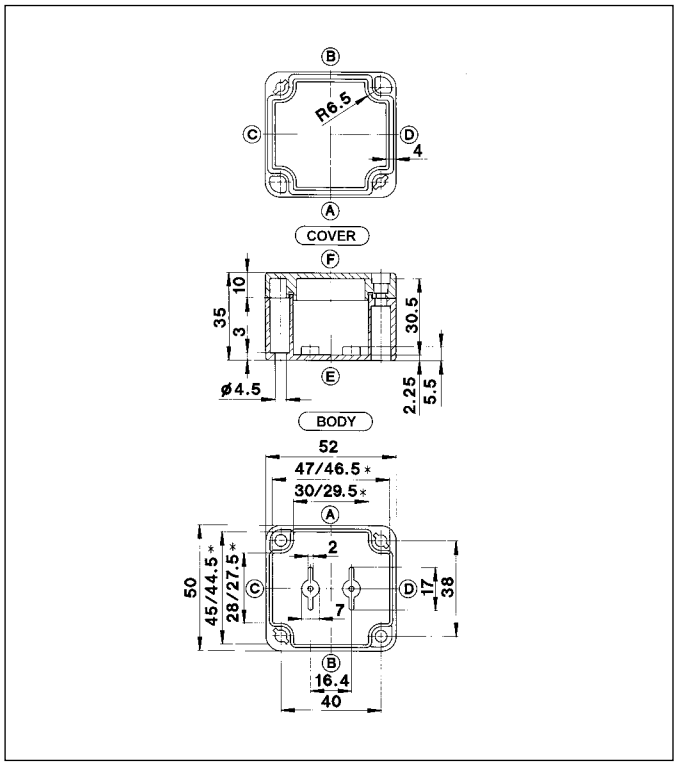
Brass press-in bushes

with metric fastening screws M3 (M4 on CT-88), for mounting built-in components with metric screws in the mounting bushes in the enclosure body.

					Polycarbonate enclosure		Polycarbonate enclosure with transparent cover (PC)		ABS enclosure		ABS enclosure with transparent cover (PC)	
Dimensions/mm					Article number	Type	Article number	Type	Article number	Type	Article number	Type
L	x	B	x	H								
52	x	50	x	35	**2500000000**	CT-501	**2501000000**	CT-501 T	**3500000000**	CT-502	**3501000000**	CT-502 T
65	x	50	x	35	**2520000000**	CT-521	**2521000000**	CT-521 T	**3520000000**	CT-522	**3521000000**	CT-522 T
82	x	80	x	55	**2540000000**	CT-541	**2541000000**	CT-541 T	**3540000000**	CT-542	**3541000000**	CT-542 T
82	x	80	x	85	**2560000000**	CT-561	**2561000000**	CT-561 T	**3560000000**	CT-562	**3561000000**	CT-562 T
120	x	80	x	55	**2580000000**	CT-581	**2581000000**	CT-581 T	**3580000000**	CT-582	**3581000000**	CT-582 T
120	x	80	x	85	**2600000000**	CT-601	**2601000000**	CT-601 T	**3600000000**	CT-602	**3601000000**	CT-602 T
160	x	80	x	55	**2620000000**	CT-621	**2621000000**	CT-621 T	**3620000000**	CT-622	**3621000000**	CT-622 T
160	x	80	x	85	**2640000000**	CT-641	**2641000000**	CT-641 T	**3640000000**	CT-642	**3641000000**	CT-642 T
122	x	120	x	55	**2660000000**	CT-661	**2661000000**	CT-661 T	**3660000000**	CT-662	**3661000000**	CT-662 T
122	x	120	x	85	**2680000000**	CT-681	**2681000000**	CT-681 T	**3680000000**	CT-682	**3681000000**	CT-682 T
160	x	120	x	90	**2720000000**	CT-721	**2721000000**	CT-721 T	**3720000000**	CT-722	**3721000000**	CT-722 T
200	x	120	x	75	**2760000000**	CT-761	**2761000000**	CT-761 T	**3760000000**	CT-762	**3761000000**	CT-762 T
200	x	120	x	90	**2780000000**	CT-781	**2781000000**	CT-781 T	**3780000000**	CT-782	**3781000000**	CT-782 T
240	x	120	x	100	**2800000000**	CT-801	**2801000000**	CT-801 T	**3800000000**	CT-802	**3801000000**	CT-802 T
200	x	150	x	75	**2820000000**	CT-821	**2821000000**	CT-821 T	**3820000000**	CT-822	**3821000000**	CT-822 T
240	x	160	x	90	**2840000000**	CT-841	**2841000000**	CT-841 T	**3840000000**	CT-842	**3841000000**	CT-842 T
240	x	160	x	120	**2860000000**	CT-861	**2861000000**	CT-861 T	**3860000000**	CT-862	**3861000000**	CT-862 T
250	x	160	x	90	**2900000000**	CT-901	**2901000000**	CT-901 T	**3900000000**	CT-902	**3901000000**	CT-902 T
250	x	160	x	120	**2910000000**	CT-911	**2911000000**	CT-911 T	**3910000000**	CT-912	**3911000000**	CT-912 T
360	x	200	x	150	**2880000000**	CT-881	**2881000000**	CT-881 T	**3880000000**	CT-882	**3881000000**	CT-882 T
300	x	230	x	86	**2870000000**	CT-871	**2871000000**	CT-871 T	**3870000000**	CT-872	**3871000000**	CT-872 T
300	x	230	x	110	**2890000000**	CT-891	**2891000000**	CT-891 T	**3890000000**	CT-892	**3891000000**	CT-892 T

52 x 50 x 35 mm

CT-501 Polycarbonate enclosure
CT-502 ABS enclosure



* Smaller dimension at mounting plate support

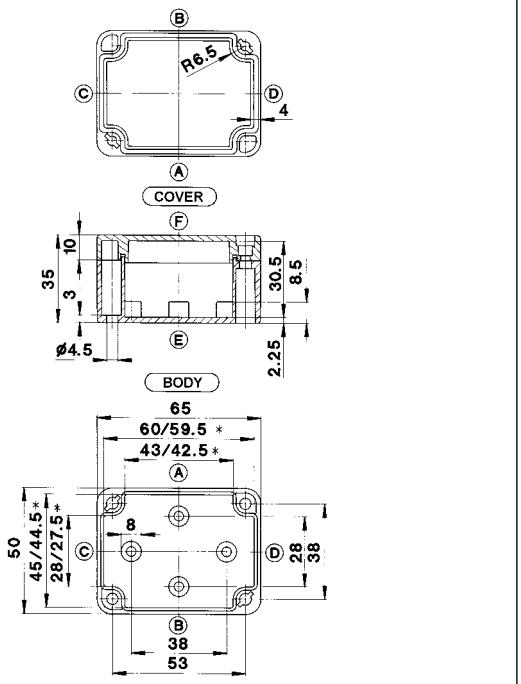
Type	CT-501 PC	CT-502 ABS
Weight (g)	40 (PC)	38 (ABS)
External dimension (mm)	52 x 50 x 35	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2500000000**	
PC, with screw fastener	**2500001000**	
PC, with transparent cover (PC) and quick-release fastener	**2501000000**	
PC, with transparent cover (PC) and screw fastener	**2501001000**	
ABS, with quick-release fastener		**3500000000**
ABS, with screw fastener		**3500001000**
ABS, with transparent cover (PC) and quick-release fastener		**3501000000**
ABS, with transparent cover (PC) and screw fastener		**3501001000**
Accessories (individual part or installation kit)		
Mounting plate	**9512009000**	
Mounting rail TS 15	–	
Mounting rail TS 32	–	
Mounting rail TS 35	–	
Earthing rail (secured on central bosses C/D)	–	
External mounting brackets	–	
External articulated hinges**	–	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	–	
Silicone seal for extended temperature range (by the metre)	–	
Mounting bushes with 4 screws M3 x 8	–	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	1	0	0	0	0	0	0	0
Side C/D	1	0	0	0	0	0	0	0

** Enclosure preparation required

65 x 50 x 35 mm

CT-521 Polycarbonate enclosure
CT-522 ABS enclosure



* Smaller dimension at mounting plate support

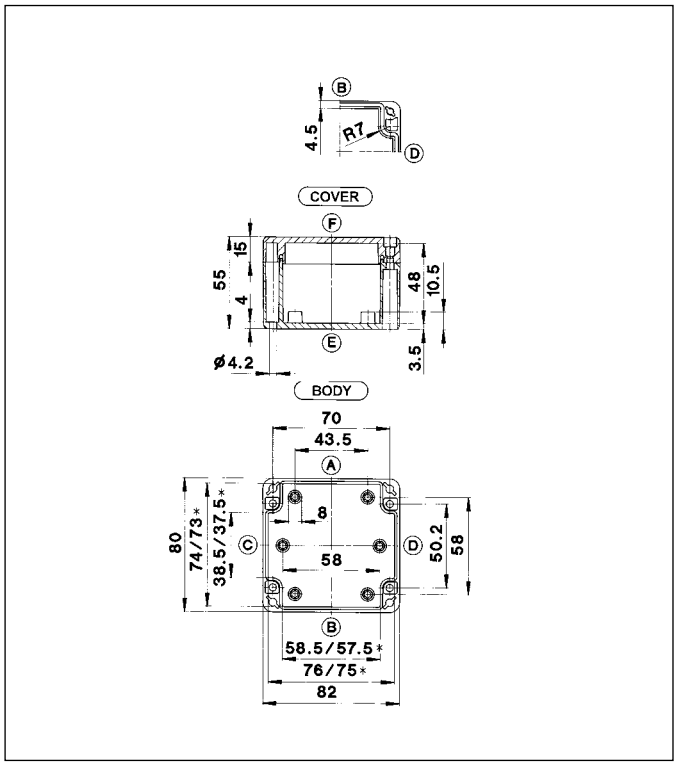
Type	CT-521 PC	CT-522 ABS
Weight (g)	50 (PC)	47 (ABS)
External dimension (mm)	65 x 50 x 35	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2520000000**	
PC, with screw fastener	**2520001000**	
PC, with transparent cover (PC) and quick-release fastener	**2521000000**	
PC, with transparent cover (PC) and screw fastener	**2521001000**	
ABS, with quick-release fastener		**3520000000**
ABS, with screw fastener		**3520001000**
ABS, with transparent cover (PC) and quick-release fastener		**3521000000**
ABS, with transparent cover (PC) and screw fastener		**3521001000**
Accessories (individual part or installation kit)		
Mounting plate	**9512010000**	
Mounting rail TS 15	**9820001000**	
Mounting rail TS 32	–	
Mounting rail TS 35	–	
Earthing rail (secured on central bosses C/D)	–	
External mounting brackets	–	
External articulated hinges**	–	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	–	
Silicone seal for extended temperature range (by the metre)	–	
Mounting bushes with 4 screws M3 x 8	**9800025000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	2	0	0	0	0	0	0	0
Side C/D	0	0	0	0	0	0	0	0

** Enclosure preparation required

82 x 80 x 55 mm

CT-541 Polycarbonate enclosure
CT-542 ABS enclosure



* Smaller dimension at mounting plate support

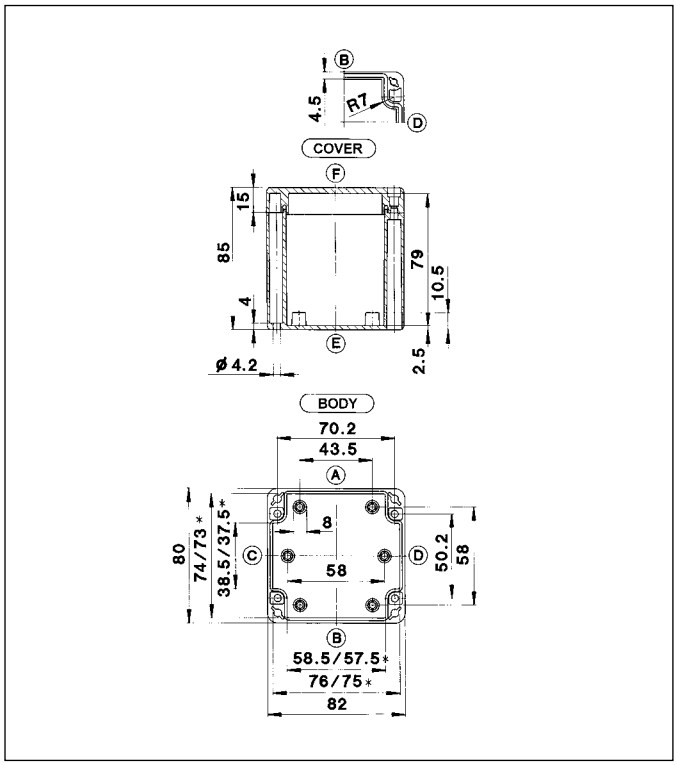
Type	CT-541 PC	CT-542 ABS
Weight (g)	140 (PC)	116 (ABS)
External dimension (mm)	82 x 80 x 55	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2540000000**	
PC, with screw fastener	**2540001000**	
PC, with transparent cover (PC) and quick-release fastener	**2541000000**	
PC, with transparent cover (PC) and screw fastener	**2541001000**	
ABS, with quick-release fastener	**3540000000**	
ABS, with screw fastener	**3540001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3541000000**	
ABS, with transparent cover (PC) and screw fastener	**3541001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512011000**	
Mounting rail TS 15	**9820004000**	
Mounting rail TS 32	**–**	
Mounting rail TS 35	**9822000000**	
Earthing rail (secured on central bosses C/D)	**–**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801076000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800025000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	5	2	2	0	0	0	0	0
Side C/D	2	1	0	0	0	0	0	0

** Enclosure preparation required

82 x 80 x 85 mm

CT-561 Polycarbonate enclosure
CT-562 ABS enclosure



* Smaller dimension at mounting plate support

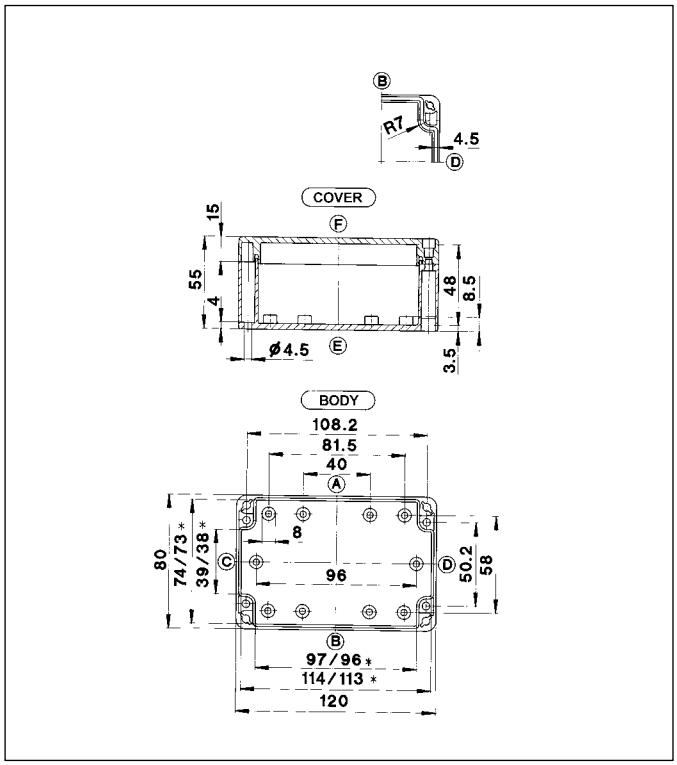
Type	CT-561 PC	CT-562 ABS
Weight (g)	175 (PC)	150 (ABS)
External dimension (mm)	82 x 80 x 85	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2560000000**	
PC, with screw fastener	**2560001000**	
PC, with transparent cover (PC) and quick-release fastener	**2561000000**	
PC, with transparent cover (PC) and screw fastener	**2561001000**	
ABS, with quick-release fastener	**3560000000**	
ABS, with screw fastener	**3560001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3561000000**	
ABS, with transparent cover (PC) and screw fastener	**3561001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512011000**	
Mounting rail TS 15	**9820004000**	
Mounting rail TS 32	**–**	
Mounting rail TS 35	**9822000000**	
Earthing rail (secured on central bosses C/D)	**–**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801076000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800025000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	10	5	3	2	1	1	1	0
Side C/D	5	2	1	1	1	0	0	0

** Enclosure preparation required

120 x 80 x 55 mm

CT-581 Polycarbonate enclosure
CT-582 ABS enclosure



* Smaller dimension at mounting plate support

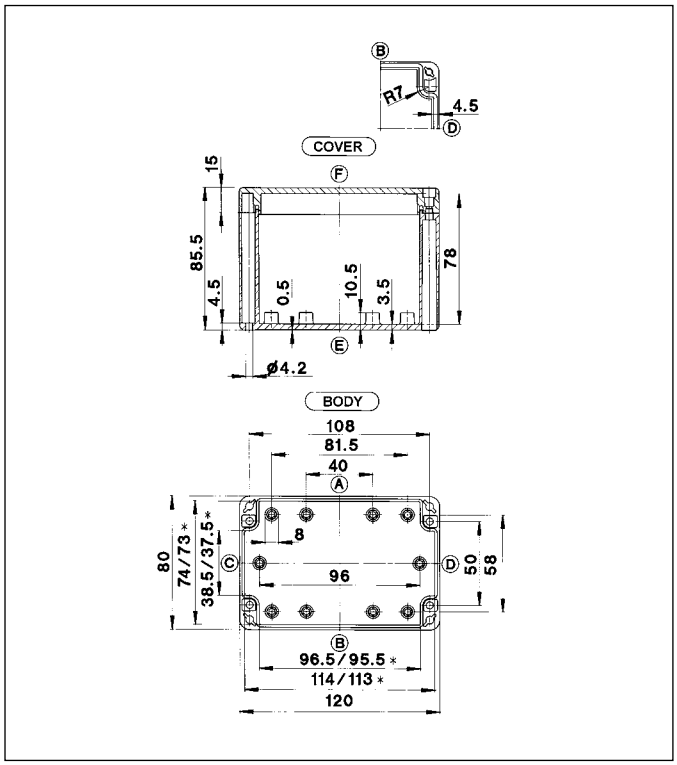
Type	CT-581 PC	CT-582 ABS
Weight (g)	180 (PC)	135 (ABS)
External dimension (mm)	120 x 80 x 55	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2580000000**	
PC, with screw fastener	**2580001000**	
PC, with transparent cover (PC) and quick-release fastener	**2581000000**	
PC, with transparent cover (PC) and screw fastener	**2581001000**	
ABS, with quick-release fastener	**3580000000**	
ABS, with screw fastener	**3580001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3581000000**	
ABS, with transparent cover (PC) and screw fastener	**3581001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512012000**	
Mounting rail TS 15	**9820009000**	
Mounting rail TS 32	**–**	
Mounting rail TS 35	**9822002000**	
Earthing rail (secured on central bosses C/D)	**9810001000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801076000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800040000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	9	4	3	2	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

** Enclosure preparation required

120 x 80 x 85 mm

CT-601 Polycarbonate enclosure
CT-602 ABS enclosure



* Smaller dimension at mounting plate support

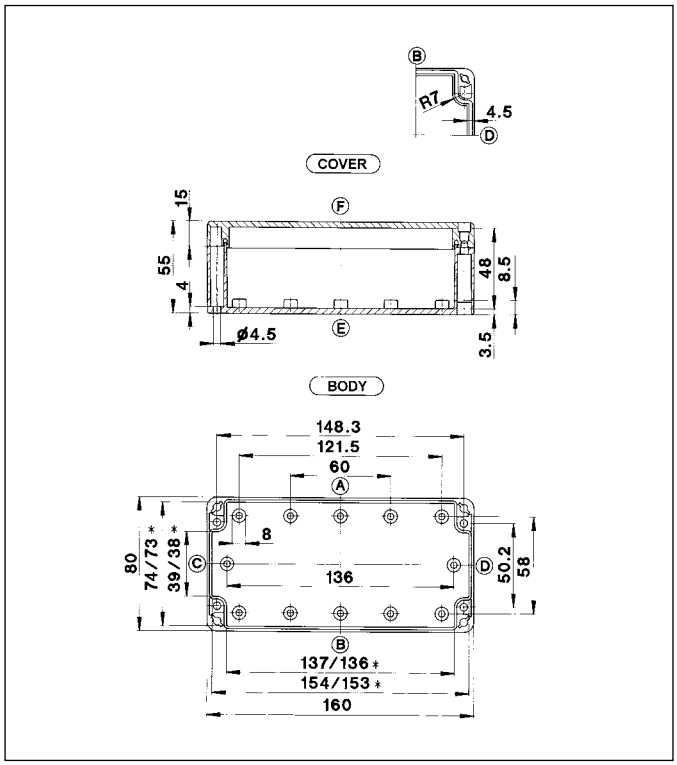
Type	CT-601 PC	CT-602 ABS
Weight (g)	225 (PC)	192 (ABS)
External dimension (mm)	120 x 80 x 85	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2600000000**	
PC, with screw fastener	**2600001000**	
PC, with transparent cover (PC) and quick-release fastener	**2601000000**	
PC, with transparent cover (PC) and screw fastener	**2601001000**	
ABS, with quick-release fastener	**3600000000**	
ABS, with screw fastener	**3600001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3601000000**	
ABS, with transparent cover (PC) and screw fastener	**3601001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512012000**	
Mounting rail TS 15	**9820009000**	
Mounting rail TS 32	**–**	
Mounting rail TS 35	**9822002000**	
Earthing rail (secured on central bosses C/D)	**9810001000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801076000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800025000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	15	6	6	3	2	1	1	0
Side C/D	5	2	1	1	1	0	0	0

** Enclosure preparation required

160 x 80 x 55 mm

CT-621 Polycarbonate enclosure
CT-622 ABS enclosure



* Smaller dimension at mounting plate support

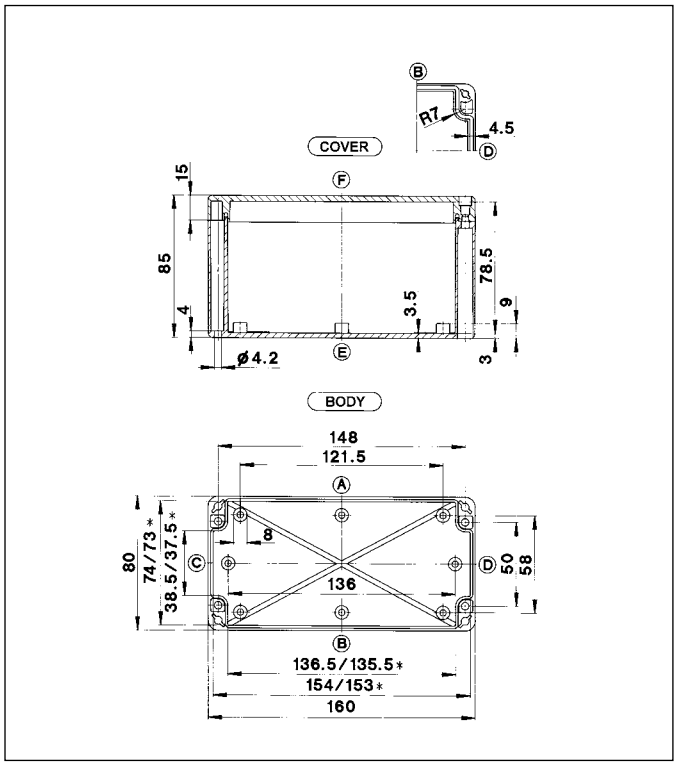
Type	CT-621 PC	CT-622 ABS
Weight (g)	225 (PC)	199 (ABS)
External dimension (mm)	160 x 80 x 55	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2620000000**	
PC, with screw fastener	**2620001000**	
PC, with transparent cover (PC) and quick-release fastener	**2621000000**	
PC, with transparent cover (PC) and screw fastener	**2621001000**	
ABS, with quick-release fastener	**3620000000**	
ABS, with screw fastener	**3620001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3621000000**	
ABS, with transparent cover (PC) and screw fastener	**3621001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512013000**	
Mounting rail TS 15	**9820013000**	
Mounting rail TS 32	**–**	
Mounting rail TS 35	**9822028000**	
Earthing rail (secured on central bosses C/D)	**9810005000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801076000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800040000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	11	5	4	3	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

** Enclosure preparation required

160 x 80 x 85 mm

CT-641 Polycarbonate enclosure
CT-642 ABS enclosure



* Smaller dimension at mounting plate support

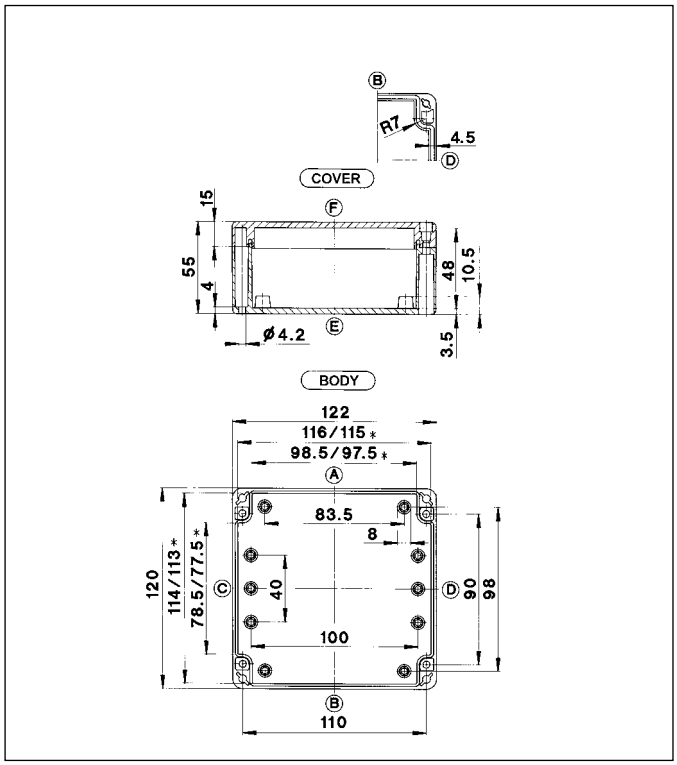
Type	CT-641 PC	CT-642 ABS
Weight (g)	240 (PC)	225 (ABS)
External dimension (mm)	160 x 80 x 85	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2640000000**	
PC, with screw fastener	**2640001000**	
PC, with transparent cover (PC) and quick-release fastener	**2641000000**	
PC, with transparent cover (PC) and screw fastener	**2641001000**	
ABS, with quick-release fastener	**3640000000**	
ABS, with screw fastener	**3640001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3641000000**	
ABS, with transparent cover (PC) and screw fastener	**3641001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512013000**	
Mounting rail TS 15	**9820013000**	
Mounting rail TS 32	**–**	
Mounting rail TS 35	**9822028000**	
Earthing rail (secured on central bosses C/D)	**9810005000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801076000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800025000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	22	10	8	5	3	2	2	0
Side C/D	5	2	1	1	1	0	0	0

** Enclosure preparation required

122 x 120 x 55 mm

CT-661 Polycarbonate enclosure
CT-662 ABS enclosure



* Smaller dimension at mounting plate support

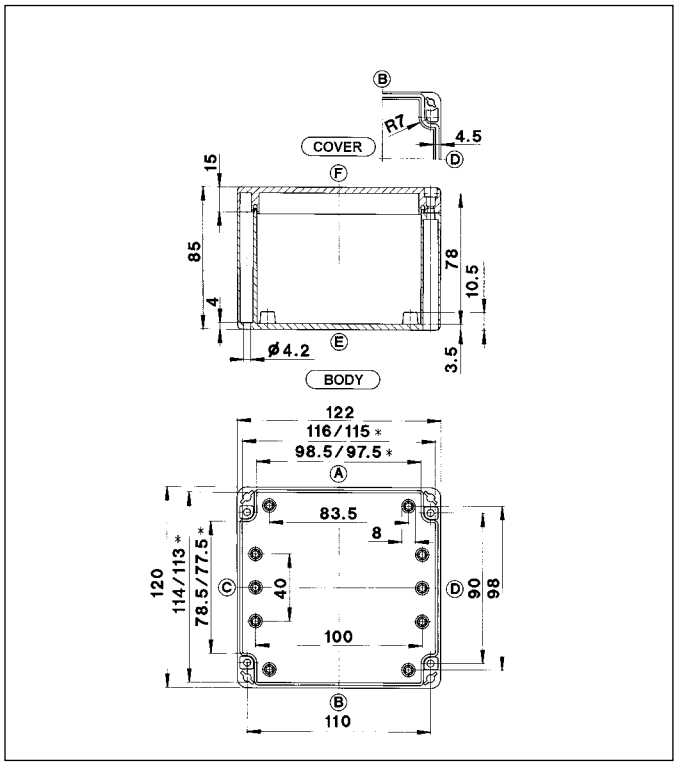
Type	CT-661 PC	CT-662 ABS
Weight (g)	240 (PC)	218 (ABS)
External dimension (mm)	122 x 120 x 55	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2660000000**	
PC, with screw fastener	**2660001000**	
PC, with transparent cover (PC) and quick-release fastener	**2661000000**	
PC, with transparent cover (PC) and screw fastener	**2661001000**	
ABS, with quick-release fastener	**3660000000**	
ABS, with screw fastener	**3660001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3661000000**	
ABS, with transparent cover (PC) and screw fastener	**3661001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512014000**	
Mounting rail TS 15	**9820008000**	
Mounting rail TS 32	**–**	
Mounting rail TS 35	**9822002000**	
Earthing rail (secured on central bosses C/D)	**9810003000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801076000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800025000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	9	4	3	2	0	0	0	0
Side C/D	4	3	2	0	0	0	0	0

** Enclosure preparation required

122 x 120 x 85 mm

CT-681 Polycarbonate enclosure
CT-682 ABS enclosure



* Smaller dimension at mounting plate support

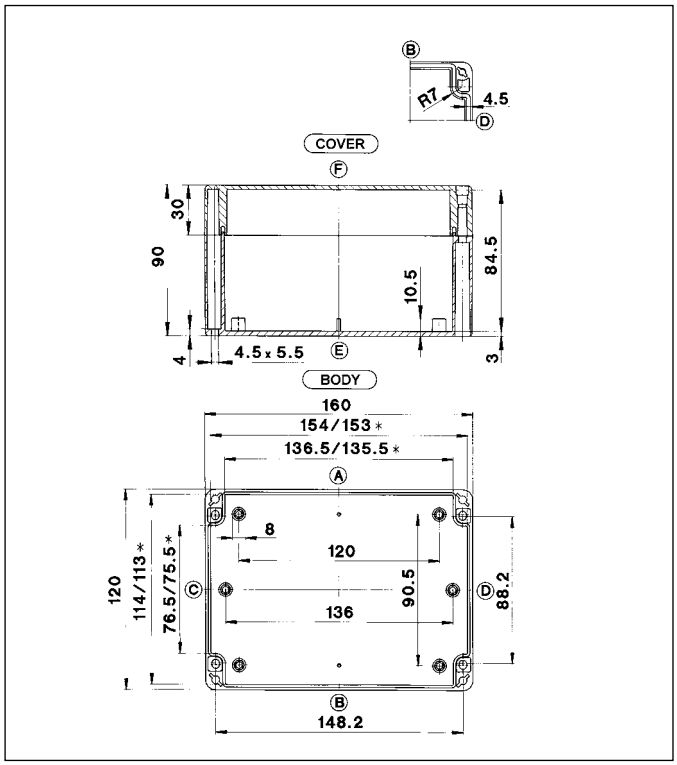
Type	CT-681 PC	CT-682 ABS
Weight (g)	295 (PC)	269 (ABS)
External dimension (mm)	122 x 120 x 85	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2680000000**	
PC, with screw fastener	**2680001000**	
PC, with transparent cover (PC) and quick-release fastener	**2681000000**	
PC, with transparent cover (PC) and screw fastener	**2681001000**	
ABS, with quick-release fastener	**3680000000**	
ABS, with screw fastener	**3680001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3681000000**	
ABS, with transparent cover (PC) and screw fastener	**3681001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512014000**	
Mounting rail TS 15	**–**	
Mounting rail TS 32	**9821001000**	
Mounting rail TS 35	**9822002000**	
Earthing rail (secured on central bosses C/D)	**9810003000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801076000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800025000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	15	6	6	3	20	1	1	0
Side C/D	10	3	3	2	1	0	0	0

** Enclosure preparation required

160 x 120 x 90 mm

CT-721 Polycarbonate enclosure
CT-722 ABS enclosure



* Smaller dimension at mounting plate support

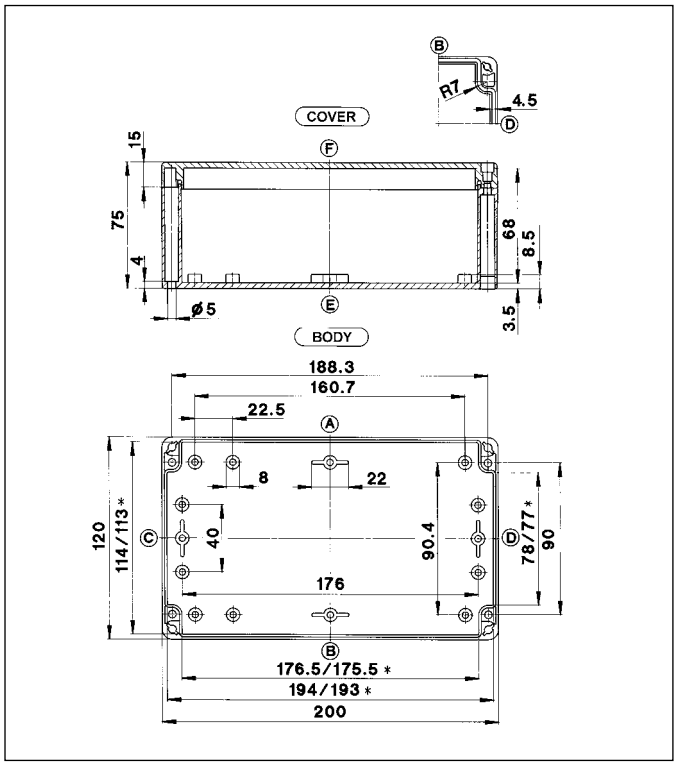
Type	CT-721 PC	CT-722 ABS
Weight (g)	360 (PC)	310 (ABS)
External dimension (mm)	160 x 120 x 90	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2720000000**	
PC, with screw fastener	**2720001000**	
PC, with transparent cover (PC) and quick-release fastener	**2721000000**	
PC, with transparent cover (PC) and screw fastener	**2721001000**	
ABS, with quick-release fastener	**3720000000**	
ABS, with screw fastener	**3720001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3721000000**	
ABS, with transparent cover (PC) and screw fastener	**3721001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512036000**	
Mounting rail TS 15	**–**	
Mounting rail TS 32	**9821025000**	
Mounting rail TS 35	**9822028000**	
Earthing rail (secured on central bosses C/D)	**9810040000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801079000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800025000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	18	10	7	3	3	0	0	0
Side C/D	9	5	2	2	1	0	0	0

** Enclosure preparation required

200 x 120 x 75 mm

CT-761 Polycarbonate enclosure
CT-762 ABS enclosure



* Smaller dimension at mounting plate support

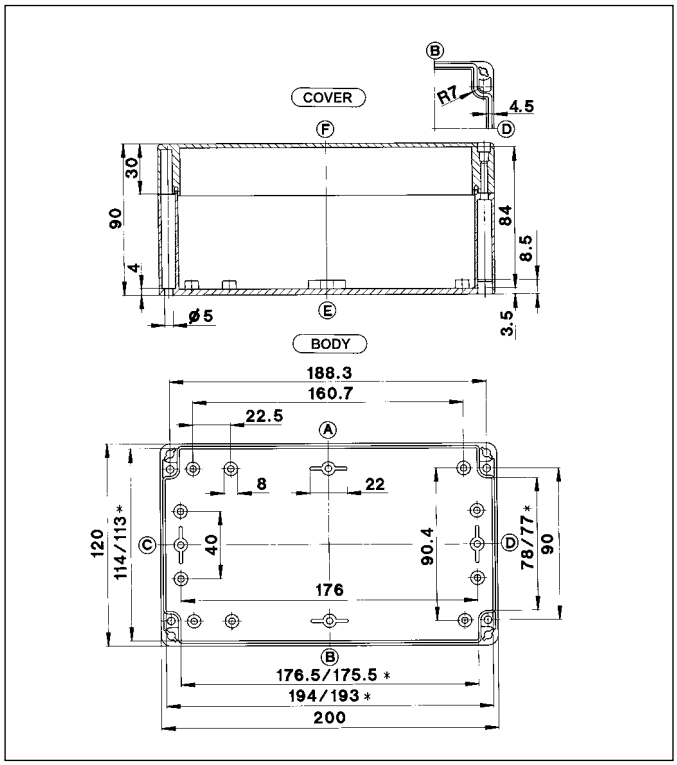
Type	CT-761 PC	CT-762 ABS
Weight (g)	400 (PC)	373 (ABS)
External dimension (mm)	200 x 120 x 75	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2760000000**	
PC, with screw fastener	**2760001000**	
PC, with transparent cover (PC) and quick-release fastener	**2761000000**	
PC, with transparent cover (PC) and screw fastener	**2761001000**	
ABS, with quick-release fastener	**3760000000**	
ABS, with screw fastener	**3760001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3761000000**	
ABS, with transparent cover (PC) and screw fastener	**3761001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512015000**	
Mounting rail TS 15	**–**	
Mounting rail TS 32	**9821004000**	
Mounting rail TS 35	**9822006000**	
Earthing rail (secured on central bosses C/D)	**9810006000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801076000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800040000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	26	12	8	5	3	0	0	0
Side C/D	10	5	2	2	1	0	0	0

** Enclosure preparation required

200 x 120 x 90 mm

CT-781 Polycarbonate enclosure
CT-782 ABS enclosure



* Smaller dimension at mounting plate support

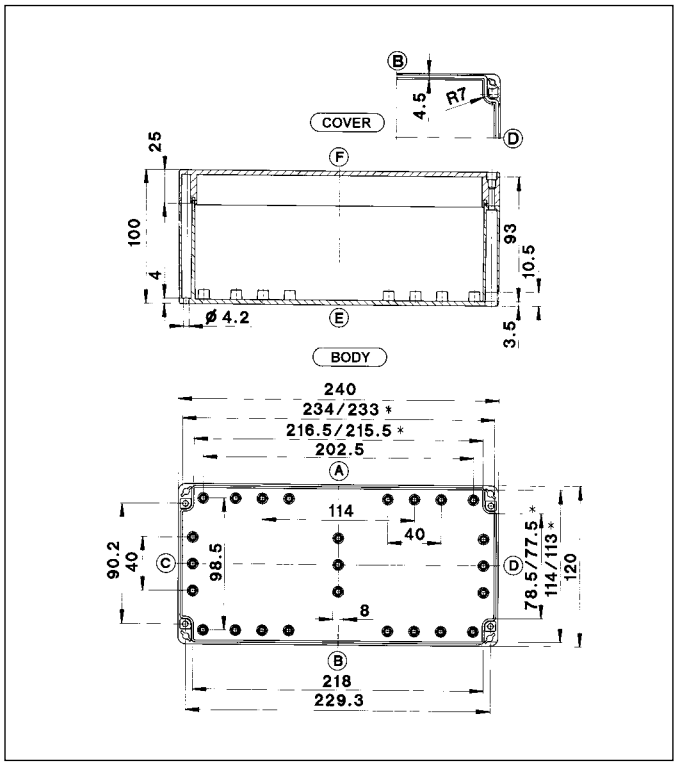
Type	CT-781 PC	CT-782 ABS
Weight (g)	420 (PC)	365 (ABS)
External dimension (mm)	200 x 120 x 90	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2780000000**	
PC, with screw fastener	**2780001000**	
PC, with transparent cover (PC) and quick-release fastener	**2781000000**	
PC, with transparent cover (PC) and screw fastener	**2781001000**	
ABS, with quick-release fastener	**3780000000**	
ABS, with screw fastener	**3780001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3781000000**	
ABS, with transparent cover (PC) and screw fastener	**3781001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512015000**	
Mounting rail TS 15	**–**	
Mounting rail TS 32	**9821004000**	
Mounting rail TS 35	**9822006000**	
Earthing rail (secured on central bosses C/D)	**9810006000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801079000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800040000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	26	12	8	5	3	0	0	0
Side C/D	10	5	2	2	1	0	0	0

** Enclosure preparation required

240 x 120 x 100 mm

CT-801 Polycarbonate enclosure
CT-802ABS enclosure



* Smaller dimension at mounting plate support

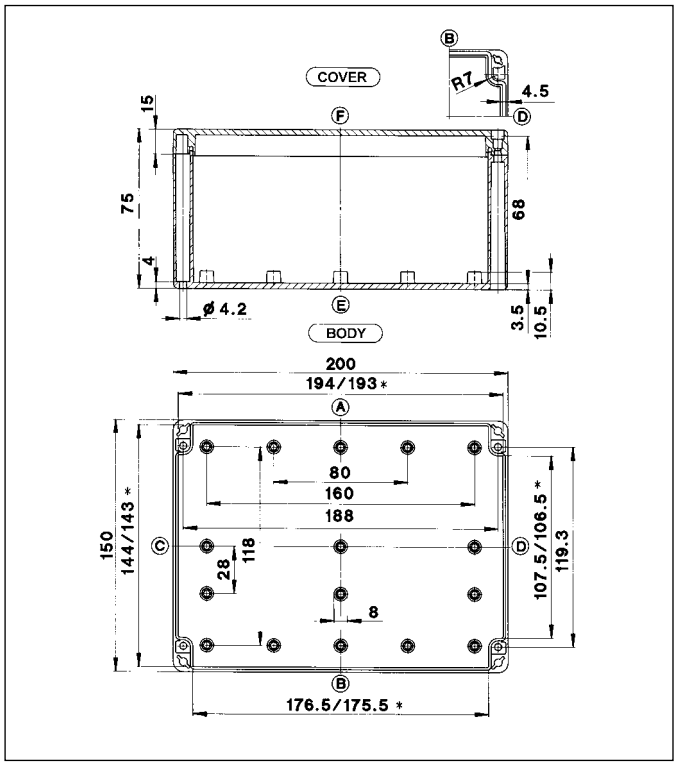
Type	CT-801 PC	CT-802 ABS
Weight (g)	540 (PC)	478 (ABS)
External dimension (mm)	240 x 120 x 100	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2800000000**	
PC, with screw fastener	**2800001000**	
PC, with transparent cover (PC) and quick-release fastener	**2801000000**	
PC, with transparent cover (PC) and screw fastener	**2801001000**	
ABS, with quick-release fastener	**3800000000**	
ABS, with screw fastener	**3800001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3801000000**	
ABS, with transparent cover (PC) and screw fastener	**3801001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512016000**	
Mounting rail TS 15	**–**	
Mounting rail TS 32	**9821006000**	
Mounting rail TS 35	**9822008000**	
Earthing rail (secured on central bosses C/D)	**9810009000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801078000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800025000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	34	17	12	6	5	3	3	2
Side C/D	10	6	3	2	1	1	0	0

** Enclosure preparation required

200 x 150 x 75 mm

CT-821 Polycarbonate enclosure
CT-822 ABS enclosure



* Smaller dimension at mounting plate support

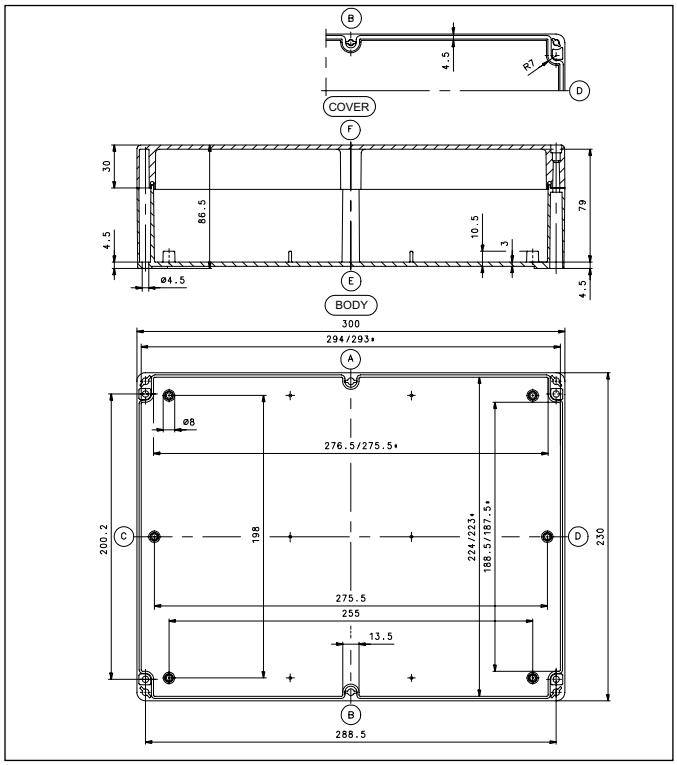
Type	CT-821 PC	CT-822 ABS
Weight (g)	475 (PC)	425 (ABS)
External dimension (mm)	200 x 150 x 75	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2820000000**	
PC, with screw fastener	**2820001000**	
PC, with transparent cover (PC) and quick-release fastener	**2821000000**	
PC, with transparent cover (PC) and screw fastener	**2821001000**	
ABS, with quick-release fastener	**3820000000**	
ABS, with screw fastener	**3820001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3821000000**	
ABS, with transparent cover (PC) and screw fastener	**3821001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512017000**	
Mounting rail TS 15	**–**	
Mounting rail TS 32	**9821017000**	
Mounting rail TS 35	**9822020000**	
Earthing rail (secured on central bosses C/D)	**9810006000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801076000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800025000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	22	12	9	5	3	0	0	0
Side C/D	12	6	3	2	2	0	0	0

** Enclosure preparation required

240 x 160 x 90 mm

CT-841 Polycarbonate enclosure
CT-842 ABS enclosure



* Smaller dimension at mounting plate support

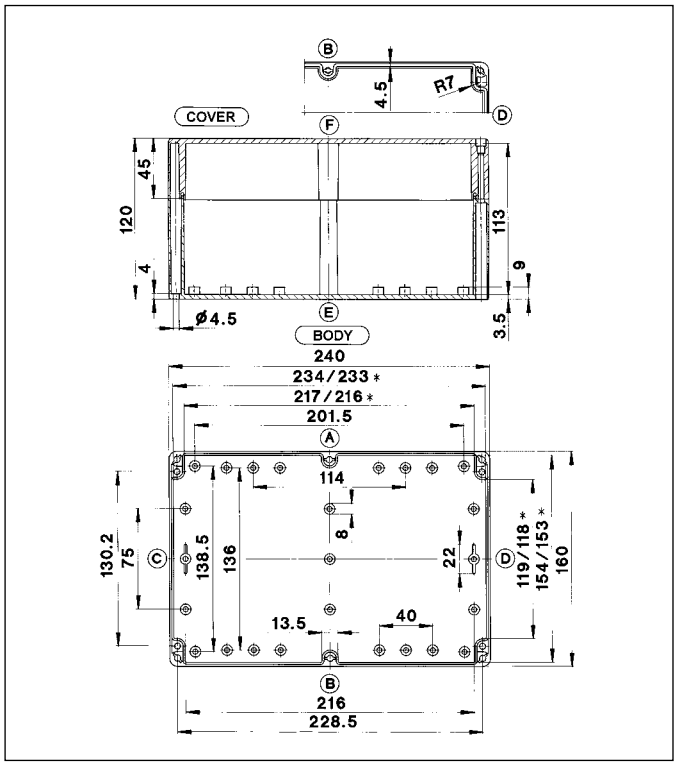
Type	CT-841 PC	CT-842 ABS
Weight (g)	650 (PC)	528 (ABS)
External dimension (mm)	240 x 160 x 90	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2840000000**	
PC, with screw fastener	**2840001000**	
PC, with transparent cover (PC) and quick-release fastener	**2841000000**	
PC, with transparent cover (PC) and screw fastener	**2841001000**	
ABS, with quick-release fastener	**3840000000**	
ABS, with screw fastener	**3840001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3841000000**	
ABS, with transparent cover (PC) and screw fastener	**3841001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512018000**	
Mounting rail TS 15	**–**	
Mounting rail TS 32	**9821006000**	
Mounting rail TS 35	**9822008000**	
Earthing rail (secured on central bosses C/D)	**9810009000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801076000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800040000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	36	16	12	8	4	2	2	2
Side C/D	17	8	5	3	2	2	1	0

** Enclosure preparation required

240 x 160 x 120 mm

CT-861 Polycarbonate enclosure
CT-862 ABS enclosure



* Smaller dimension at mounting plate support

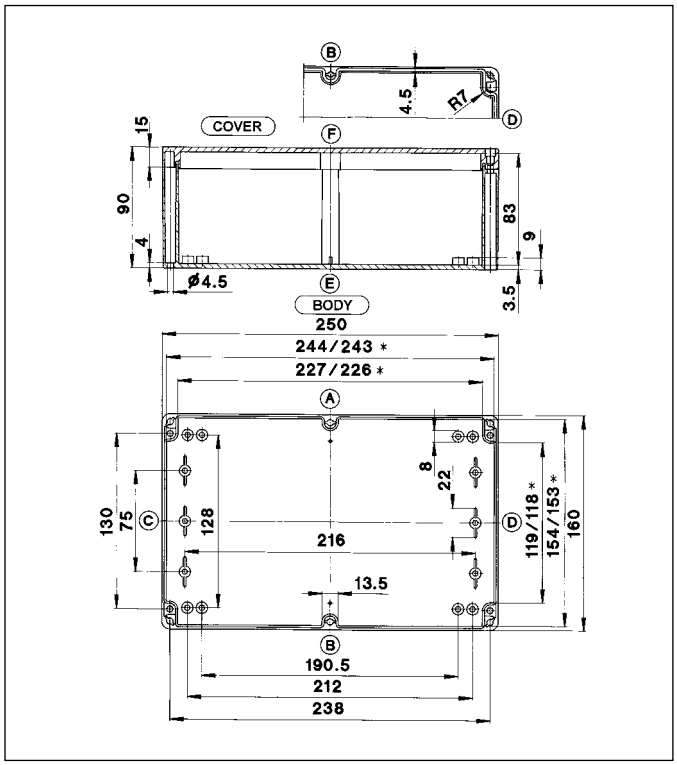
Type	CT-861 PC	CT-862 ABS
Weight (g)	785 (PC)	636 (ABS)
External dimension (mm)	240 x 160 x 120	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2860000000**	
PC, with screw fastener	**2860001000**	
PC, with transparent cover (PC) and quick-release fastener	**2861000000**	
PC, with transparent cover (PC) and screw fastener	**2861001000**	
ABS, with quick-release fastener	**3860000000**	
ABS, with screw fastener	**3860001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3861000000**	
ABS, with transparent cover (PC) and screw fastener	**3861001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512018000**	
Mounting rail TS 15	**–**	
Mounting rail TS 32	**9821006000**	
Mounting rail TS 35	**9822008000**	
Earthing rail (secured on central bosses C/D)	**9810009000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801080000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800040000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	36	16	12	8	4	2	2	2
Side C/D	17	8	5	3	2	2	1	0

** Enclosure preparation required

250 x 160 x 90 mm

CT-901 Polycarbonate enclosure
CT-902 ABS enclosure



* Smaller dimension at mounting plate support

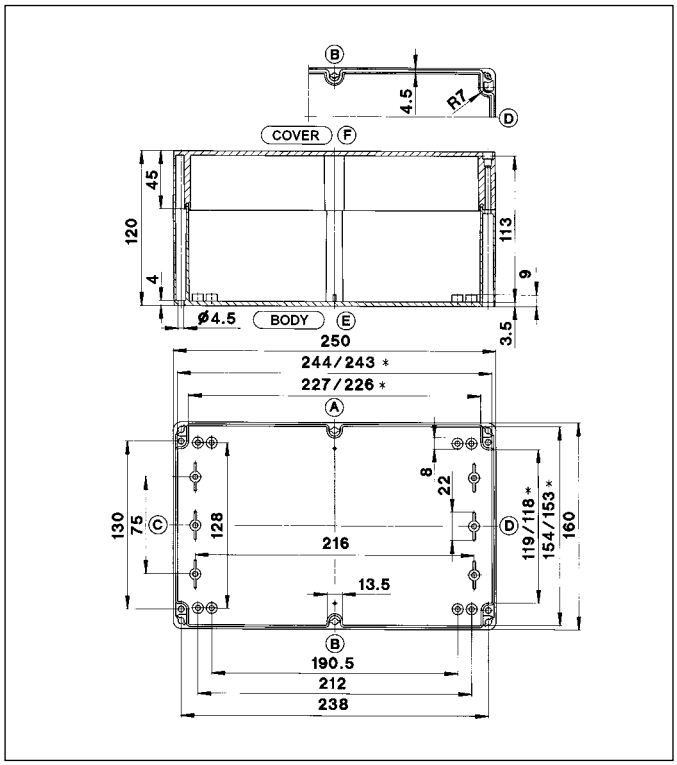
Type	CT-901 PC	CT-902 ABS
Weight (g)	680 (PC)	550 (ABS)
External dimension (mm)	250 x 160 x 90	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2900000000**	
PC, with screw fastener	**2900001000**	
PC, with transparent cover (PC) and quick-release fastener	**2901000000**	
PC, with transparent cover (PC) and screw fastener	**2901001000**	
ABS, with quick-release fastener	**3900000000**	
ABS, with screw fastener	**3900001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3901000000**	
ABS, with transparent cover (PC) and screw fastener	**3901001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512187000**	
Mounting rail TS 15	**–**	
Mounting rail TS 32	**9821006000**	
Mounting rail TS 35	**9822008000**	
Earthing rail (secured on central bosses C/D)	**9810009000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801076000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800040000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	38	16	12	8	4	2	2	2
Side C/D	17	8	5	3	2	2	1	0

** Enclosure preparation required

250 x 160 x 120 mm

CT-911 Polycarbonate enclosure
CT-912 ABS enclosure



* Smaller dimension at mounting plate support

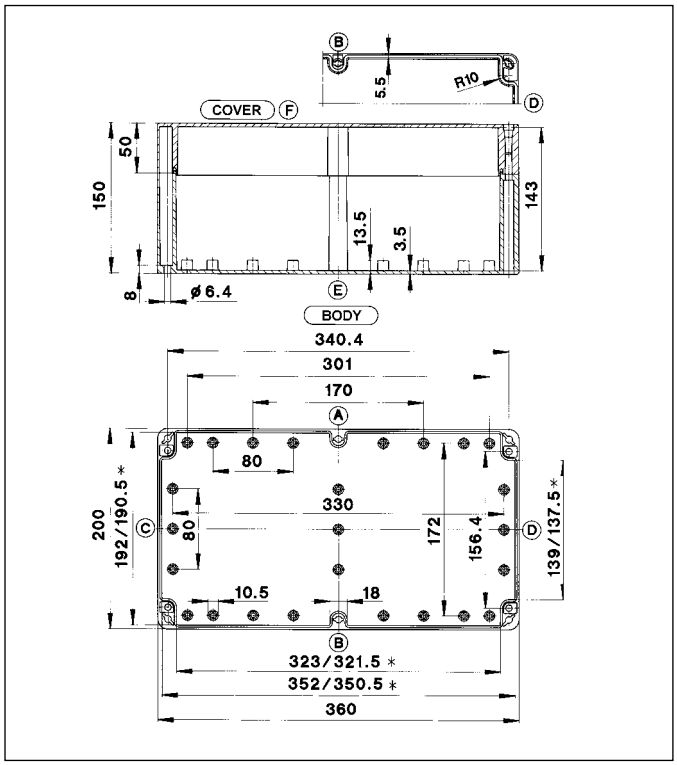
Type	CT-911 PC	CT-912 ABS
Weight (g)	830 (PC)	660 (ABS)
External dimension (mm)	250 x 160 x 120	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2910000000**	
PC, with screw fastener	**2910001000**	
PC, with transparent cover (PC) and quick-release fastener	**2911000000**	
PC, with transparent cover (PC) and screw fastener	**2911001000**	
ABS, with quick-release fastener	**3910000000**	
ABS, with screw fastener	**3910001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3911000000**	
ABS, with transparent cover (PC) and screw fastener	**3911001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512187000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821006000**	
Mounting rail TS 35	**9822008000**	
Earthing rail (secured on central bosses C/D)	**9810009000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801080000**	
Silicone seal for extended temperature range (by the metre)	**9231005000**	
Mounting bushes with 4 screws M3 x 8	**9800040000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	38	16	12	8	4	2	2	2
Side C/D	17	8	5	3	2	2	1	0

** Enclosure preparation required

360 x 200 x 150 mm

CT-881 Polycarbonate enclosure
CT-882 ABS enclosure



* Smaller dimension at mounting plate support

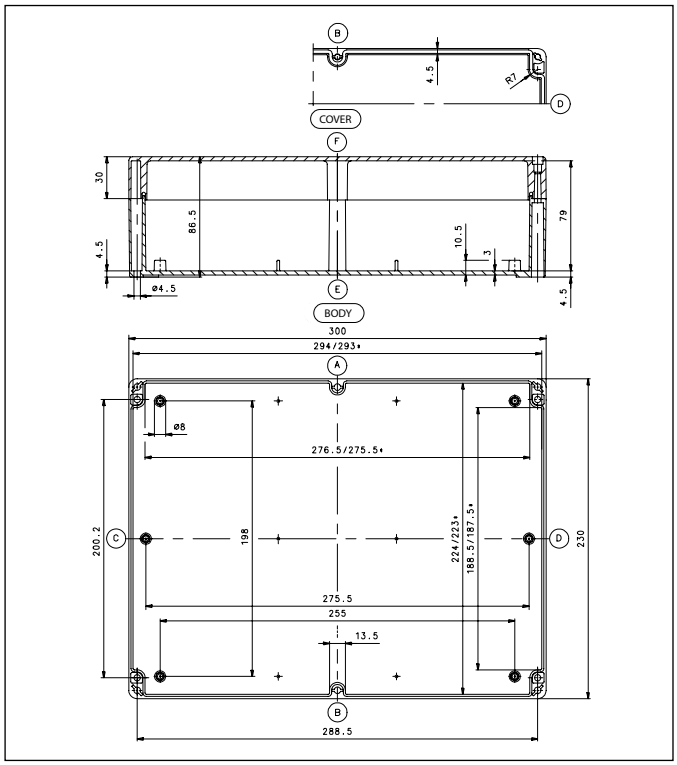
Type	CT-881 PC	CT-882 ABS
Weight (g)	1550 (PC)	1375 (ABS)
External dimension (mm)	360 x 200 x 150	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2880000000**	
PC, with screw fastener	**2880001000**	
PC, with transparent cover (PC) and quick-release fastener	**2881000000**	
PC, with transparent cover (PC) and screw fastener	**2881001000**	
ABS, with quick-release fastener	**3880000000**	
ABS, with screw fastener	**3880001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3881000000**	
ABS, with transparent cover (PC) and screw fastener	**3881001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512020000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821013000**	
Mounting rail TS 35	**9822016000**	
Earthing rail (secured on central bosses C/D)	**9810034000**	
External mounting brackets	–	
External articulated hinges**	**9802026000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	–	
Silicone seal for extended temperature range (by the metre)	**9231006000**	
Mounting bushes with 4 screws M3 x 8	**9800026000** (M4 x 8)	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	70	32	24	16	10	6	4	4
Side C/D	26	11	8	5	3	2	2	1

** Enclosure preparation required

300 x 230 x 86 mm

CT-871 Polycarbonate enclosure
CT-872 ABS enclosure



* Smaller dimension at mounting plate support

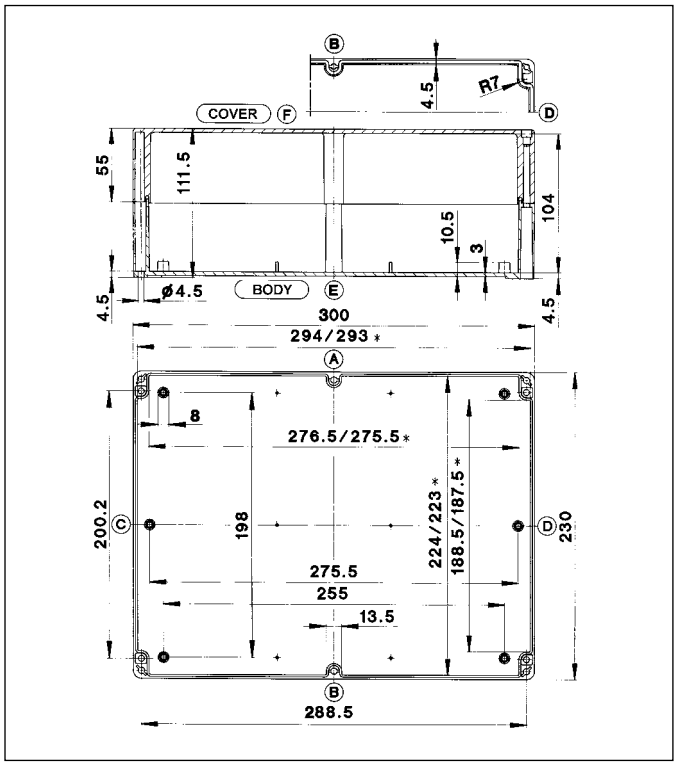
Type	CT-871 PC	CT-872 ABS
Weight (g)	915 (PC)	850 (ABS)
External dimension (mm)	300 x 230 x 86	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2870000000**	
PC, with screw fastener	**2870001000**	
PC, with transparent cover (PC) and quick-release fastener	**2871000000**	
PC, with transparent cover (PC) and screw fastener	**2871001000**	
ABS, with quick-release fastener	**3870000000**	
ABS, with screw fastener	**3870001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3871000000**	
ABS, with transparent cover (PC) and screw fastener	**3871001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512019000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821010000**	
Mounting rail TS 35	**9822013000**	
Earthing rail (secured on central bosses C/D)	**9810012000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801079000**	
Silicone seal for extended temperature range (by the metre)	–	
Mounting bushes with 4 screws M3 x 8	**9800025000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	34	14	10	6	4	0	0	0
Side C/D	21	13	5	4	2	0	0	0

** Enclosure preparation required

300 x 230 x 110 mm

CT-891 Polycarbonate enclosure
CT-892 ABS enclosure



* Smaller dimension at mounting plate support

Type	CT-891 PC	CT-892 ABS
Weight (g)	1155 (PC)	1000 (ABS)
External dimension (mm)	300 x 230 x 110	
Ordering data Enclosure (painted) with seal (CR)	**Part number**	
PC, with quick-release fastener	**2890000000**	
PC, with screw fastener	**2890001000**	
PC, with transparent cover (PC) and quick-release fastener	**2891000000**	
PC, with transparent cover (PC) and screw fastener	**2891001000**	
ABS, with quick-release fastener	**3890000000**	
ABS, with screw fastener	**3890001000**	
ABS, with transparent cover (PC) and quick-release fastener	**3891000000**	
ABS, with transparent cover (PC) and screw fastener	**3891001000**	
Accessories (individual part or installation kit)		
Mounting plate	**9512019000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821010000**	
Mounting rail TS 35	**9822013000**	
Earthing rail (secured on central bosses C/D)	**9810012000**	
External mounting brackets	**9802002000**	
External articulated hinges**	**9802025000**	
Internal articulated hinges, flexible, for enclosure with quick-release fastener	**9801082000**	
Silicone seal for extended temperature range (by the metre)	–	
Mounting bushes with 4 screws M3 x 8	**9800025000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	34	14	10	6	4	0	0	0
Side C/D	21	13	5	4	2	0	0	0

** Enclosure preparation required

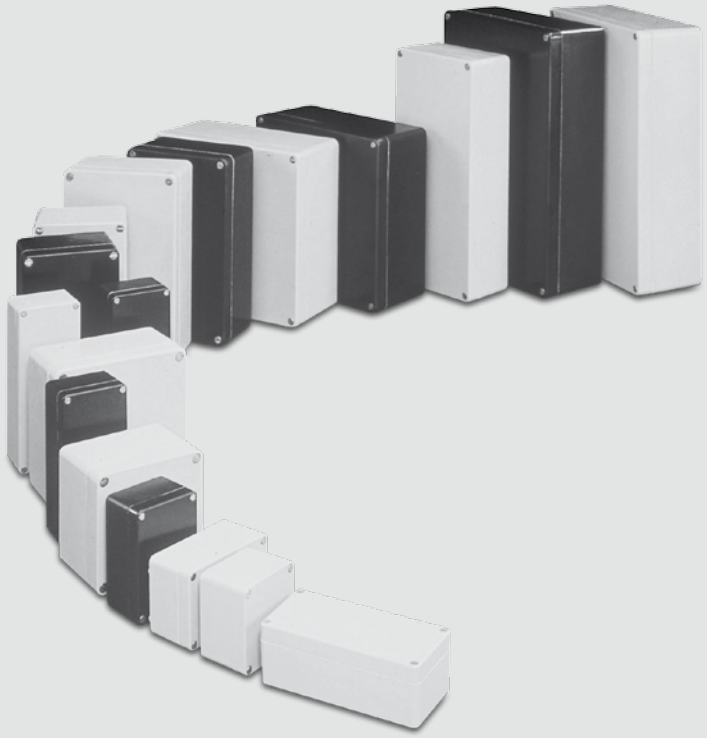
Notes

Polyester Enclosures – Series CP

BERNSTEIN Series CP and CPS polyester enclosures are produced from highgrade glass fibre-reinforced polyester. Thanks to their reduced surface resistance (Ro < 109 Ohm), the black polyester enclosures meet the requirements for Ex applications. Polyester enclosures are therefore particularly suitable for accepting and encapsulating electrical and electronic components as well as control components in harsh environments or potentially explosive atmospheres (see Page 14). All enclosures achieve protection class IP66 in accordance with IEC529 (optionally IP67).

Corresponding to their size, BERNSTEIN polyester enclosures feature M4 or M6 mounting elements in the enclosure body. These galvanised steel bushes are embedded in a flange on the narrow sides of the base and accept mounting plates, mounting rails, pc boards etc.

The captive stainless steel cover screws are retained by a self-latching element integrated in the cover. The threaded bushes for mounting the cover are also made from stainless steel. The protection class (on the standard enclosure) is ensured by a factory-fitted seal. The polyester enclosures are available as standard in grey (RAL 7000, squirrel grey) or black (RAL 9005, jet black) material.



Technical data

Material

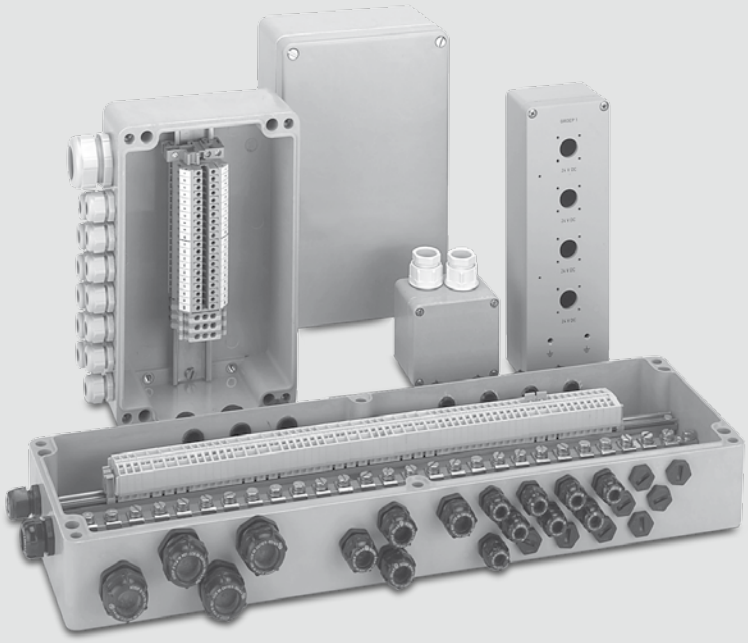
Glass fibre-reinforced polyester
in grey or black

Seal

Neoprene (CR) round cord (siliconized)

alternatively:

Neoprene (CR) round cord (silicone-free)
Silicone round cord, EPDM round cord



Cover screws

Stainless steel, captive, cross recessed head

alternatively:

Socket head cap screws, stainless steel, captive

Colour

RAL 7000 (squirrel grey)

bzw. RAL 9005 (jet black)

Alternatively for large quantities:
Other colours (coating or dyeing) available on request

Temperature range of CP enclosures

-100°C to +165°C

Temperature range of seals

-30°C to +80°C (Neoprene seal)

alternatively:

-60°C to +130°C (silicone seal) or
-35°C to +100°C (EPDM seal)

Protection class

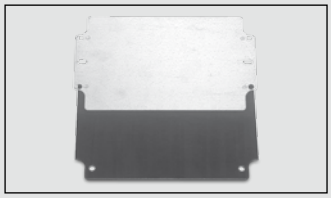
IP66

IP67 on request

Approbations

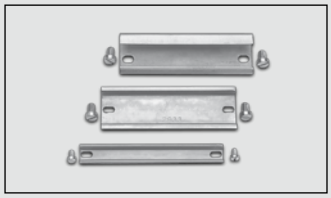
Germanischer Lloyd

UL



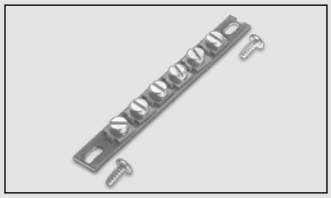
Mounting plates

made from galvanised steel plate or laminated paper (thickness: CP-140 to CP 195 laminated paper 1.5 mm; CP-220 to CP-320 and CP-370 to CP-460 steel plate 1.5 mm; CP-330 steel plate 2.5 mm) for versatile mounting of built-in components.



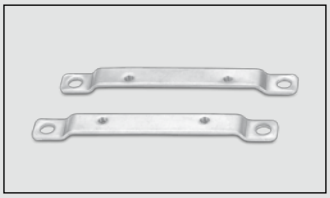
Mounting rails

conforming to Standards TS 15 or TS 32 and TS 35 made from steel; surface treated for accepting terminal blocks.



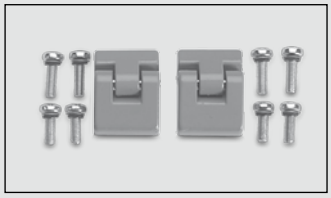
Earthing bars

made from galvanised steel for combining and connecting PE conductors.



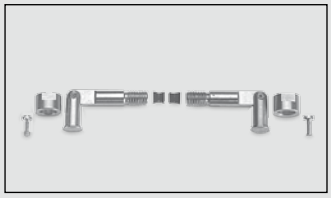
External mounting brackets

made from metal for mounting enclosures without opening the covers. The brackets are always arranged parallel to the narrow side of the enclosures.



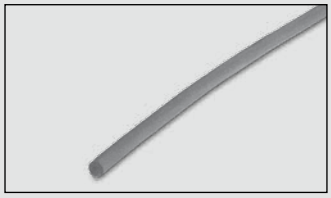
External articulated hinges

for hinged mounting of enclosure cover. Opening range of cover approx. 155°. Cast aluminium, painted in RAL 7001 or RAL 9005. Machining is required for mounting on enclosures. Supplied with drilling template.



Internal articulated hinges

for hinged mounting of enclosure cover. Opening range of cover approx. 95°. Stainless steel. Machining is required for mounting on enclosures.



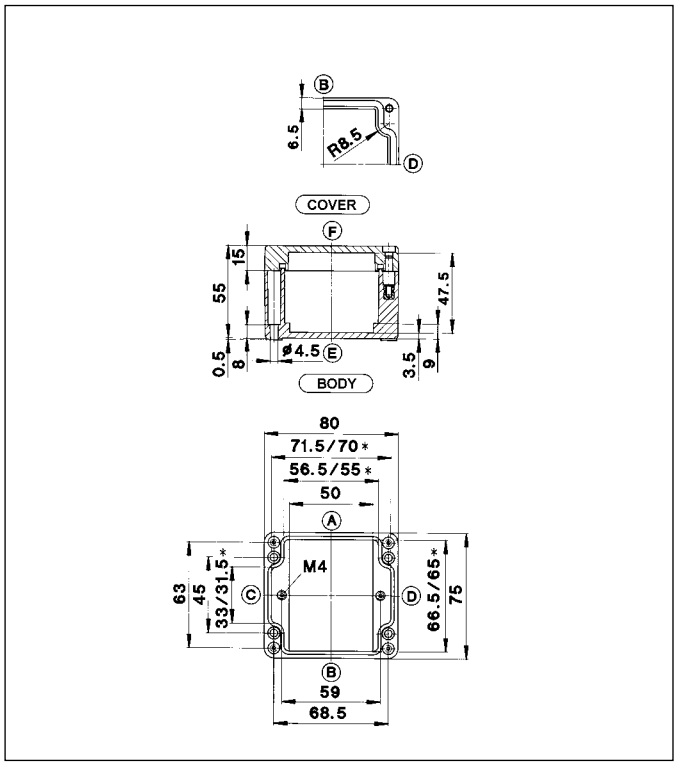
Silicone cover seal

with increased temperature resistance for subsequent fitting or for replacing standard cover seal. Expanded silicone by the metre.

					Polyester enclosure (grey		Polyester enclosure (black)	
Dimensions/mm					Article number	Type	Article number	Type
L	x	B	x	H				
80	x	75	x	55	**4140000000**	CP-140	**5140000000**	CPS-140
80	x	75	x	75	**4140000050**	CP-145	**5140000050**	CPS-145
110	x	75	x	55	**4150000000**	CP-150	**5150000000**	CPS-150
110	x	75	x	75	**4150000050**	CP-155	**5150000050**	CPS-155
160	x	75	x	55	**4170000000**	CP-170	**5170000000**	CPS-170
160	x	75	x	75	**4170000050**	CP-175	**5170000050**	CPS-175
190	x	75	x	55	**4190000000**	CP-190	**5190000000**	CPS-190
190	x	75	x	75	**4190000050**	CP-195	**5190000050**	CPS-195
122	x	120	x	90	**4220000000**	CP-220	**5220000000**	CPS-220
220	x	120	x	90	**4240000000**	CP-240	**5240000000**	CPS-240
160	x	160	x	90	**4280000000**	CP-280	**5280000000**	CPS-280
260	x	160	x	90	**4300000000**	CP-300	**5300000000**	CPS-300
360	x	160	x	90	**4320000000**	CP-320	**5320000000**	CPS-320
560	x	160	x	90	**4330000000**	CP-330	**5330000000**	CPS-330
255	x	250	x	120	**4370000000**	CP-370	**5370000000**	CPS-370
400	x	250	x	120	**4400000000**	CP-400	**5400000000**	CPS-400
400	x	405	x	120	**4450000000**	CP-450	**5450000000**	CPS-450
400	x	405	x	165	**4460000000**	CP-460	**5460000000**	CPS-460

80 x 75 x 55 mm

CP-140 RAL 7000 (squirrel grey)
CPS-140 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

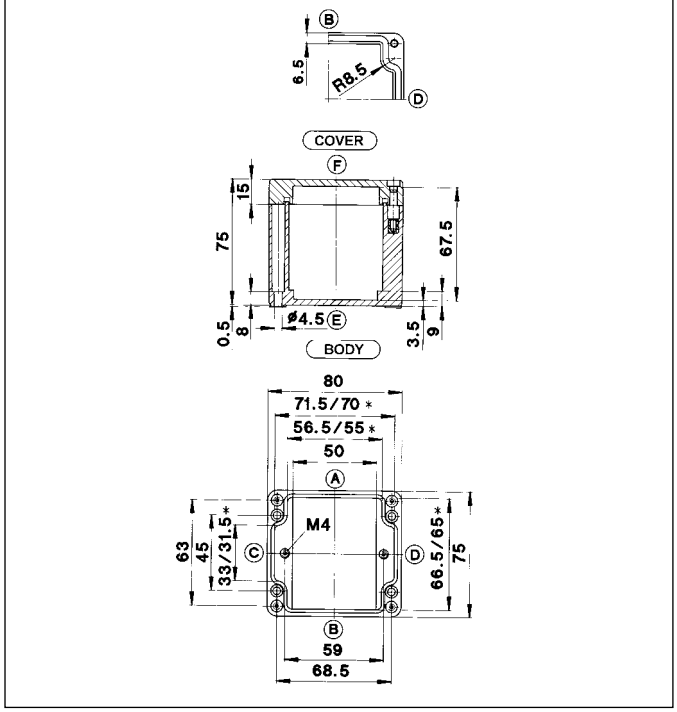
Type	CP-140	CPS-140
Weight (g)	230	230
External dimension (mm)	80 x 75 x 55	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4140000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4140001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4140014000**	
RAL 9005 (jet black), with cover screws	**5140000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5140001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5140017000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823000000**	
Mounting rail TS 15	**9820003000**	
Mounting rail TS 32	–	
Mounting rail TS 35	–	
Earthing rail	–	
External mounting brackets	**9824000000**	
External articulated hinges for CP** enclosures	–	
External articulated hinges for CPS** enclosures	–	
Internal articulated hinges with cover guide**	–	
Silicone seal for extended temperature range (by the metre)	**9231006000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	5	2	2	1	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

** Enclosure preparation required

80 x 75 x 75 mm

CP-145 RAL 7000 (squirrel grey)
CPS-145 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

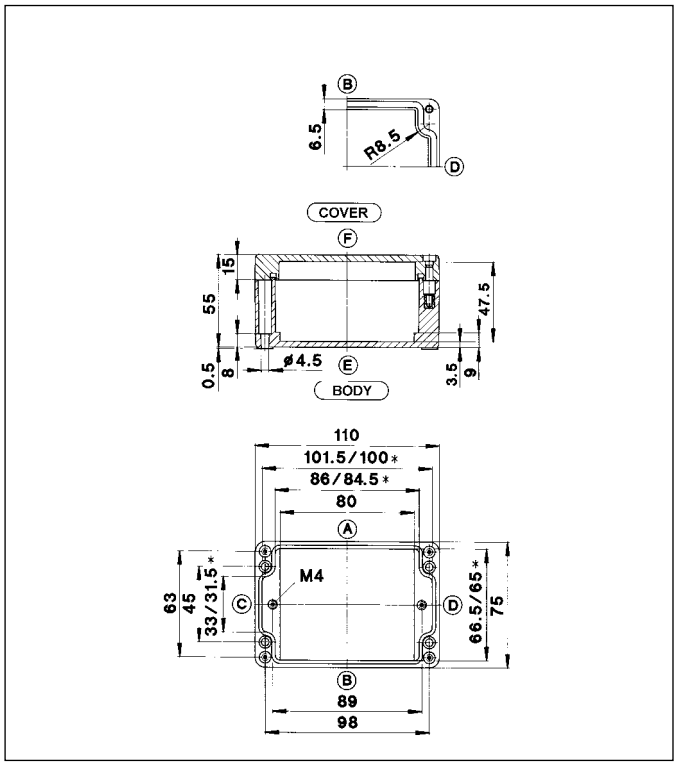
Type	CP-145	CPS-145
Weight (g)	300	300
External dimension (mm)	80 x 75 x 75	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4140000050**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4140001050**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4140010050**	
RAL 9005 (jet black), with cover screws	**5140000050**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5140001050**	
RAL 9005 (jet black), with silicone seal and cover screws	**5140010050**	
Accessories (individual part or installation kit)		
Mounting plate	**9823000000**	
Mounting rail TS 15	**9820003000**	
Mounting rail TS 32	–	
Mounting rail TS 35	–	
Earthing rail	–	
External mounting brackets	**9824000000**	
External articulated hinges for CP** enclosures	–	
External articulated hinges for CPS** enclosures	–	
Internal articulated hinges with cover guide**	–	
Silicone seal for extended temperature range (by the metre)	**9231006000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	8	4	2	1	1	0	0	0
Side C/D	4	1	1	1	1	0	0	0

** Enclosure preparation required

110 x 75 x 55 mm

CP-150 RAL 7000 (squirrel grey)
CPS-150 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

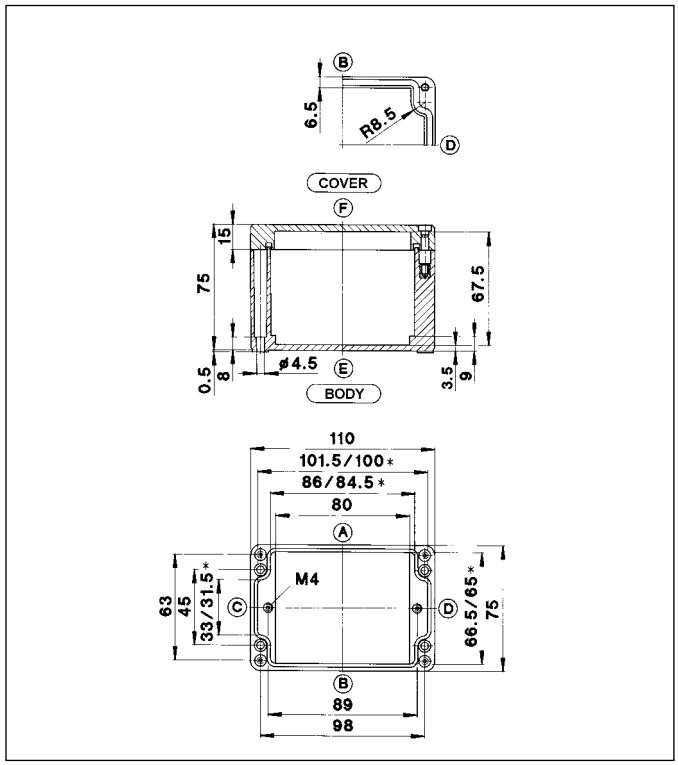
Type	**CP-150**	**CPS-150**
Weight (g)	295	295
External dimension (mm)	110 x 75 x 55	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4150000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4150001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4150025000**	
RAL 9005 (jet black), with cover screws	**5150000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5150001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5150031000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823001000**	
Mounting rail TS 15	**9820006000**	
Mounting rail TS 32	–	
Mounting rail TS 35	–	
Earthing rail	–	
External mounting brackets	**9824000000**	
External articulated hinges for CP** enclosures	–	
External articulated hinges for CPS** enclosures	–	
Internal articulated hinges with cover guide**	–	
Silicone seal for extended temperature range (by the metre)	**9231006000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	8	3	2	2	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

** Enclosure preparation required

110 x 75 x 75 mm

CP-155 RAL 7000 (squirrel grey)
CPS-155 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

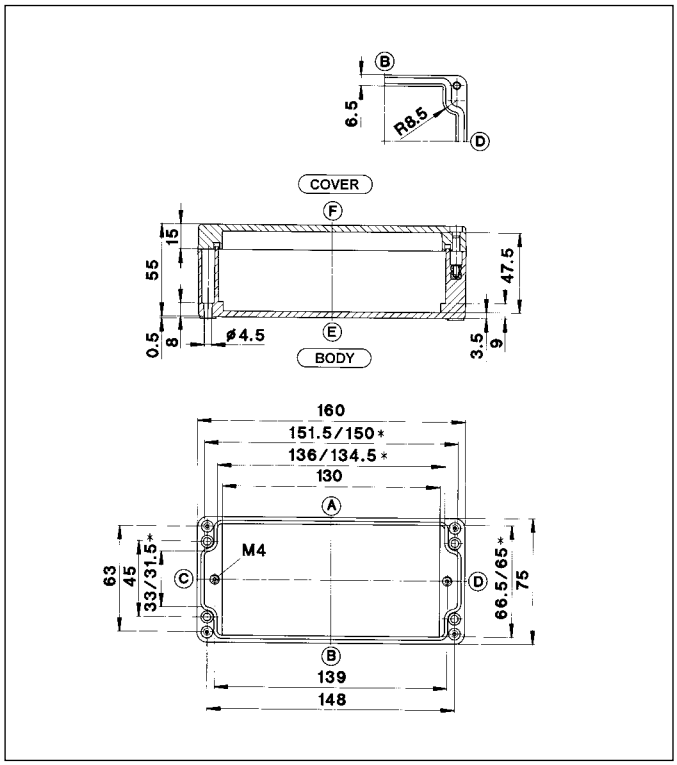
Type	**CP-155**	**CPS-155**
Weight (g)	360	360
External dimension (mm)	110 x 75 x 75	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4150000050**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4150001050**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4150010050**	
RAL 9005 (jet black), with cover screws	**5150000050**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5150001050**	
RAL 9005 (jet black), with silicone seal and cover screws	**5150010050**	
Accessories (individual part or installation kit)		
Mounting plate	**9823001000**	
Mounting rail TS 15	**9820006000**	
Mounting rail TS 32	–	
Mounting rail TS 35	–	
Earthing rail	–	
External mounting brackets	**9824000000**	
External articulated hinges for CP** enclosures	–	
External articulated hinges for CPS** enclosures	–	
Internal articulated hinges with cover guide**	–	
Silicone seal for extended temperature range (by the metre)	**9231006000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	12	6	3	2	2	0	0	0
Side C/D	4	1	1	1	1	0	0	0

** Enclosure preparation required

160 x 75 x 55 mm

CP-170 RAL 7000 (squirrel grey)
CPS-170 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

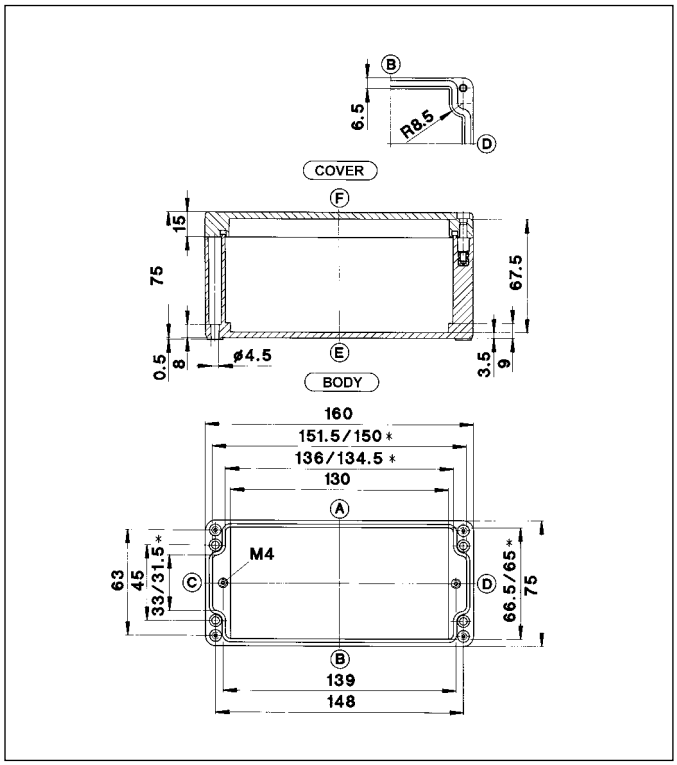
Type	CP-170	CPS-170
Weight (g)	405	405
External dimension (mm)	160 x 75 x 55	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4170000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4170001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4170016000**	
RAL 9005 (jet black), with cover screws	**5170000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5170001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5170010000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823002000**	
Mounting rail TS 15	**9820012000**	
Mounting rail TS 32	–	
Mounting rail TS 35	–	
Earthing rail	–	
External mounting brackets	**9824000000**	
External articulated hinges for CP** enclosures	–	
External articulated hinges for CPS** enclosures	–	
Internal articulated hinges with cover guide**	–	
Silicone seal for extended temperature range (by the metre)	**9231006000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	12	5	4	3	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

** Enclosure preparation required

160 x 75 x 75 mm

CP-175 RAL 7000 (squirrel grey)
CPS-175 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

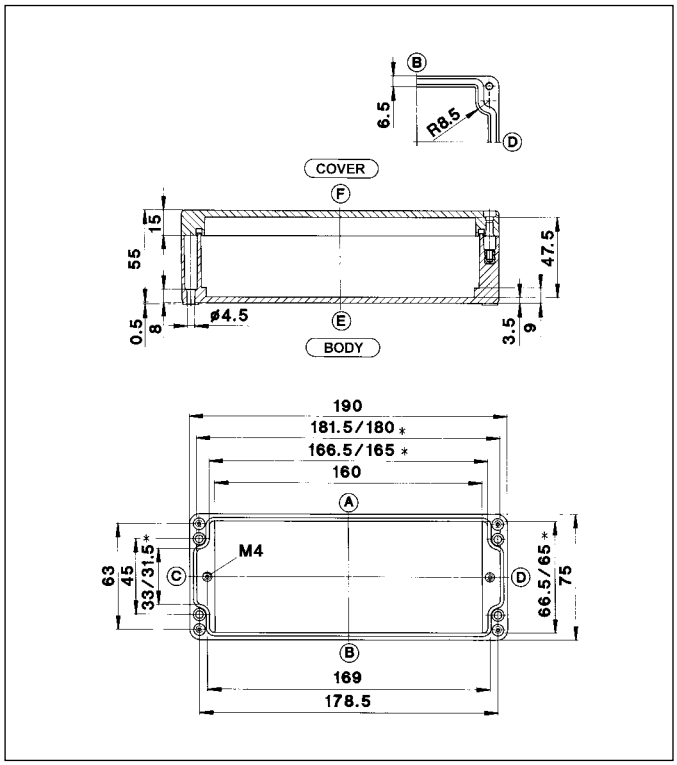
Type	CP-175	CPS-175
Weight (g)	460	460
External dimension (mm)	160 x 75 x 75	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4170000050**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4170001050**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4170010050**	
RAL 9005 (jet black), with cover screws	**5170000050**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5170001050**	
RAL 9005 (jet black), with silicone seal and cover screws	**5170010050**	
Accessories (individual part or installation kit)		
Mounting plate	**9823002000**	
Mounting rail TS 15	**9820012000**	
Mounting rail TS 32	–	
Mounting rail TS 35	–	
Earthing rail	–	
External mounting brackets	**9824000000**	
External articulated hinges for CP** enclosures	–	
External articulated hinges for CPS** enclosures	–	
Internal articulated hinges with cover guide**	–	
Silicone seal for extended temperature range (by the metre)	**9231006000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	18	10	6	4	3	0	0	0
Side C/D	4	1	1	1	1	0	0	0

** Enclosure preparation required

190 x 75 x 55 mm

CP-190 RAL 7000 (squirrel grey)
CPS-190 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

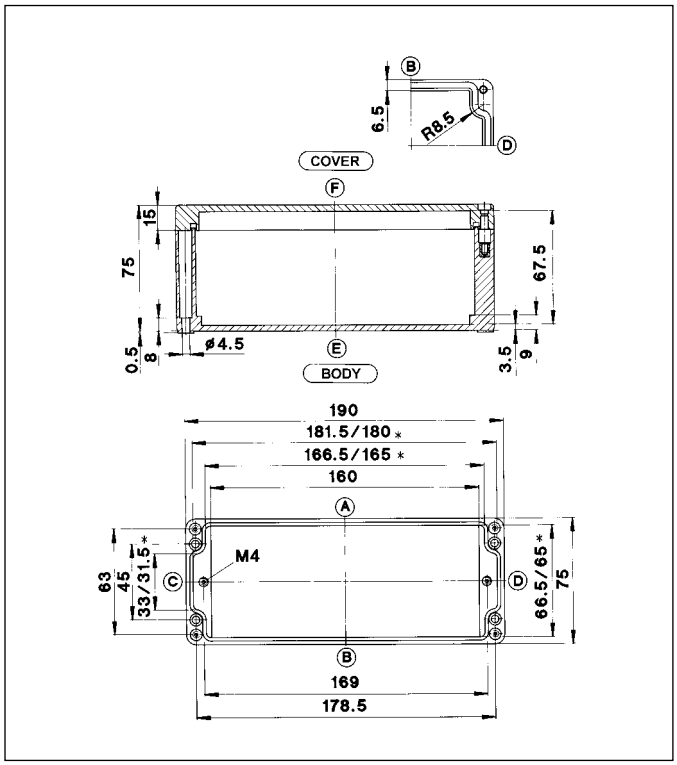
Type	**CP-190**	**CPS-190**
Weight (g)	450	450
External dimension (mm)	190 x 75 x 55	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4190000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4190001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4190015000**	
RAL 9005 (jet black), with cover screws	**5190000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5190001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5190010000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823003000**	
Mounting rail TS 15	**9820015000**	
Mounting rail TS 32	–	
Mounting rail TS 35	–	
Earthing rail	–	
External mounting brackets	**9824000000**	
External articulated hinges for CP** enclosures	–	
External articulated hinges for CPS** enclosures	–	
Internal articulated hinges with cover guide**	–	
Silicone seal for extended temperature range (by the metre)	**9231006000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	16	7	5	4	0	0	0	0
Side C/D	2	1	1	0	0	0	0	0

** Enclosure preparation required

190 x 75 x 75 mm

CP-195 RAL 7000 (squirrel grey)
CPS-195 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

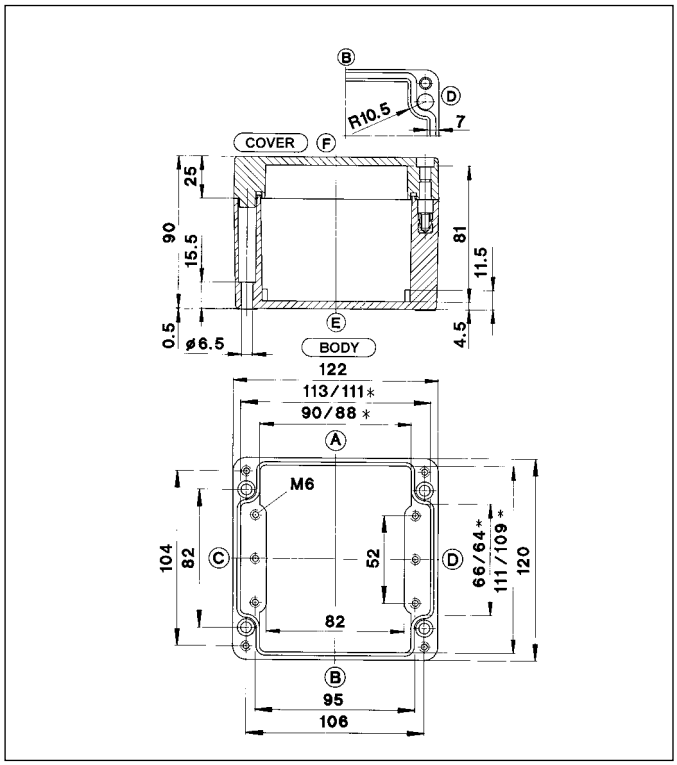
Type	**CP-195**	**CPS-195**
Weight (g)	530	530
External dimension (mm)	190 x 75 x 75	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4190000050**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4190001050**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4190010050**	
RAL 9005 (jet black), with cover screws	**5190000050**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5190001050**	
RAL 9005 (jet black), with silicone seal and cover screws	**5190010050**	
Accessories (individual part or installation kit)		
Mounting plate	**9823003000**	
Mounting rail TS 15	**9820015000**	
Mounting rail TS 32	–	
Mounting rail TS 35	–	
Earthing rail	–	
External mounting brackets	**9824000000**	
External articulated hinges for CP** enclosures	–	
External articulated hinges for CPS** enclosures	–	
Internal articulated hinges with cover guide**	–	
Silicone seal for extended temperature range (by the metre)	**9231006000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	24	12	8	4	3	0	0	0
Side C/D	14	1	1	1	1	0	0	0

** Enclosure preparation required

122 x 120 x 90 mm

CP-220 RAL 7000 (squirrel grey)
CPS-220 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

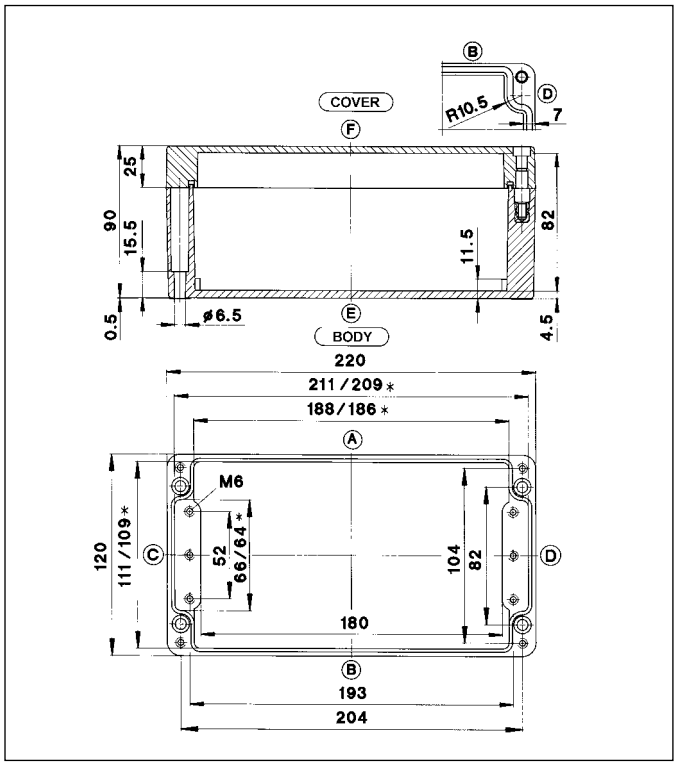
Type	CP-220	CPS-220
Weight (g)	750	750
External dimension (mm)	122 x 120 x 90	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4220000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4220001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4220018000**	
RAL 9005 (jet black), with cover screws	**5220000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5220001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5220040000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823004000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821000000**	
Mounting rail TS 35	**9822001000**	
Earthing rail	**9810002000**	
External mounting brackets	**9824001000**	
External articulated hinges for CP** enclosures	**9801045000**	
External articulated hinges for CPS** enclosures	**9801046000**	
Internal articulated hinges with cover guide**	–	
Silicone seal for extended temperature range (by the metre)	**9231006000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	13	6	4	3	2	1	0	0
Side C/D	6	3	2	2	1	0	0	0

** Enclosure preparation required

220 x 120 x 90 mm

CP-240 RAL 7000 (squirrel grey)
CPS-240 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

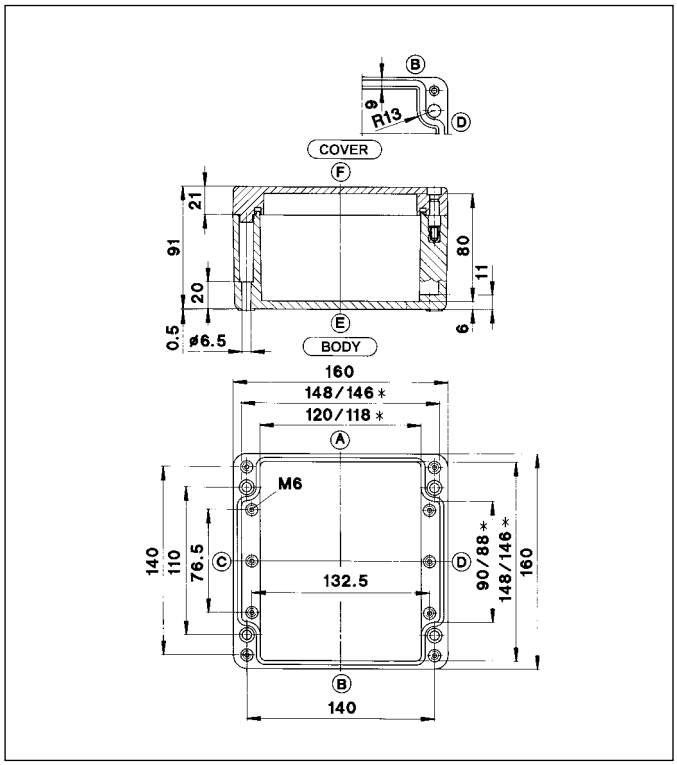
Type	CP-240	CPS-240
Weight (g)	1060	1060
External dimension (mm)	220 x 120 x 90	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4240000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4240001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4240047000**	
RAL 9005 (jet black), with cover screws	**5240000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5240001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5240040000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823005000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821005000**	
Mounting rail TS 35	**9822007000**	
Earthing rail	**9810008000**	
External mounting brackets	**9824001000**	
External articulated hinges for CP** enclosures	**9801045000**	
External articulated hinges for CPS** enclosures	**9801046000**	
Internal articulated hinges with cover guide**	–	
Silicone seal for extended temperature range (by the metre)	**9231006000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	27	12	9	6	4	3	0	0
Side C/D	6	3	2	2	1	0	0	0

** Enclosure preparation required

160 x 160 x 91 mm

CP-280 RAL 7000 (squirrel grey)
CPS-280 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

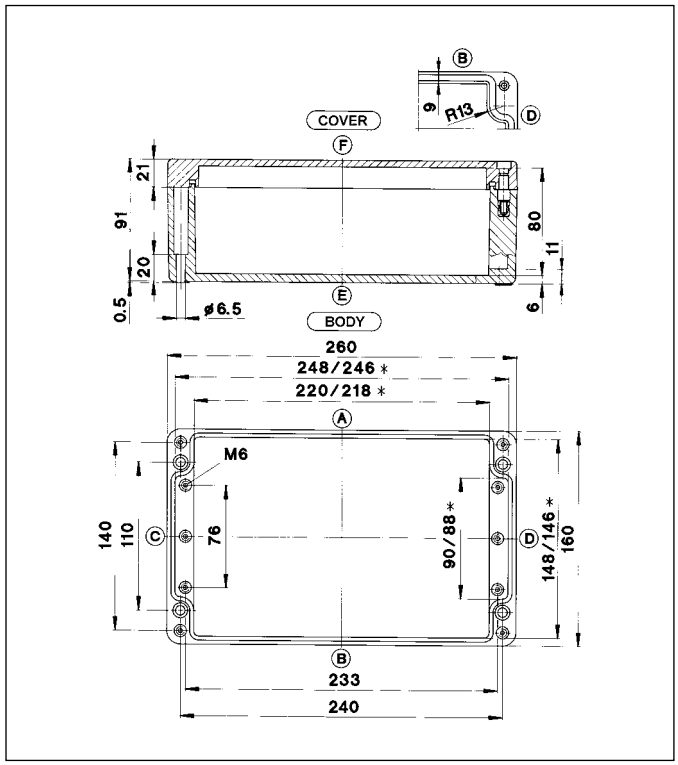
Type	**CP-280**	**CPS-280**
Weight (g)	1130	1130
External dimension (mm)	160 x 160 x 91	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4280000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4280001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4280020000**	
RAL 9005 (jet black), with cover screws	**5280000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5280001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5280010000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823006000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821002000**	
Mounting rail TS 35	**9822003000**	
Earthing rail	**9810004000**	
External mounting brackets	**9824004000**	
External articulated hinges for CP** enclosures	**9801045000**	
External articulated hinges for CPS** enclosures	**9801046000**	
Internal articulated hinges with cover guide**	**9801032000**	
Silicone seal for extended temperature range (by the metre)	**9231009000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	18	8	6	4	2	2	1	0
Side C/D	9	4	3	2	2	1	0	0

** Enclosure preparation required

260 x 160 x 91 mm

CP-300 RAL 7000 (squirrel grey)
CPS-300 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

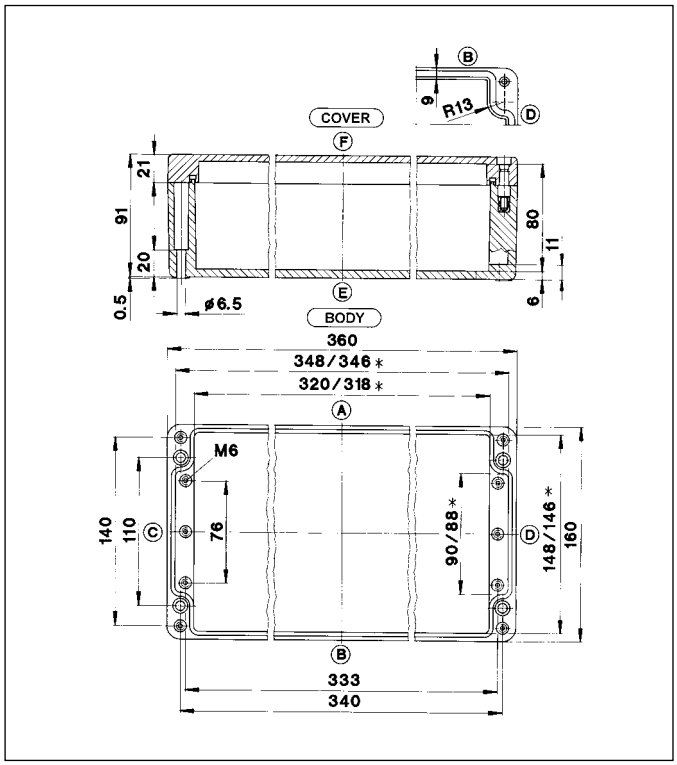
Type	**CP-300**	**CPS-300**
Weight (g)	1710	1710
External dimension (mm)	260 x 160 x 91	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4300000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4300001000**	
RAL 7000 (squirrel grey),with silicone seal and cover screws	**4300014000**	
RAL 9005 (jet black), with cover screws	**5300000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5300001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5300034000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823007000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821008000**	
Mounting rail TS 35	**9822011000**	
Earthing rail	**9810010000**	
External mounting brackets	**9824004000**	
External articulated hinges for CP** enclosures	**9801045000**	
External articulated hinges for CPS** enclosures	**9801046000**	
Internal articulated hinges with cover guide**	**9801032000**	
Silicone seal for extended temperature range (by the metre)	**9231009000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	33	15	12	8	4	3	3	0
Side C/D	9	4	3	2	2	1	0	0

** Enclosure preparation required

360 x 160 x 91 mm

CP-320 RAL 7000 (squirrel grey)
CPS-320 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

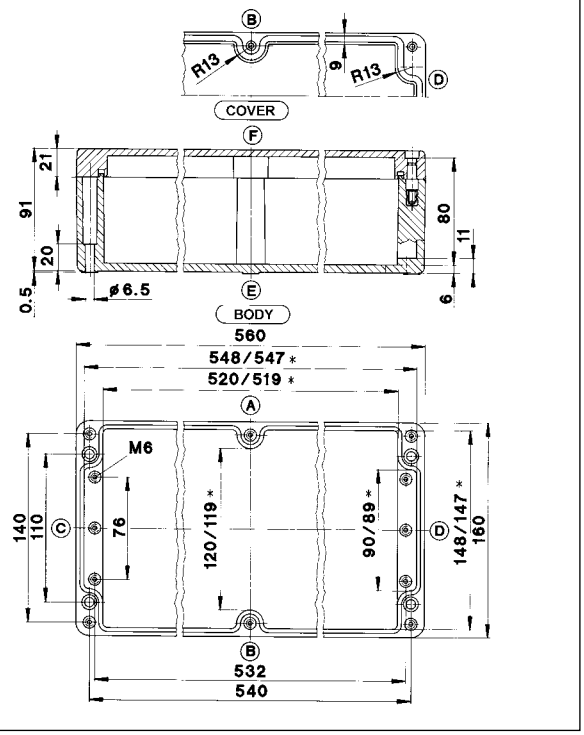
Type	CP-320	CPS-320
Weight (g)	2150	2150
External dimension (mm)	360 x 160 x 91	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4320000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4320001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4320031000**	
RAL 9005 (jet black), with cover screws	**5320000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5320001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5320021000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823008000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821012000**	
Mounting rail TS 35	**9822015000**	
Earthing rail	**9810014000**	
External mounting brackets	**9824004000**	
External articulated hinges for CP** enclosures	**9801045000**	
External articulated hinges for CPS** enclosures	**9801046000**	
Internal articulated hinges with cover guide**	**9801032000**	
Silicone seal for extended temperature range (by the metre)	**9231009000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	48	23	18	11	7	5	4	0
Side C/D	9	4	3	2	2	1	0	0

** Enclosure preparation required

560 x 160 x 91 mm

CP-330 RAL 7000 (squirrel grey)
CPS-330 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

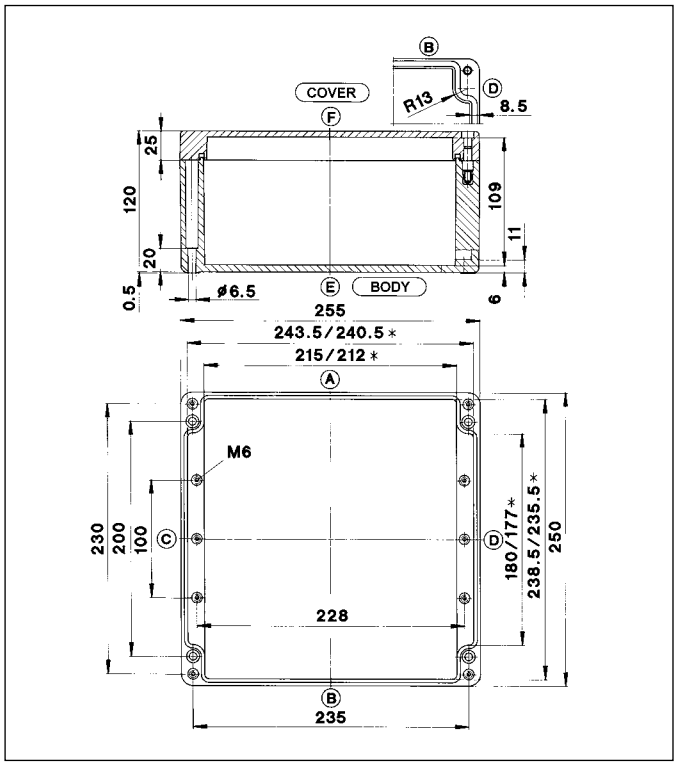
Type	CP-330	CPS-330
Weight (g)	3185	3185
External dimension (mm)	560 x 160 x 91	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4330000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4330001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4330010000**	
RAL 9005 (jet black), with cover screws	**5330000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5330001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5330010000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823085000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821015000**	
Mounting rail TS 35	**9822018000**	
Earthing rail	**9810016000**	
External mounting brackets	**9824004000**	
External articulated hinges for CP** enclosures	**9801045000**	
External articulated hinges for CPS** enclosures	**9801046000**	
Internal articulated hinges with cover guide**	**9801032000**	
Silicone seal for extended temperature range (by the metre)	**9231009000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	76	40	28	18	10	8	6	0
Side C/D	9	4	3	2	2	1	0	0

** Enclosure preparation required

255 x 250 x 120 mm

CP-370 RAL 7000 (squirrel grey)
CPS-370 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

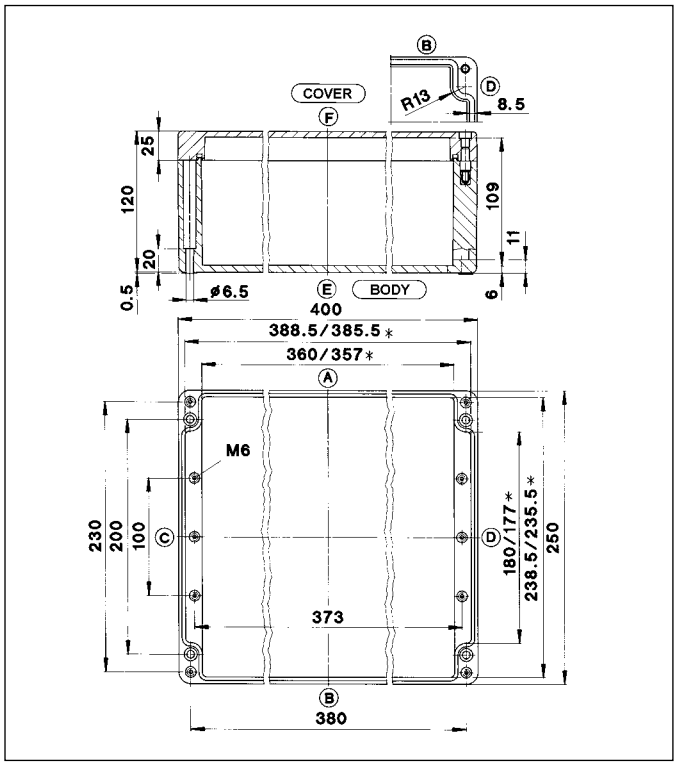
Type	**CP-370**	**CPS-370**
Weight (g)	2650	2650
External dimension (mm)	255 x 250 x 120	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4370000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4370001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4370010000**	
RAL 9005 (jet black), with cover screws	**5370000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5370001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5370023000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823009000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821007000**	
Mounting rail TS 35	**9822010000**	
Earthing rail	**9810035000**	
External mounting brackets	**9824011000**	
External articulated hinges for CP** enclosures	**9801045000**	
External articulated hinges for CPS** enclosures	**9801046000**	
Internal articulated hinges with cover guide**	**9801032000**	
Silicone seal for extended temperature range (by the metre)	**9231009000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	42	23	17	11	7	4	3	3
Side C/D	32	14	10	16	4	3	2	2

** Enclosure preparation required

400 x 250 x 120 mm

CP-400 RAL 7000 (squirrel grey)
CPS-400 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

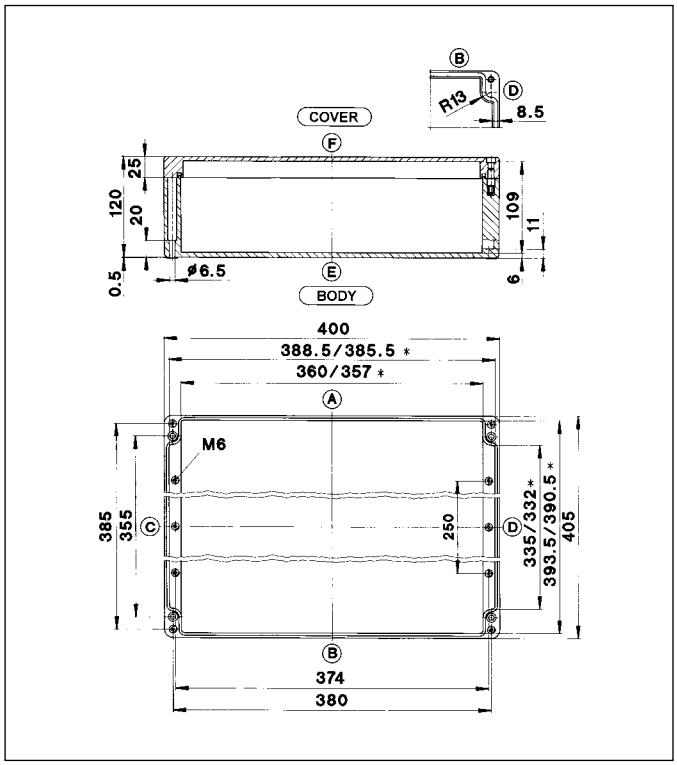
Type	**CP-400**	**CPS-400**
Weight (g)	3650	3650
External dimension (mm)	400 x 250 x 120	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4400000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4400001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4400077000**	
RAL 9005 (jet black), with cover screws	**5400000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5400001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5400010000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823010000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821014000**	
Mounting rail TS 35	**9822017000**	
Earthing rail	**9810015000**	
External mounting brackets	**9824011000**	
External articulated hinges for CP** enclosures	**9801045000**	
External articulated hinges for CPS** enclosures	**9801046000**	
Internal articulated hinges with cover guide**	**9801032000**	
Silicone seal for extended temperature range (by the metre)	**9231009000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	74	38	27	17	13	6	5	4
Side C/D	32	14	10	8	4	3	2	2

** Enclosure preparation required

400 x 405 x 120 mm

CP-450 RAL 7000 (squirrel grey)
CPS-450 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

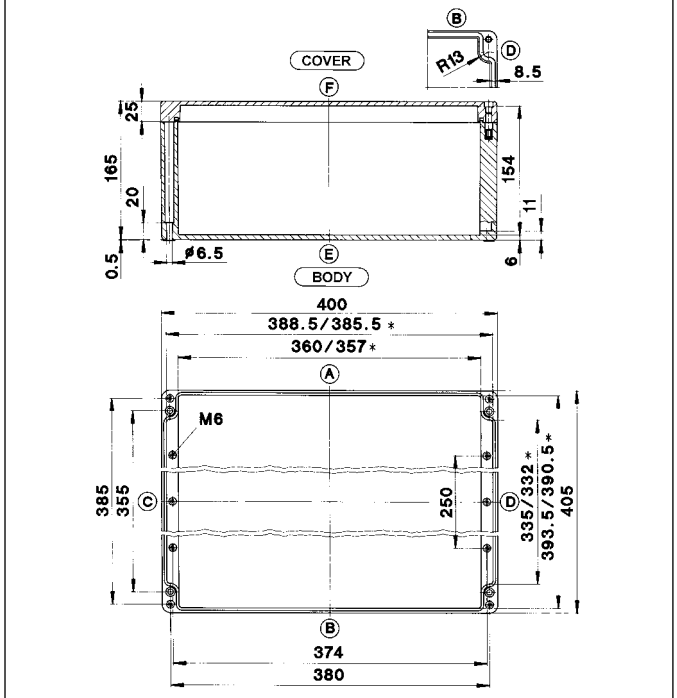
Type	CP-450	CPS-450
Weight (g)	5580	5580
External dimension (mm)	400 x 405 x 120	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4450000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4450001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4450013000**	
RAL 9005 (jet black), with cover screws	**5450000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5450001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5450010000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823011000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821014000**	
Mounting rail TS 35	**9822017000**	
Earthing rail	**9810015000**	
External mounting brackets	**9824012000**	
External articulated hinges for CP** enclosures	**9801045000**	
External articulated hinges for CPS** enclosures	**9801046000**	
Internal articulated hinges with cover guide**	**9801032000**	
Silicone seal for extended temperature range (by the metre)	**9231009000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	74	38	27	17	13	6	5	4
Side C/D	57	29	20	15	7	5	4	4

** Enclosure preparation required

400 x 405 x 165 mm

CP-460 RAL 7000 (squirrel grey)
CPS-460 RAL 9005 (jet black)



* Smaller dimension at mounting plate support

Type	CP-460	CPS-460
Weight (g)	7740	7740
External dimension (mm)	400 x 405 x 165	
Ordering data Enclosure with seal (CR)	**Part number**	
RAL 7000 (squirrel grey), with cover screws	**4460000000**	
RAL 7000 (squirrel grey), with hexagon socket head cap screws	**4460001000**	
RAL 7000 (squirrel grey), with silicone seal and cover screws	**4460010000**	
RAL 9005 (jet black), with cover screws	**5460000000**	
RAL 9005 (jet black), with hexagon socket head cap screws	**5460001000**	
RAL 9005 (jet black), with silicone seal and cover screws	**5460010000**	
Accessories (individual part or installation kit)		
Mounting plate	**9823011000**	
Mounting rail TS 15	–	
Mounting rail TS 32	**9821014000**	
Mounting rail TS 35	**9822017000**	
Earthing rail	**9810015000**	
External mounting brackets	**9824012000**	
External articulated hinges for CP** enclosures	**9801045000**	
External articulated hinges for CPS** enclosures	**9801046000**	
Internal articulated hinges with cover guide**	**9801032000**	
Silicone seal for extended temperature range (by the metre)	**9231009000**	

Maximum possible number of threads								
ISO M	12	16	20	25	32	40	50	63
Side A/B	105	56	40	27	20	10	9	8
Side C/D	92	45	30	23	12	9	6	5

** Enclosure preparation required

Notes

Screwed Cable Glands for Standard Enclosures

Perfekt screwed cable glands, plastic (for CA and CP standard enclosures)						
General technical data			Thread size	Cable ø (mm)	*	**Article number**
Colour	RAL 7001		M12 x 1,5	3-6	15	**9432462000**
Temperature range	-20°C to +100°C		M16 x 1,5	5-10	20	**9432463000**
Protection class	IP68		M20 x 1,5	8-13	24	**9432464000**
Material	Polyamide PAG V-2		M25 x 1,5	11-17	29	**9432465000**
Sealing element	CR/NBR		M32 x 1,5	15-21	36	**9432466000**
			M40 x 1,5	19-28	46	**9432467000**
			M50 x 1,5	27-35	55	**9432468000**
			M63 x 1,5	32-42	68	**9432469000**
			PG7	3-6,5	15	**9432291000**
			PG9	4-8	19	**9432292000**
			PG11	5-10	22	**9432293000**
			PG13,5	6-12	24	**9432294000**
			PG16	10-14	27	**9432295000**
			PG21	13-18	33	**9432296000**
			PG29	18-25	42	**9432297000**
			PG36	22-32	53	**9432298000**
			PG42	30-38	60	**9432299000**
			PG48	34-44	65	**9432300000**

* **WAF (mm)**

Perfekt screwed cable glands, brass (for CA standard enclosures)						
General technical data			Thread size	Cable ø (mm)	*	**Article number**
Temperature range	-20°C bis +100°C		M12 x 1,5	3-6	14	**9431280000**
Protection class	IP68		M16 x 1,5	5-9	17	**9431281000**
Material	Brass		M20 x 1,5	9-13	22	**9431282000**
Sealing element	CR/NBR		M25 x 1,5	11-16	27	**9431283000**
			M32 x 1,5	14-21	34	**9431284000**
			M40 x 1,5	19-27	43	**9431285000**
			M50 x 1,5	24-35	55	**9431286000**
			M63 x 1,5	32-42	65	**9431287000**
			PG7	3-6,5	14	**9431165000**
			PG9	4-8	17	**9431166000**
			PG11	5-10	20	**9431167000**
			PG13,5	6-12	22	**9431168000**
			PG16	10-14	24	**9431169000**
			PG21	13-18	30	**9431170000**
			PG29	18-25	40	**9431171000**
			PG36	24-32	50	**9431172000**
			PG42	30-38	57	**9431173000**
			PG48	34-44	64	**9431174000**

* **WAF (mm)**

Euro-2000 (Euro-Top) screwed cable glands, plastic (for CT standard enclosures), including integrated strain relief						
General technical data			Thread size	Cable ø (mm)	*	**Article number**
Colour	RAL 7035		M12 x 1,5	3-6,5	15	**9432549000**
Temperature range	-30°C bis +80°C		M16 x 1,5	5-10	22	**9432455000**
Protection class	IP68		M20 x 1,5	6-12	24	**9432548000**
Material	Polyamide 6		M20 x 1,5	10-14	27	**9432456000**
Sealing element	Neoprene		M25 x 1,5	13-18	33	**9432457000**
			M32 x 1,5	18-25	36	**9432458000**
			M40 x 1,5	22-23	46	**9432459000**
			M50 x 1,5	30-38	60	**9432460000**
			M63 x 1,5	34-44	65	**9432461000**
			PG7	3-6,5	15	**9432445000**
			PG9	4-8	19	**9432446000**
			PG11	5-10	22	**9432447000**
			PG13,5	6-12	24	**9432448000**
			PG16	10-14	27	**9432449000**
			PG21	13-18	33	**9432450000**
			PG29	18-25	42	**9432451000**

* **WAF (mm)**

Other screwed cable glands available on request.

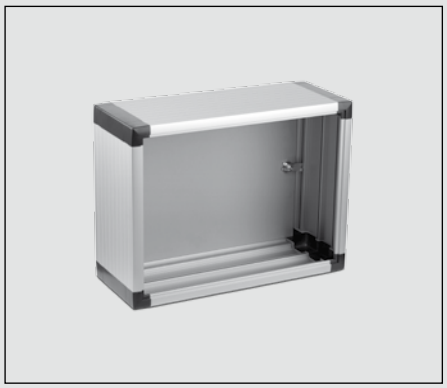


Aluminium Light-Duty Control Enclosure CC-3000

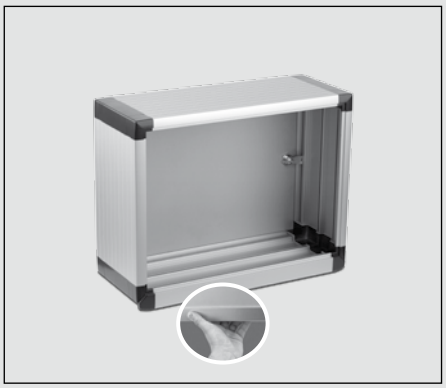
Individual modular-design enclosures

The BERNSTEIN CC-3000 light-duty control enclosure is particularly suitable for encapsulating operator control panels, industrial computers and display components and, thanks to its modular concept, can be simply adapted to versions tailored to specific customer requirements. Its height and width can be varied up to a maximum recommended size of approx. 600 x 600 mm.
The aluminium sections can be simply cut to the required lengths and assembled with aluminium corner modules. The depth of the enclosure is achieved by variably combining 120 and 200 mm wide aluminium sections that can be further extended by an additional 55 mm wide door section. In this way, the enclosure depth can be varied to suit specific requirements. By combining different sections, it is possible to create a total of 5 different enclosure designs. Standard version sections and sections with handles are available for this purpose.

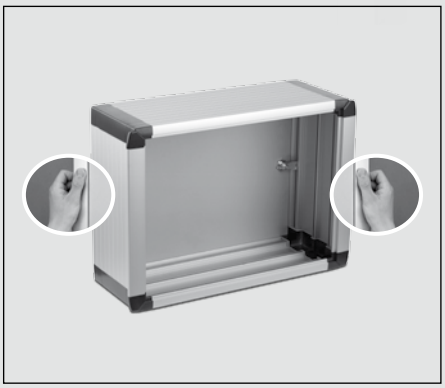




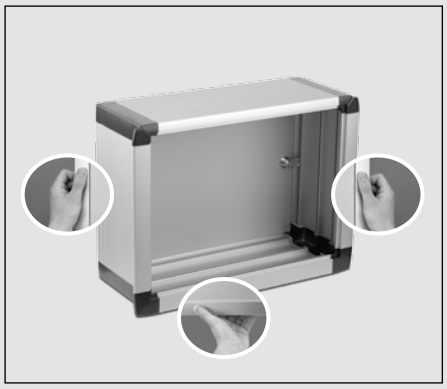
No handles



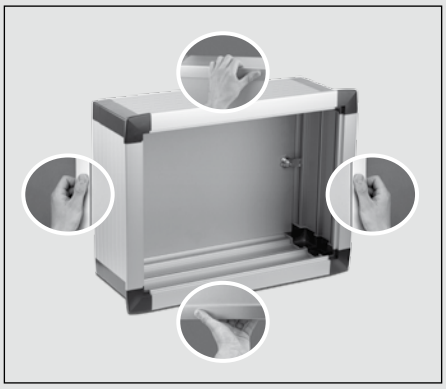
Handle only at bottom



Handles on left and right



Handles on left, right and bottom (U-shaped)



Handles all round

Besides the width, height and depth, many other enclosure properties are freely selectable to create a customised configuration, e.g.:

- door hinge mounted on left or right
- enclosure preparation for suspension systems
- colour of corner modules

Ready-to-use front panels with screen print or engraving can, of course, be used according to customer specifications.

The BERNSTEIN product range also offers complete system solutions including specific preparation and wiring
(see Page 12 for details).

A checklist will help you to define the required enclosure configuration while also serving as enquiry and order form
(see Page 106).



Aluminium section depth comparison: 200 mm (left) and 120 mm (right)



120 mm section with additional door extension (55 mm)

Different enclosure depths are created by standard 120 mm and 200 mm wide sections or by combining with the 55 mm door extension for a total depth of 175 mm and 255 mm respectively. The corresponding installation depths are listed on the page after next.



Fixed rear panel



Hinged rear panel with lock

The rear panel can be screwed down (left photo) or configured as a door without restricting the installation space by using hinges or articulated hinges (right photo).



Internally-mounted front panel

A practical quick assembly system with plastic fold-up retaining elements is used to secure the internally-mounted front panel. No changes need to be made to the front panel. The retaining elements can be shifted to freely selectable and reversible positions within the sections in the enclosure.



Externally-mounted front panel

Mounting screws are screwed through the externally-mounted front panel into captive nuts that are inserted in the moveable retaining elements that can be positioned as required. As a further mounting option, threaded studs welded on the back of the front panel (concealed from the outside) are locked with nuts behind the retaining elements thus holding the front panel. Even when the door extension is used, the rear panel can still be secured in the described manner.

Aluminium Light-Duty Control Enclosure CC-3000

Suspension system preparation

In most applications it is necessary to mount the enclosure on a machine or wall. The following BERNSTEIN suspension systems are ideally suited for this purpose:

- CS-2000 SL light-duty suspension system (Page 116)
- CS-3000 suspension system (Page 130)
- CS-2000 System 80 suspension system (Page 150)

The enclosure sections are prepared (machined) corresponding to the specific suspension system (coupling components).

Product features

- Modular system: Freely selectable width and height of enclosure
- 5 possible enclosure designs
- Modern industrial design with homogeneous appearance and distinctive identification features
- Recognition features
- Single-walled sections provide outstanding heat dissipation (the air trapped in double-walled sections acts as thermal insulation, thus inhibiting heat dissipation)
- Rectangular front panels (this allows direct installation of commercially available controllers)
- Front panels externally-mounted or internally-mounted
- Quick assembly system for internally-mounted front panel
- No need to subsequently fit external rubber seals
- Standard protection class IP65
- Rear panel fixed with screws or mounted on integrated hinge or articulated hinge
- Rear panel attachments can be used without restricting installation space
- Internal grooves for simple mounting with spring nuts
- Configuration corresponding to customer specifications (CC-3000 check list, see Page 106)
- Extensive range of accessories (see Page 82)



Heat dissipation

The single-wall configuration gives the aluminium section particularly good passive heat dissipation properties while conforming to protection class IP65. In many cases there is no need to use active coolers. To meet increased heat dissipation requirements, it is possible to use internal (not outward blowing), low-wear and maintenance-free fans.
You will find further details and corresponding components in the range of accessories for control enclosures from Page 82 onwards.

Built-in components

The extruded aluminium section features an all-round grooves, allowing components to be simply secured with spring nuts without the need for mechanical modification to the enclosure.



All-round mounting grooves simplify installation.

Technical data

Dimensions

Single section configuration				
	Front panel	Rear panel	Section depth	Installation depth
A.	Internally mounted	Fixed or hinged	120	103
			200	183
B.	Externally mounted	Fixed or hinged	120	111
			200	191
Configuration with combination of two sections (as door)				
	Front panel	Rear panel	Section depth	Installation depth
C.	Internally mounted	Internally mounted	120+55	149
			200+55	229
D.	Externally mounted	Internally mounted	120+55	157
			200+55	237
E.	Internally mounted	Externally mounted	120+55	157
			200+55	237
F.	Externally mounted	Externally mounted	120+55	166
			200+55	246

Materials

Extruded aluminium section	Al Mg Si 05
Pressure die-cast aluminium corners	Al Si 12
Seals between section and corner module	Plastic
Seal between front panel and rear panel	CR
Hinge, articulated hinge	Al Mg Si 05
Front panel, rear panel	Al Mg

Colours

Sections	Anodised, neutral
Front panels, rear panels	Anodised, neutral
Corner module	RAL 7016

Approbations

UL 50 Type 12

Modular Aluminium Control Enclosures CC-4000/CC-4000 SL

Modular Control Enclosures CC-4000 and CC-4000 SL

The CC-4000/CC-4000 SL are modular aluminium control enclosure systems. With their outstanding technical features, the enclosures simply and efficiently encapsulate industrial controllers and operator control panels for centralised and decentralised automation in production processes.



Produkteigenschaften:

- Modern monitor-based industrial design
- Modular system made from high-grade cast aluminium with functional surface finish
- Colour surfaces accentuating design features, choice of other colours (RAL) on request
- Freely selectable width and height
- Single-walled aluminium sections for optimum heat dissipation
- Integrated handle elements that make the enclosure easy to handle while underscoring the monitor characteristics
- Protection class IP65
- Heat dissipation suitable for industrial applications without reducing protection class
- Extensive range of accessories (siehe Seite 82)
- All-round mounting grooves for built-in components, no need for modifications
- Quick front panel mounting
- Internally or externally mounted front panel
- Direct installation of controller or visualisation unit, display and operator control panel...
- Door configurations for direct access
- Configuration corresponding to customer specifications (CC-4000 and CC-4000 SL check lists, see Pages 108 to 111)

Approbations

- UL 50 Type 12
- TÜV



Suspension system preparation

In most applications it is necessary to mount the enclosure on a machine or wall. The following BERNSTEIN suspension systems are ideally suited for this purpose:

- SL light-duty suspension system CS-2000 SL (Page 116)
- suspension system CS-3000 (Page 130)
- System 80 suspension system (Page 150)

The enclosure sections are prepared (machined) corresponding to the specific suspension system (coupling components).

CC-4000

Thanks to a comprehensive modular system, the enclosure depth can be adapted precisely to your controller. Based on aluminium frame sections with depths of 52, 80, 140, 200 and 290 mm with extension sections with depths of 68, 128 and 228 mm, depending on the size of the controller, you can choose depths between 52 mm and 646 mm. Your selected width or height is produced by correspondingly cutting and machining the aluminium sections.

You determine the type of access

- Hinged rear panel
- Frame sections as front door, also for hinge-mounted controller
- Frame or extension section (rear door) with articulated hinge (fixed or detachable). The detachable version makes it possible to replace the complete module together with the built-in controller for servicing purposes.



The single-walled aluminium section offers outstanding heat dissipation properties which are significantly superior to two-walled enclosures where the air trapped between the walls acts as an insulator. For more demanding requirements, the heat dissipation can be further enhanced and adapted to defined operating conditions by incorporating optional measures such as heat sink rear panel, internal fans or even an air conditioner. You will find further details in our range of accessories for control enclosures from Page 82 onwards.

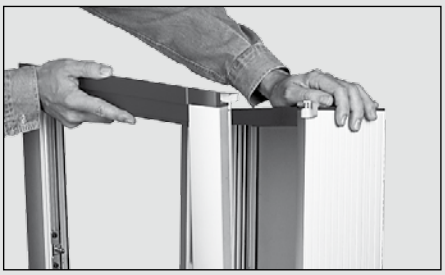
The BERNSTEIN suspension systems CS-2000 SL, CS-3000 and CS-2000 System 80 provide ideal attachment to machine or wall (see Pages 116 to 161). Selection of the suitable system depends on the arm length and the total weight of the enclosure. We would be pleased to assist you in selecting the right system for your application.



Opening CC-4000 enclosure from front with hinged frame section.



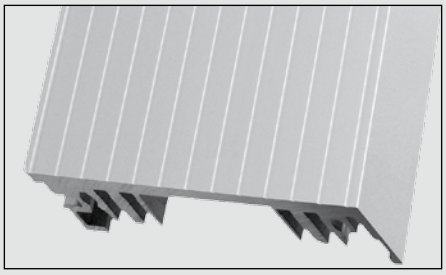
Opening CC-4000 enclosure from rear with flush-closing door.



Opening CC-4000 enclosure and detaching entire frame section at articulated hinges.



The ergonomically formed handles at the front of the enclosure make safe handling easy.



External view of aluminium section. Generously sized cable channels on the inside. Direct screw mounting of components or mounting with easy-to-fit spring nuts.



Combined, frame and expansion sections with different widths make up your specified control enclosure depth.

Dimensions

Thanks to the different section depths, BERNSTEIN CC-4000 control enclosures are available in depths from 52 mm up to 646 mm (see drawings below).

Frame sections

52 mm
80 mm
140 mm
200 mm
290 mm

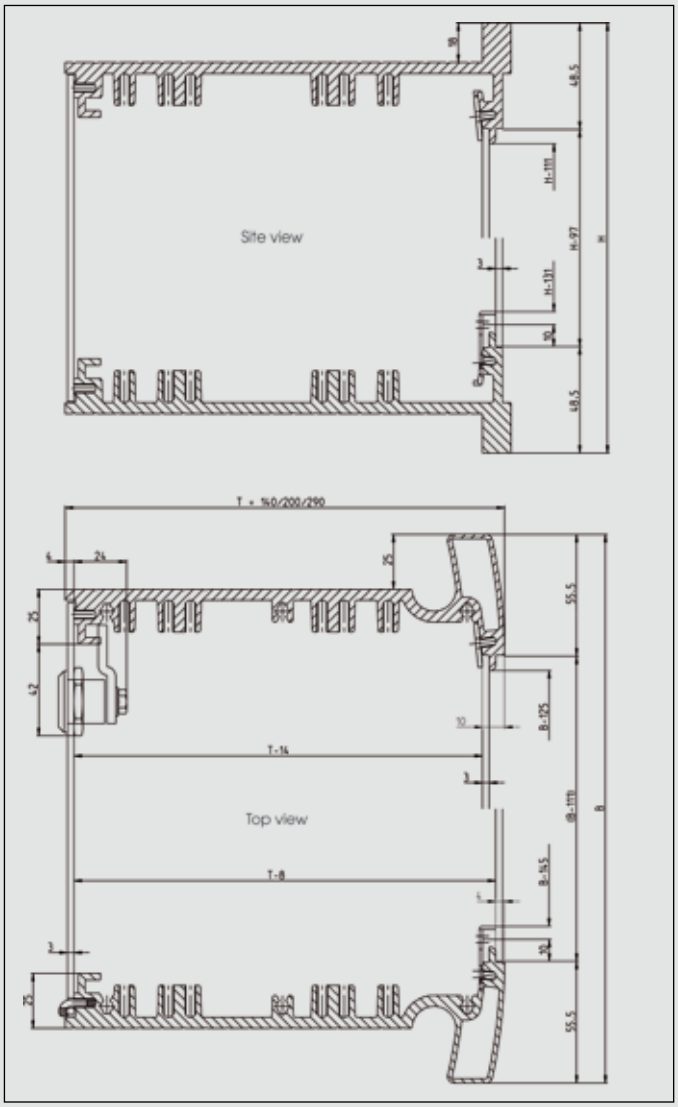
Extension sections

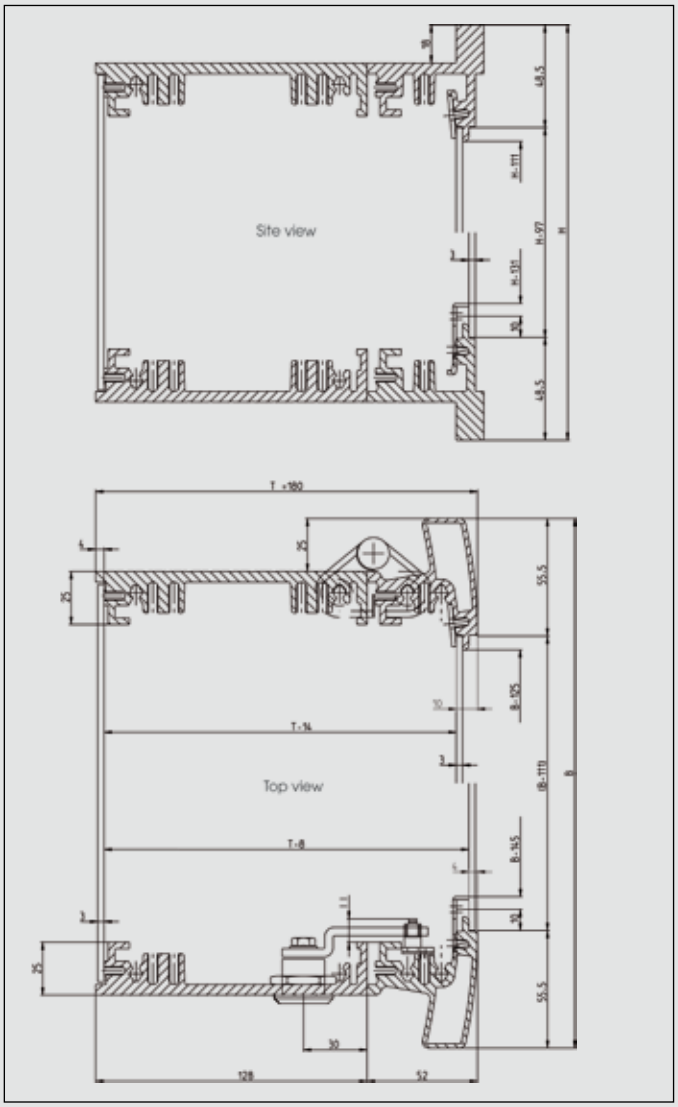
68 mm
128 mm
228 mm

The width and height are freely selectable up to a size of 800 x 800 mm. Different sizes may be possible from case to case.

Requirements for front-mounted front panel:

- Front panel support 3.0 mm deep for 140, 200 and 290 sections
- Front panel support 6.5 mm deep for 52 and 80 sections





Stand/console version CC-4000

In addition to the options for mounting the CC-4000 control enclosures on type CS-3000, CS-2000 System 80 and CS-2000 SL suspension systems (see Page 116 onwards), BERNSTEIN also offers the configuration on a terminal stand as well as a suspended or upright console version.

With components specifically developed for this purpose, the user has available an ergonomically arranged and attractive industrial PC workstation. In all three variants the inclination of the control enclosure and of the keyboard console is adjustable, providing an optimum field of view and ideal access to the control panel for the user, corresponding to size and light conditions.

The cable gland in the stand itself is located in a cable duct integrated at the rear, concealed by a cover panel. Cables and connectors can be routed directly to the attached control enclosure or keyboard console through the coupling head combined with the stand. This renders external cable ducts superfluous.





You will find the terminal stand, the stand/console version as well as the console coupling head for creating a suspended console configuration in our range of accessories from Page 82 onwards. Using the BERNSTEIN checklist (see Page 106), with corresponding preparation, the type CC-4000 and CC-3000 control enclosures can be configured to enable direct connection. Vertically adjustable support feet as well as a set of castors for mobile applications that can be fitted directly to the stand without the need for additional modifications, are available as accessories.

Delivery specification

- Single stand, stand/console, console coupling head suspended, support feet and set of castors come with assembly material and instructions
- Single stand, stand/console and coupling head suspended in colour RAL 7035
- Special colours available on request

Modular Aluminium Control Enclosures CC-4000/CC-4000 SL

CC-4000 SL



The ideal addition to the CC-4000 control enclosure range

Thanks to its elegant, slimline design, the CC-4000 SL is the ideal addition to the BERNSTEIN CC-4000 range of control enclosures.

The modern, dynamic industrial design of the enclosure gives the entire machine or system a high-quality appearance. Tailored to the size of the controller or operator control panels, a corresponding aluminium section configuration can be selected from the extended range of enclosures.

With its many outstanding technical features the enclosure makes it easy to encapsulate the controllers cost-effectively.

Product features (additionally to CC-4000):

- Two enclosure depths (external dimensions: 55 and 99 mm)
- Slimline design for configuring small visualisation systems

Without the need for mechanical modifications, built-in components are easy to mount and remove with the aid of spring nuts in the all-round mounting grooves in the enclosure.



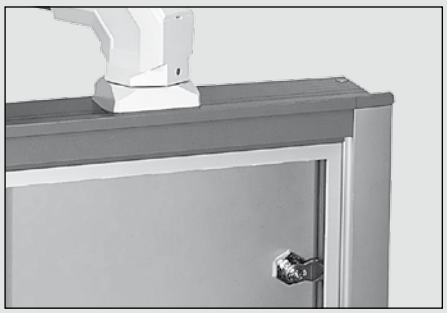
Comparison of handle sections:
Left: CC-4000 SL, right: CC-4000



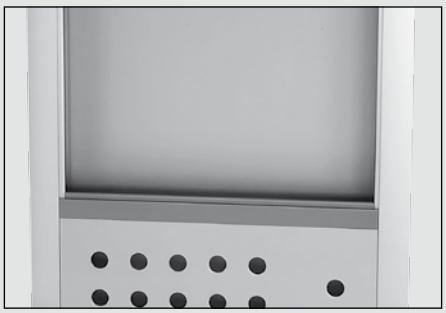
Application with control unit, partition and two-row operator control panel



Application with control unit



CC-4000 SL with suspension system attachment CS-2000 SL and front panel aperture



CC-4000 SL with partition and externally-mounted two-row operator control panel.

- Externally mounted front panel: Inner depth = Outer depth - 14 mm
- Internally mounted front panel: Inner depth = Outer depth - 20 mm
- Rationalisation effects thanks to time-saving installation and servicing.

Accessories for control enclosures CC-3000, CC-4000 and CC-4000 SL

BERNSTEIN not only offers innovative control enclosures that can be perfectly configured to suit your specific requirements with our comprehensive range of accessories that you will find on the following pages but our system solution service also realises complete enclosure solutions.

The range of accessories covers the following areas:

- **Attachment solutions**
  Whether suspended, upright or mobile – we have the right system for any configuration.

- **Interface solutions**
  With the interfaces laptops, programming devices, diagnostic facilities, modems etc. can be easily connected to built-in components for servicing purposes. Simply open the cover and connect. Protection class IP65 is retained (cover closed).

- **Keyboard solutions**
  Data input devices do not always have to be in the way. We have available excellent solutions for storing such devices and cleverly integrating them in the overall concept while retaining the user-friendly ergonomics of the system.

- **Handle solutions**
  The BERNSTEIN range of accessories also includes practical handles to ensure the enclosures are handled safely.

- **Safety solutions**
  Your safety is our concern – we therefore offer a range of accessories that help and protect.

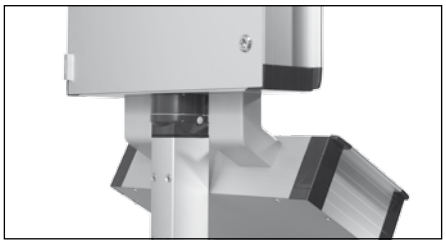
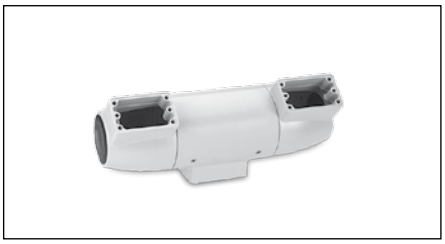
- **Heat dissipation solutions**
  Heat dissipation is a key problem which we will gladly resolve for you. Take the easy way out and contact us. We have the right enclosures, suitable equipment and the necessary know-how to effectively solve heat dissipation problems.

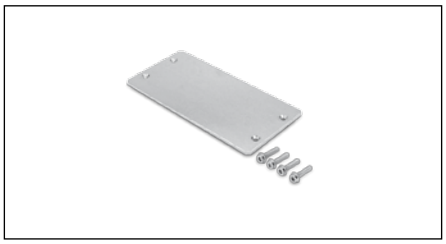
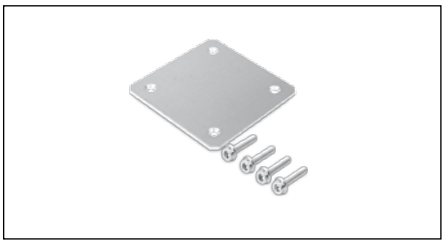
- **Cable solutions**
  It is often necessary to route cables into the enclosure – whether single core or preassembled cables, we have the right solution

- **Front panel solutions**
  The front is the most important side of the enclosure. Here everything must be right and should look exactly as you imagined. Take advantage of our service to help you find the appropriate accessories.

Our comprehensive range of accessories is listed on the following pages.

Attachment solutions

Article	Console connector kit	Console coupling head, single
Article number	9806493000	9808013100
		
Design	Rigid elements for connecting upper section of console to lower section, set of 2 connectors, finish similar to RAL 9006.	For connecting upper section of console to lower section, including infinitely variable adjustment of lower section of console from 0 to 30°. Finish similar to RAL 7035. Also available in RAL 9006 on request.

Article	Suspension system cover, adapter flange	Suspension system covers CS-2000 SL
Article number	9806512000	9806495000
		
Design	For closing off unused BERNSTEIN adapter flange connection points in the enclosure. Finish similar to RAL 9006.	Flange size 60 mm. For closing off unused BERNSTEIN suspension system connection points. Finish similar to RAL 9006. Other RAL colours available on request.

Article	Stand CC-3000	Stand CC-4000
Article number	1016509100	See specification
		
Design	Upright stand with straight column for mounting control enclosures. Finish similar to RAL 7035. Please order castors and coupling components separately.	Upright stand with integrated coupling head for infinitely variable, pivoted attachment of CC-4000 and CC-3000 control enclosures (infinitely variable from 0°to 30°). Finish similar to RAL 7035. **1016786000** with integrated coupling head **1016787000** with integrated console coupling head that additionally allows infinitely variable, pivoted (0° to 20°) attachment of keyboard consoles.

Thin Client wall mount bracket – enclosure attachment

9805332000



Particularly suitable for mounting an enclosure on safety gate posts that can accept 40, 60 and 80 mm post attachments. The plastic mount is silicone-free. Designed for standard M6 attachment. The maximum load for central mounting is 20 kg.
The wall/post attachment, Art. No. 9805333000, is additionally required for a complete system.

Thin Client wall mounting bracket – wall/ pillar attachment

9805333000



Particularly suitable for mounting an enclosure on safety gate posts that can accept 40, 60 and 80 mm post attachments. The plastic mount is silicone-free. Designed for standard M6 attachment. The maximum load for central mounting is 20 kg.
The enclosure attachment, Art. No. 9805332000, is additionally required for a complete system.

Adapter flange

9806213000



For simple "one-man mounting" of a control enclosure on the suspension system. Finish similar to RAL 7035.

Suspension system cover CS-2000 System 80

9806499000



Flange size 80 mm. For closing off unused BERNSTEIN suspension system connection points. Finish similar to RAL 9006. Other RAL colours available on request.

TFT monitor mounting bracket

9806679000



Commercially available displays can be easily secured in modern control enclosures, thus encapsulating them in a way that meets industrial standards.

Transparent Makrolon front panel

On request



Please contact us regarding the protection of a commercially available monitor that is secured in the enclosure by means of a TFT monitor mounting bracket.

Industrial castors

9808012800



Set of castors, consisting of 4 swivel castors with brake. Load-bearing capacity of each castor 50 kg.

Equipment castors

9808015300



Set of castors, consisting of 2 swivel castors and 2 swivel castors with brake. Load-bearing capacity of each castor 70 kg.

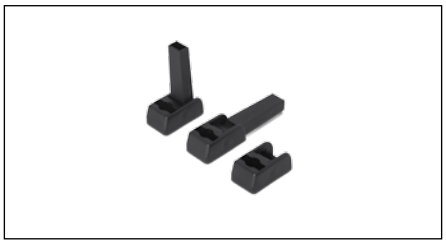
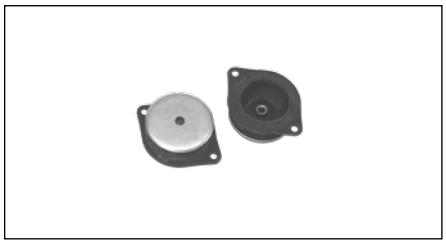
Support feet

9808012900



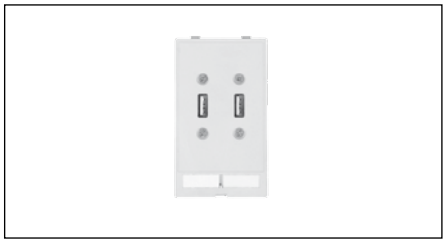
Vertically adjustable feet (4x) for upright stands.

Attachment solutions

Article	Tabletop feet, adjustable	Tabletop feet (StopChoc)
Article number	9806014000	9806500000
		
Design	Simple plastic tabletop feet for control enclosures; feet can be set upright to adjust enclosure inclination.	Vibration-absorbing tabletop feet for control enclosures, ideal for mobile use in close proximity to machines or sensitive electronic equipment.

Interface solutions

Article	CD-ROM cover	Floppy disk cover
Article number	9806486000	9806258000
		
Design	Aluminium interface cover, 177 x 119 x 8 mm, finish similar to RAL 9006, with snap-in fastener. Also available with turn-lock fastener.	Aluminium interface cover, 120 x 92 x 8 mm, finish similar to RAL 9006, with snap-in fastener.

Article	Interface insert	Interface insert
Article number	9421308000	9421284000
		
Design	1x Sub-D9/1xSub-D15, female/female	2x USB 2.0 Type A with 0.7 m cable and connector

External articulated hinge, fixed

9806021000



For wall mounting of control enclosures, set of 2 (2 sets are required for fixed mounting). Finish similar to RAL 9006.

External articulated hinge, detachable

9806123000

For wall mounting of control enclosures or swivelling away from wall. (1x 980.6123.000 and 1x 980.6021.000 are required for this application.) Finish similar to RAL 9006, set of 2.

External mounting bracket

9806017000



For fixed wall mounting of an enclosure.

Front panel interface, single

9421283000



Metal interface cover, various snap-in inserts for modular configurations. Plastic version available on request.

Front panel interface, double

9421306000



Metal interface cover, various snap-in inserts for modular configurations. Plastic version available on request.

Interface insert

9421311000



1x RJ45 / USB BF-A / Sub-D9

Interface insert

9421300000



2x USB 2.0 Type A shielded

Interface insert

9421307000



Earthed socket outlet 250V

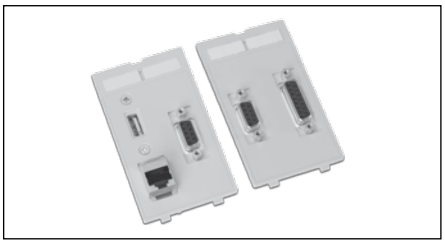
Interface insert

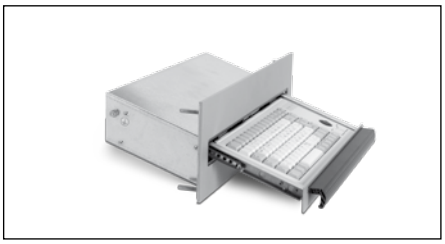
9421310000

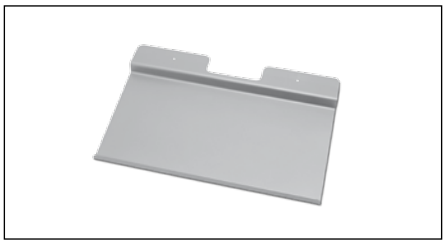
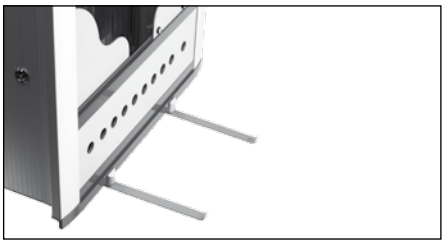


1x Sub-D9/1xSub-D15, female/male

Interface/ keyboard solutions

Article	Interface insert	Interface insert
Article number	9421312000	On request
		
Design	Flat dummy panel	Other inserts available on request. Please contact us.

Article	Keyboard drawer 483 x 89 x 155 mm (19“/2HM)	Keyboard drawer 483 x 134 x 155 mm (19“/3HM) 20° inclination
Article number	9806744000	9806497000
		
Design	With mounting pin, no lock, IP65 rating when closed, including German keyboard with USB connector. Other language-version keyboards and drawer with lock available.	With mounting pin, no lock, IP65 rating when closed, including German keyboard with PS2 connector. Other language-version keyboards and drawer with lock available.

Article	Keyboard shelf	Keyboard support bracket, straight
Article number	9806175000	9806326000
		
Design	Sheet metal, finish similar to RAL 9006. 2x M5 holes required in enclosure. Stainless steel version available on request.	Keyboard support bracket for individual positioning on enclosure. Finish similar to RAL 9006. Can be tucked away under the enclosure when not in use. No modifications required on enclosure (the adapter kit is required for CC-3000 without lower handle strip).

USB interface

9421319000



Single USB interface with captive dust cap, protection class IP65. Mounted in a 22.5 mm hole in enclosure or front panel.

RJ-45 interface

9806519000



Single Rj-45 interface with captive dust cap, protection class IP65. Mounted in a 22.5 mm hole in enclosure or front panel.

Keyboard drawer 483 x 89 x 155 mm (19"/2HM)

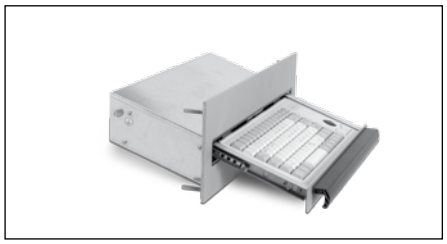
9806496000



With mounting pin, no lock, IP65 rating when closed, including German keyboard with PS2 connector. Other language-version keyboards and drawer with lock available.

Keyboard drawer 483 x 134 x 155 mm (19"/3HM) 20° inclination

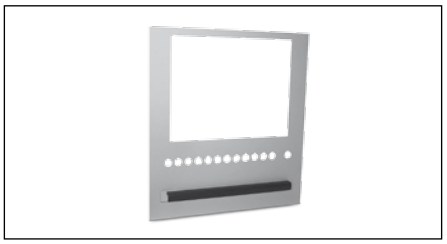
9806745000



With mounting pin, no lock, IP65 rating when closed, including German keyboard with USB connector. Other language-version keyboards and drawer with lock available.

Integrated keyboard drawer

On request



We can integrate our IP65 keyboard drawers, straight or 20° inclination, directly in your customised front panel. Please contact us.

Fold-down keyboard panel

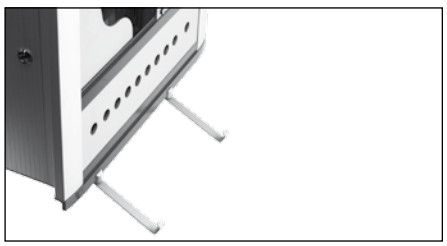
9806488000



Made from coated sheet steel, finish similar to RAL 9006. Dimensions: 483x249x50 mm. IP54 rating when open.

Keyboard support bracket, 30° inclination

9806487000



Keyboard support bracket for individual positioning on enclosure.
Finish similar to RAL 9006. Can be tucked away under the enclosure when not in use.
No modifications required on enclosure (the adapter kit is required for CC-3000 without lower handle strip).

Separate keyboard with PS2 connector

See specification

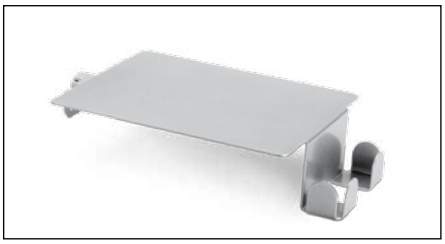
84 short-stroke keys. PS2 connector.
Dimensions (suitable for 19" keyboard drawers): 370 x 20 x 139 mm.
Other versions available on request.
9286109000 German
9286110000 US English
9286107000 French

Separate keyboard with USB connector

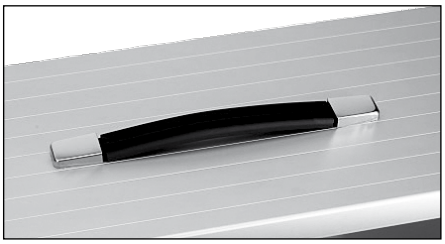
See specification

84 short-stroke keys. USB connector.
Dimensions (suitable for 19" keyboard drawers): 370 x 20 x 139 mm.
Other versions available on request.
9286159000 German
9286117000 US English
9286188000 French

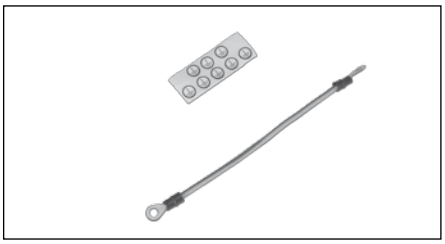
Keyboard/ handle solutions

Article	Clipboard	Mouse pad
Article number	9806388000	9806480000
		
Design	For placing production documents for instance (DIN A4) at the enclosure. Sheet steel, finish similar to RAL 9006. No modifications required on enclosure (the adapter kit is required for CC-3000 without lower handle strip).	Adjustable mouse pad with storage tray for mouse. Finish similar to RAL 9006. No modifications required on enclosures with side handle strip (the adapter kit is required for CC-3000 without side handle strip).

Handle/ safety solutions

Article	Positioning handle	Carrying handle
Article number	See specification	9806490000
		
Design	Anodised, ergonomically designed, formed aluminium positioning handle. **9808015100** Length 250 mm **9808015200** Length 350 mm	Black carrying handle especially for small enclosures in mobile applications.

Safety/ heat dissipation solutions

Article	Earthing kit, internally mounted front panel	Earthing kit, door and externally mounted front panel
Article number	9806505000	9806506000
		
Design	Additional earthing kit for earthing internally mounted front panels.	Additional earthing kit for earthing externally mounted front panels or doors (green/yellow).

Adapter kit RAL 9006

9806489000

For attaching the clipboard or keyboard mounting brackets to enclosure sections without handle strip.

CC handle

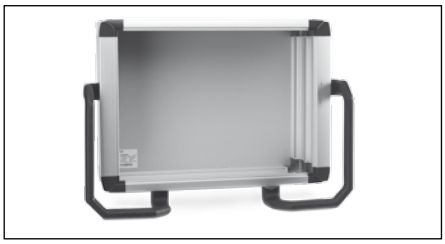
See specification



Straight, anodised aluminium handle.
9808015000 Length 140 mm
9808014900 Length 200 mm
9808014600 Length 350 mm

Corner handle set

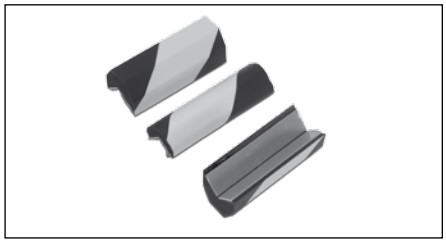
9806026000



2x black foam-coated corner handles.

Bump guard 1 m, yellow/black

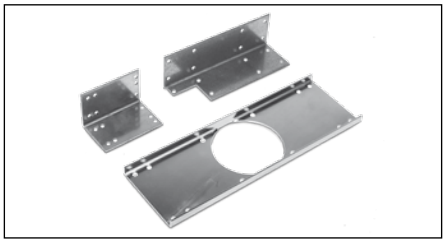
9231731000



For protecting edges and corners, self-adhesive foam material.

Corner and mounting system reinforcements

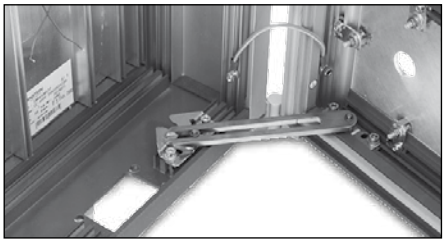
On request



Made to suit your enclosure on request.
Please specify required sizes or enclosure article number.

Door arrester

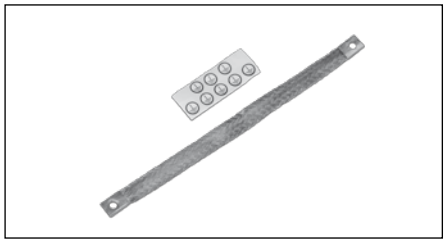
9806503000



For locking door inn open position and for limiting opening range (approx.100°).

Earthing kit, door and externally mounted front panel

9806507000



Copper strap

Heat sink, rear panel

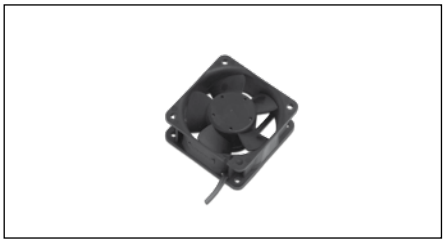
On request



Made to suit your enclosure on request.
Please contact us.

Internal fan

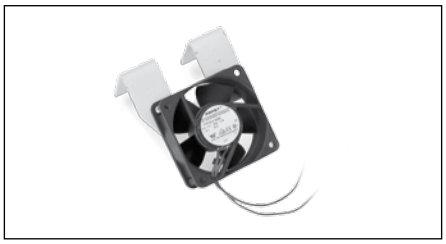
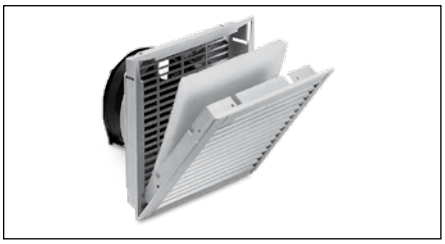
9806421000



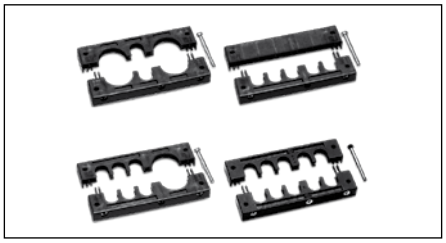
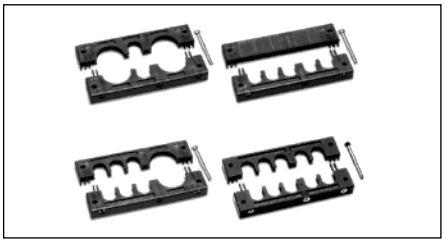
24 V, 40 m^3/h

Accessories for control enclosures

Heat dissipation solutions

Article	Fan mounting bracket set	Filter fan set PF1000
Article number	9806491000	9806492000
		
Design	Set of 2 brackets for axial or radial fan, RAL 7035.	230 V filter fan + outlet filter 24 m^3/h, IP54

Cable solutions

Article	Cable gland strips 16/4	Cable gland strips 24/5
Article number	9806501000	9806502000
		
Design	For entry of preassembled cables in enclosures (machining necessary).	For entry of preassembled cables in enclosures (machining necessary).

Cable/ front panel solutions

Article	Cable grommets	Screwed cable glands
Article number	On request	On request
		
Design	Other cable grommets available on request. Please contact us.	We have available a large selection of metal and plastic cable glands Matching your enclosure. Please contact us.

Internal filter set or filter fan set

On request

Higher power rating or 24 V/230 V units available on request.

Air conditioner 230 V, 320 W, L35L35

9421279000



270 x 520 x 110 mm, 13,3 kg

Air conditioner 230 V, 400 W, L35L35

9421276000



520 x 340 x 110 mm, 14,8 kg

Cable grommets, cable diameter 3-4 mm

9432613000



Grommets for cable gland strips

Cable grommets, cable diameter 6-7 mm

9432617000



Grommets for cable gland strips

Dummy plug

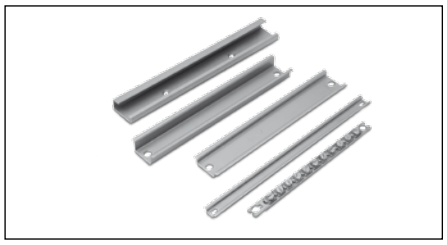
9432614000



Grommets for cable gland strips

Mounting rail service

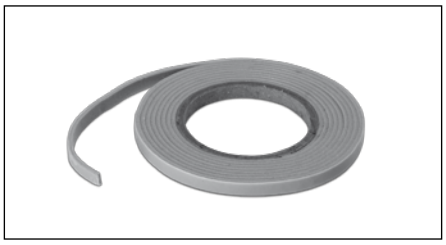
On request



On request we will cut mounting rails to size for your enclosure (TS32/TS35 for accepting terminal blocks). Please contact us.

Front panel sealing kit

9806373000



2 m front panel flat seal, 6 x 2 mm, grey

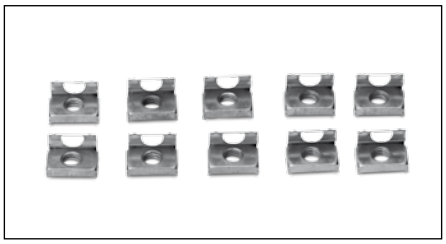
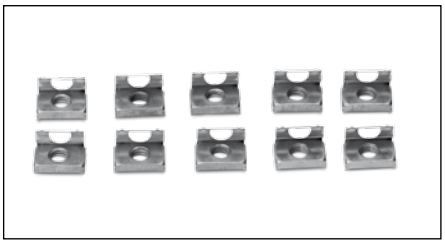
Mounting brackets

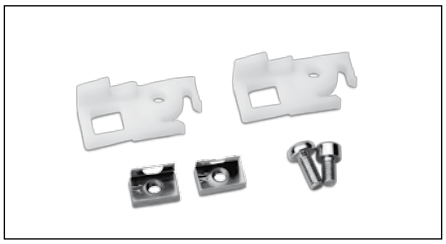
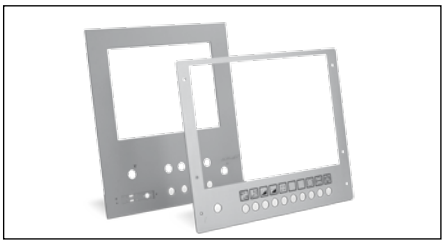
9806008000



For attaching mounting plates or other built-in components in enclosures.

Front panel solutions

Article	Set of spring nuts M4	Set of spring nuts M6
Article number	9806006000	9806007000
		
Design	Set of 10	Set of 10

Article	19" Mounting kit	Front panel preparation service
Article number	9806112000	On request
		
Design	Set of 4, used only together with front panel mounting brackets, e.g. in front panel mounting kits or in enclosures already supplied by BERNSTEIN.	We machine front and rear panels individually to suit your specific requirements. Engraving or various printing processes also possible on request. Simply provide us with a drawing with your requirements.

Set of clamping elements (PC670/PC677)

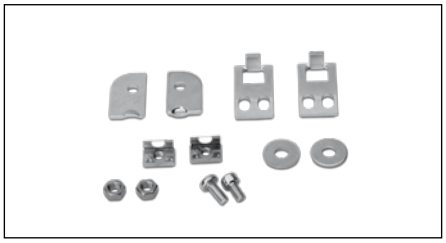
9806324000



Set of 6 clamping elements for direct installation of Siemens PC 670/677

Front panel mounting kit CC-3000

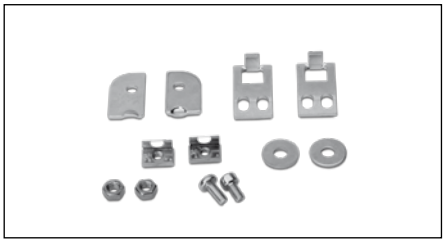
9806508000



Set of 10 mounting elements

Front panel mounting kit CC-4000

9806509000



Set of 10 mounting elements

Mounting plates

On request

Made to suit your enclosure on request. Please specify required size or enclosure article number.

Robust for harsh production environments



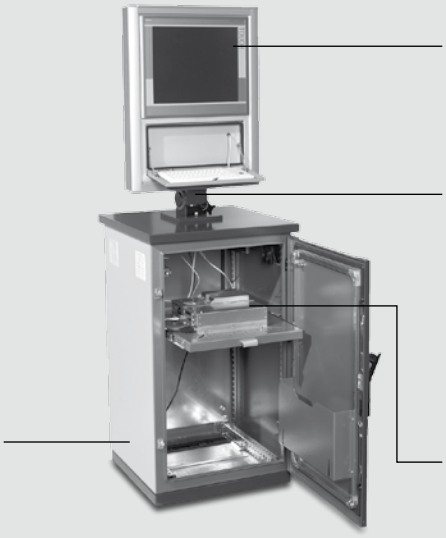
All industrial workstations look good on paper. It is only when they are put to the test in harsh everyday production conditions do they show what they are really worth. Therefore, the BERNSTEIN WS-6000 not only looks good, but also has the intrinsic qualities to back this up:

With its robust sheet steel cabinet and modular aluminium control enclosure, the workstation provides permanent and reliable protection for sensitive control electronics in harsh production environments. Whether vibration, impact, dust or moisture – the WS-6000 is completely unaffected while impressing with its well-conceived, unsurpassed ergonomics.

With numerous variation options and a comprehensive range of accessories, the BERNSTEIN WS-6000 is the tailor-made solution for your demanding applications: e.g. system controllers, QA workplace or signalling station.

Product features

- Coordinated system in terms of design and configuration
- Sheet steel and aluminium design
- individual colour schemes in most RAL shades available on request
- Protection class IP65 (cabinet IP55)
- Perfected ergonomics
- Compact design
- Service-friendly layout
- Flexible concept for tailored solutions
- Extensive range of accessories
- Complete solutions from under one roof



Modular BERNSTEIN aluminium control enclosure CC-3000, CC-4000 or CC-4000 SL

Special coupling designs for ergonomic operation

Completely closed sheet metal cabinet with protection class IP55. Different heights and variable colour scheme available.
Standard version 600 x 600 x 1042 mm and colour RAL 7035.

Extensive range of BERNSTEIN accessories for equipping the inside of the cabinet with mounting rails/plates, wiring frames, climate control components and much more.

Modular control enclosures

Together with the tried-and-tested Series CC-3000 and CC-4000/ CC-4000 SL aluminium control enclosures, the BERNSTEIN WS-6000 workstation offers a wide variety of solutions for encapsulating operator control panels, visualisation units and IPCs. Thanks to their modular design, the control enclosures are extremely well suited for customer-specific solutions.

The width and height can be freely selected in the enclosure configuration. Base elements of different depths are simply combined to create the required enclosure depth: This makes it possible to achieve graduated installation depths from 103 mm to 246 mm for the CC-3000 and from 80 mm to more than 600 mm for the CC-4000.

As all enclosure sections feature internal grooves, components can be effortlessly mounted simply using spring nuts.

The method used to secure the internally mounted front panels is just as simple. A quick assembly system ensures the front panel can be mounted directly without the need for additional work.

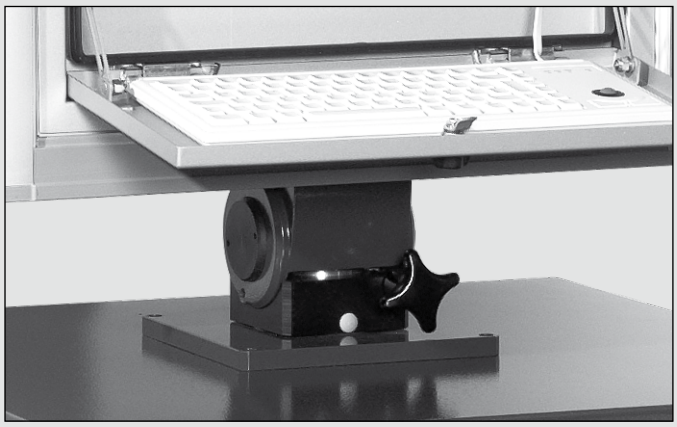
You will find detailed information on our range of control enclosures from Page 72 onwards.

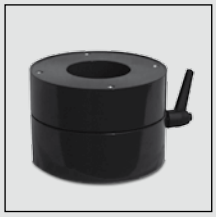
From Page 82 onwards you will also find the extensive range of accessories for the control enclosures used in connection with the BERNSTEIN WS-6000 workstation. All accessories are designed to provide a wide variety or ergonomic solutions that ensure safe operation of the BERNSTEIN WS-6000 industrial workstation without fatigue.

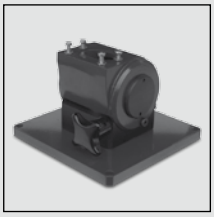


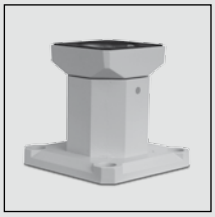
Special coupling systems

Corresponding to requirements, various coupling systems can be utilised for the purpose of connecting the control enclosure and bottom cabinet. Each coupling has its own specific features. The turn/tilt coupling for instance provides the best possible ergonomics thanks to unlimited variability it offers in aligning the control enclosure. The special design of the rotary coupling suppresses the 'chimney effect', thus preventing dust and heat from the bottom cabinet entering the control enclosure. The two base couplings, on the other hand, are particularly suitable for narrow panel enclosures.











Four coupling systems are available:
Rotary coupling, turn/tilt coupling, base coupling, base tilt coupling

Highly effective heat dissipation

The more powerful the computer, the more heat it produces. The risk of overheating rises exponentially in configurations where the electronics are completely enclosed. To effectively prevent heat failure of sensitive components, the control enclosure and bottom cabinet can be equipped with various systems for both passive and active heat dissipation.

In order to create the most favourable prerequisites for heat transfer, great importance was attached to passive heat dissipation when designing the BERNSTEIN WS-6000 industrial workstation.

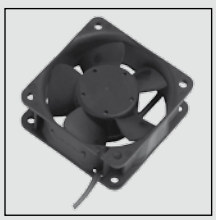
The range of accessories for the WS-6000 features many well-proven options specifically designed for thermal management in the bottom cabinet. The majority of heat build-up problems can be easily solved with filter fans fitted in the enclosure. The fans can be thermostatically controlled or speed-regulated to ensure increased reliability and longer service life. High-performance mini climate control units are the first choice for applications where fans cannot provide sufficient cooling capacity or should not be used.

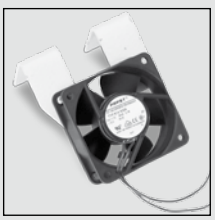
The single-wall configuration gives the aluminium section particularly good passive heat dissipation properties while conforming to protection class IP65. In many cases, therefore, there is no need to use active coolers. To meet increased heat dissipation requirements, it is possible to use internal (not outward blowing), low-wear and maintenance-free fans.

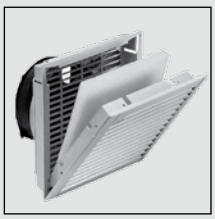
Thermal management is an important subject that should not be left to chance. Our technicians would be pleased to advise you on the most effective solution to the specific cooling requirements of your application.















Extremely sturdy bottom cabinets

The bottom cabinet is the load-bearing base of an industrial workstation. Stability and torsional rigidity are the decisive factors that govern the mechanical integrity of the overall construction. BERNSTEIN therefore uses only the highest quality materials as well as a sturdy frame structure for the cabinet body and door of the WS-6000 workstation.

Accordingly, the body of the bottom cabinet is made from solid, 2 mm thick, welded steel side panels. Together with the frame sections, this structure ensures maximum stability. The stability is further enhanced by the base guide rails and the reinforcements in the top section. Two internal reinforcement elements are additionally used for the sheet steel worktop.

The WS-6000 workstation has a static load bearing capacity of up to 150 kg. The door structure with maintenance-free 4-point bar lock and 180° opening angle (rear door 120° opening angle) provides unobstructed access. However, it is not only the mechanical qualities of the WS-6000 bottom cabinet that are of an exceptionally high standard, but, in addition to the IP55 protection rating, the efficient EMC protection and the numerous equipotential bonding options via earthing connections also contribute to the effective protection of the sensitive electronics.

Thanks to its uncompromising long-term quality, the WS-6000 workstation is predestined for use in harsh industrial environments and offers the ideal prerequisites for individually configuring workstations to your specifications. For this purpose, the comprehensive BERNSTEIN range of accessories includes everything you will need to optically configure the inside of the WS-6000 cabinet:

mounting plates, mounting rail systems, installation frames, various rear panel/door solutions, holders for circuit diagram, etc. The appealing appearance of the cabinet is further enhanced by coloured design elements on the door and inspection door. Find out more. We would be pleased to show you what's possible with the WS-6000.





Instead of a closed sheet steel door, a door with a safety glass inspection window is also available, featuring design trim panels on the door and inspection window. The rear panel can also be designed as a door.



The WS-6000 is available with a fixed base or on castors.

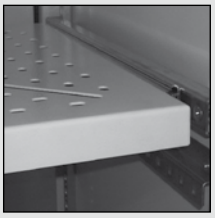


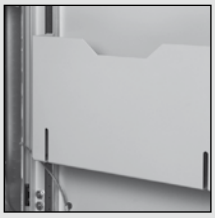


Open for your applications: Thanks to a comprehensive range of accessories, the WS-6000 can be perfectly adapted to your requirements.









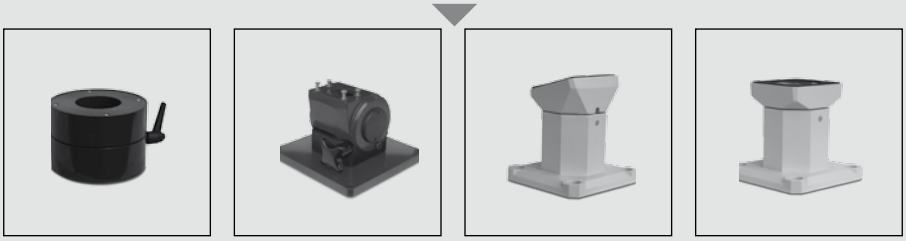
The interior of the WS-6000 bottom cabinet can be customised for any application. Interior lighting, fixed shelves and circuit diagram holders are just a few examples.

Endless possibilities

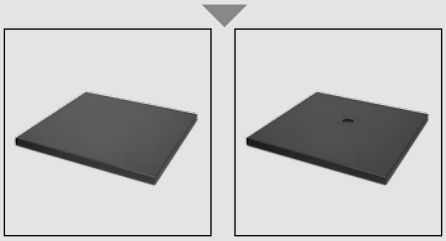
How to put together your individual BERNSTEIN WS-6000 workstation:



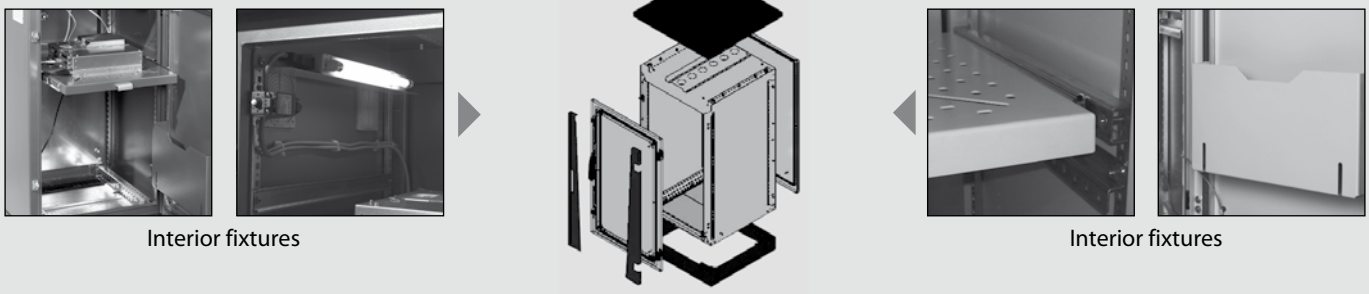
Monitor/control enclosures



Couplings



Worktops

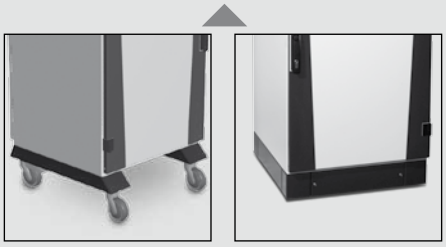


Interior fixtures

Interior fixtures

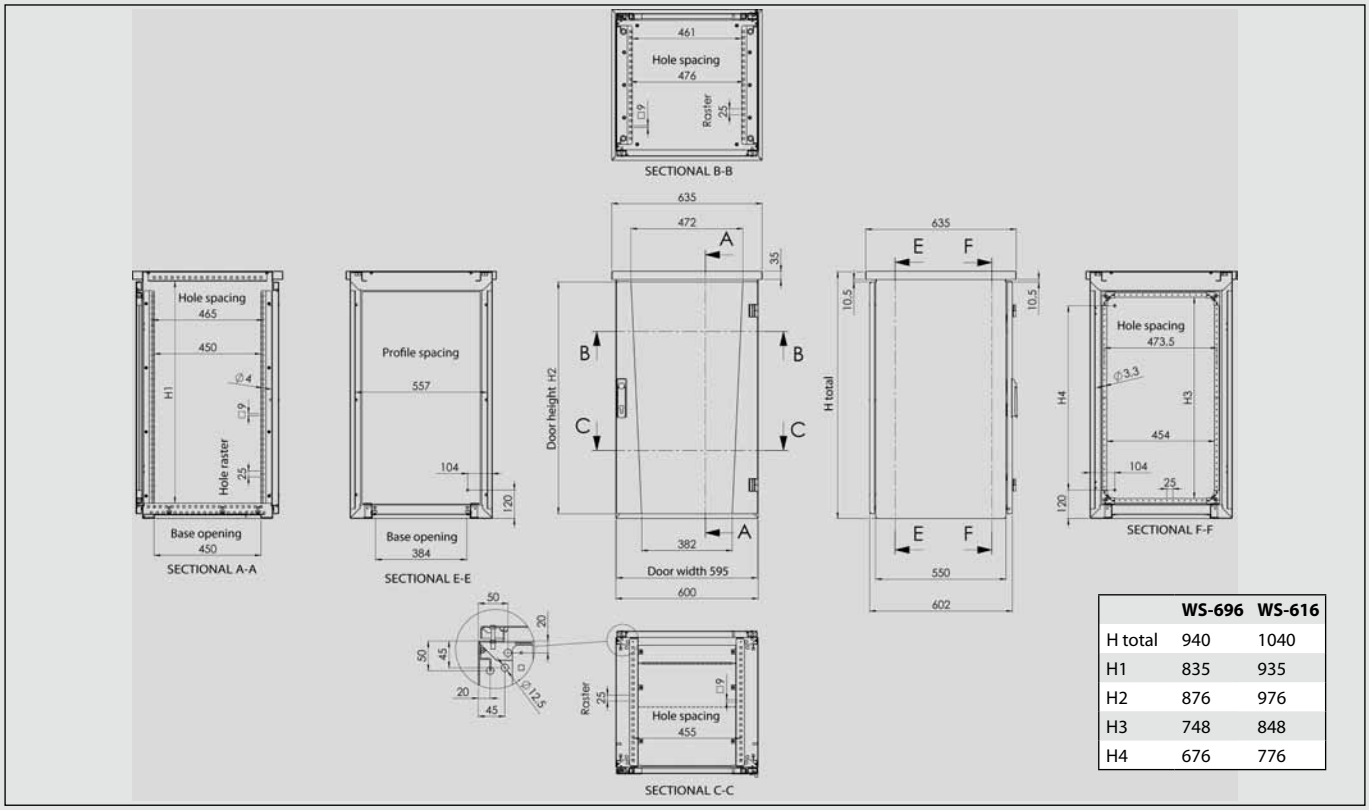


Bottom cabinet variants



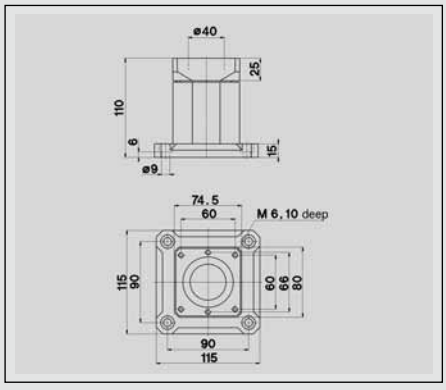
Base variants

Bottom cabinets with sheet metal worktop

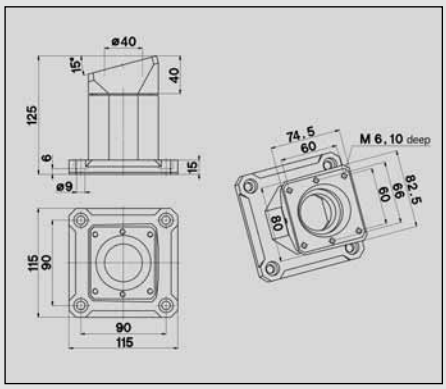


	WS-696	WS-616
H total	940	1040
H1	835	935
H2	876	976
H3	748	848
H4	676	776

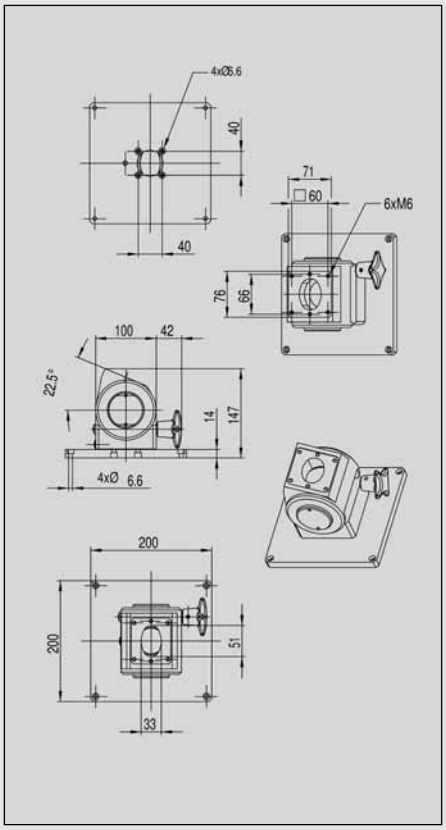
Couplings



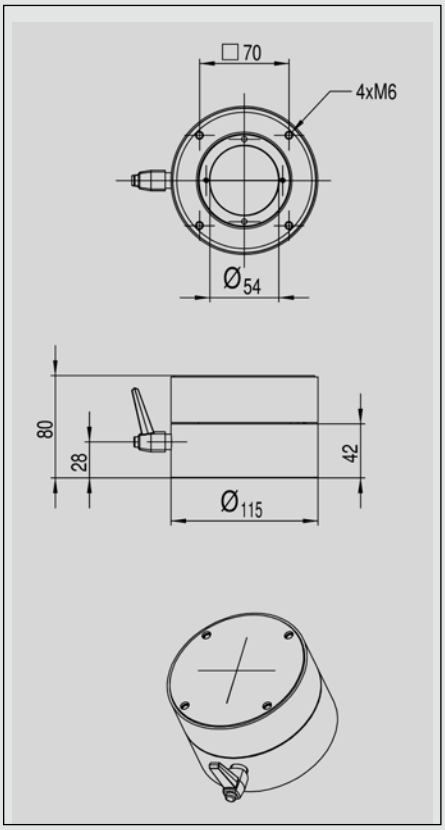
Base coupling
Article number: 1015167000



Tilt base coupling
Article number: 1015168000



Turn/tilt coupling
Article number: 1016329000



Rotary coupling
Article number: 1014100001

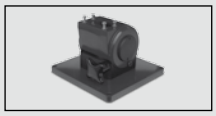
Please refer to Page 82 for control enclosure accessories

Coupling components



WS coupling 78 **1014100001**
Rotary coupling, angle of rotation 90°, left and right stop, locked in position with clamping lever, RAL 7016
Height 78 mm

WS coupling 140 **1014100002**
Same as 1014100001 but height 140 mm, RAL 7016

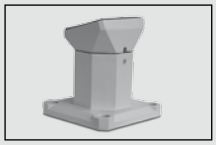


WS turn/tilt coupling **1016329000**
Angle of rotation 300° with stop, infinitely variable tilt from 0 to 30°, RAL 7016



Base coupling **1015167000**
Angle of rotation 300° with stop, RAL 7035

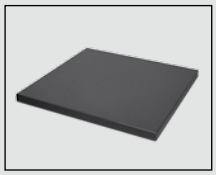
RAL 7016 **1015343000**



Tilt base coupling **1015168000**
Angle of rotation 300° with stop, Fixed inclination of 15°, RAL 7035

RAL 7016 **1015344000**

Worktop RAL 7016
(other colours on request)



Material	Machining	Art. No.	Order No.
Sheet steel	❶	WS-201	**B**
	❷	WS-201	**BX**

❶ Non-machined
❷ Machined to customer specifications

Handle, size 330 mm	GR-4300	**9806544000**
Handle, size 430 mm	GR-4400	**9806545000**

Bottom cabinets

Versions, including top reinforcement, 4 OPTIMA inner sections, 3-piece base plate. 2 base guide rails, front door opening 180° (rear door 120°), right hinged, cabinet RAL 7035, worktop and trim strips in RAL 7016, welded side panels. Add-on configuration available on request.

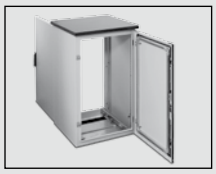


	Height	Art. No.
Design door	1000 mm	**WS-616**
Rear panel, screw-mounted	900 mm	**WS-696**



Design door with inspection window	1000 mm	**WS-616-ST**
Rear panel, screw-mounted	900 mm	**WS-696-ST**

(inspection window made of ESG safety glass)



Design door at front	1000 mm	**WS-6160**
and sheet metal door at rear	900 mm	**WS-6960**



Design door with inspection window, front	1000 mm	**WS-6160-ST**
	900 mm	**WS-6960-ST**

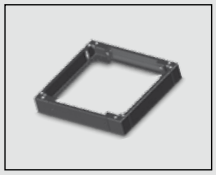
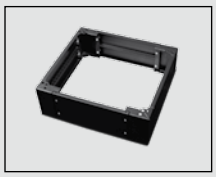
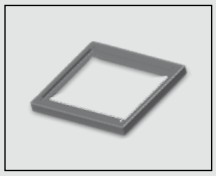
Sheet metal door, rear
(inspection window made of ESG safety glass)

Lock systems

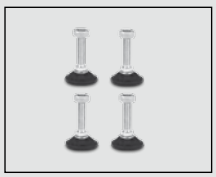
	Art. No.
 **Standard escutcheon plate, two-way bit 3 mm** Escutcheon plate complete with lock and key catch	**SV-920**
 **Swinging lever handle without actuator/without cover** Please select actuator required	**SV-5341**
 **Swinging lever handle without actuator/with cover** Please select actuator required	**SV-5343**
 **Swinging lever handle, E1 complete** Barrel with synchronous locking EK333	**SV-5348**

Lock actuator SV-5400	**SV-5400**
Barrel with synchronous locking EK 333	
Barrel, non-synchronous locking	**SV-5401**
3 mm two-way key bit	**SV-5402**
5 mm two-way key bit	**SV-5403**
6 mm square	**SV-5404**
7 mm square	**SV-5405**
8 mm square	**SV-5406**
6,5 mm Cnomo triangle	**SV-5407**
7 mm triangle	**SV-5408**
8 mm triangle	**SV-5409**
Daimler-Chrysler	**SV-5410**
Radial pin	**SV-5411**
Pushbutton	**SV-5412**
Polyamide, dummy plug	**SV-5413**

Base RAL 7016 (other colours on request)

	Art. No.	Order No.
 **Base 100** Multi-piece set 600 x 100 x 550 mm	SO-1150-WS	
 **Base 200** Multi-piece set 600 x 200 x 550 mm	SO-2250-WS	
 **Base 50** Single piece, including cable gland at rear, 600 x 50 x 550 mm	SO-6506-WS	
 **Base panel** Single piece, including cable gland at rear, 600 x 50 x 550 mm	SO-1030-WS	**9806522000**

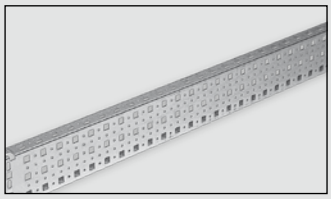
Base accessories

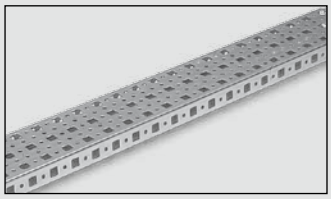
	Art. No.	Order No.
 **Base on castors** Including crossbar and 4 swivel castors Height 200 mm	SO-2950-WS	**9806523000**
 **Levelling feet** Including retainer, for use with SO-11 and SO-22, galvanised	SO-2800-WS	**9806524000**
 **Snap-on brush strip** 2 x 430 mm	BÜL-430	**9806584000**

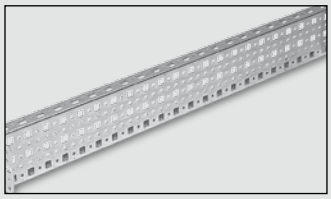
Interior fixtures

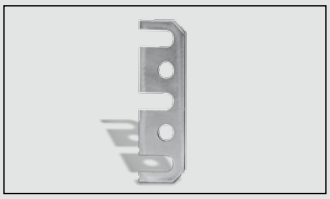
Mounting rail systems

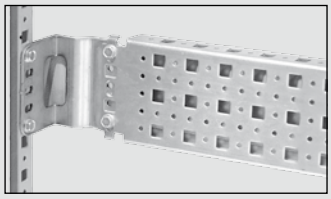
Description	Qty.	Art. No.	**Order No.**
Mounting rail system, 490 x 74 x 21 mm, side mounting, galvanised	4 ea.	ML-490	**9806525000**
Mounting rail system, 592 x 74 x 23 mm, horizontal top mounting, galvanised	4 ea.	ML-590	**9806526000**
Mounting rail system, 550 x 74 x 23 mm, horizontal intermediate mounting, low or high fitting, galvanised	4 ea.	ML-550	**9806527000**
Mounting rail system, 592 x 74 x 23 mm, between ML rails, galvanised	4 ea.	ML-570	**9806528000**
Bracket for securing various rails at rear, 50 x 65 x 54 mm, galvanised	10 ea.	ML-6670	**9806529000**
Spacer, 2 mm, for all ML rails, galvanised	50 ea.	ML-6660	**9806530000**
Self-tapping screw DIN 7976, BZ 4.8 x 9.5 mm, galvanised	100 ea.	ML-6661	**9806531000**
Carriage bolt DIN 603, M8 x 16 mm, short square, galvanised	50 ea.	ML-6663	**9806532000**
Captive nut M6, galvanised	100 ea.	ZB-5080	**9806533000**
Captive nut M5, galvanised	100 ea.	ZB-5085	**9806534000**
Pre-drilled side rail, 483 x 34 x 12.5 mm, for cabinet depth 600 mm, galvanised	6 ea.	LS-550	**9806535000**
Pre-drilled door rail, 491 x 30 x 22.5 mm, for door width 600 mm, galvanised	6 ea.	LS-475	**9806536000**
Cable support rail, 40 x 40 x 515 mm, angle section 40 x 40 x 4 mm, galvanised	1 ea.	KS-610	**9806537000**
Lightweight section rail, C35 x 18 x 460 mm, for cabinet width 600 mm, galvanised	1 ea.	CPO-600	**9806538000**
Lightweight section rail, C35 x 18 x 496 mm, for cabinet width 600 mm, galvanised	1 ea.	CPO-496	**9806539000**

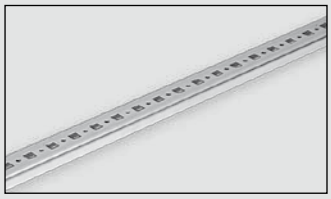

ML-490

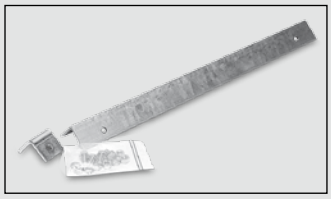

ML-590

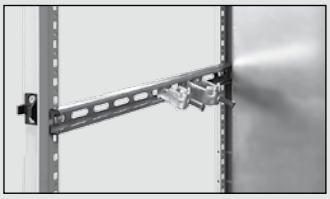

ML-550


ML-6660

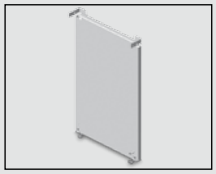

ML-6670


LS-550


KS-610


CPO-600

Mounting plates (galvanized, d = 2,5 mm)



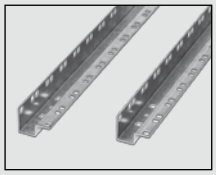
	Height	Art. No.	**Order No.**
Mounting panel, including mounting material			
Mounting panel 800 mm for cabinet height 900 mm		MP-610	**9806546000**
Mounting panel 900 mm for cabinet height 1000 mm		MP-609	**9806547000**



Mounting rack for cabinet width 600 mm, can only be installed together with ML-490 (optional)

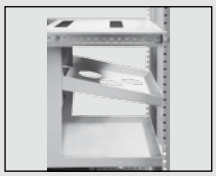
198 mm	TM-620	**9806548000**
398 mm	TM-640	**9806549000**
498 mm	TM-645	**9806550000**
598 mm	TM-660	**9806551000**

19" Inner sections (galvanised)



Height	Art. No.	**Order No.**
1000 mm	LS-1910	**9806552000**
900 mm	LS-1909	**9806553000**

Printer drawer module



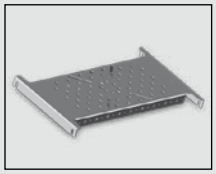
	Art. No.	**Order No.**
RAL 7035 including telescopic rails	ES-6660	**9806554000**

Document holders

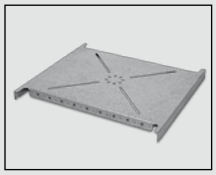


Width	Art. No.	**Order No.**
DIN A3 for door width 600 mm Sheet metal RAL 7035	ZB-5630	**9806555000**
DIN A4 Sheet metal RAL 7035	ZB-5333	**9806556000**
DIN A4 Self-adhesive, polystyrene	ZB-5026	**9806557000**
DIN A4 Self-adhesive, plastic pocket	ZB-5036	**9806558000**

Shelves RAL 7035

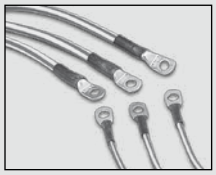


	Art. No.	**Order No.**
Fixed, with perforation and cross-holes, load-bearing capacity 30 kg	ZBP-660	**9806559000**

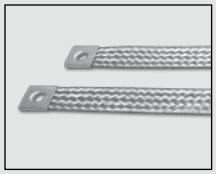


Pull-out version, including telescopic rails, mounting sections and handle, with perforation and cross-holes, load-bearing capacity 30 kg	ZBA-660	**9806560000**

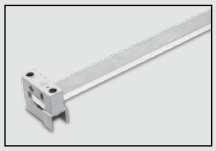
Equipotential bonding (always select as not included as standard)



	Art. No.	**Order No.**
Green/yellow, M8 cable lugs either end, Quality NYAF (Ho7 V-K)		
Earthing strap 4 mm, 200 mm long	EB-204	**9806561000**
Earthing strap 16 mm, 200 mm long	EB-216	**9806562000**
Earthing strap 16 mm, 300 mm long	EB-316	**9806563000**
Earthing strap 25 mm, 300 mm long	EB-325	**9806564000**



Copper braided strap, tin plated M8 connections both ends		
Braided strap 16 mm, 200 mm long	EB-216-EMV	**9806565000**
Braided strap 16 mm, 300 mm long	EB-316-EMV	**9806566000**
Braided strap 16 mm, 500 mm long	EB-516-EMV	**9806567000**



Busbars E-CE 30/5 Including bar carrier, length suitable for 600 mm cabinet width	PE-600	**9806568000**

Industrial Workstation WS-6000

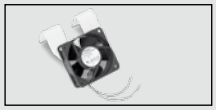
Climate control



Heat sink, rear panel — Order No.
Custom-made as required.
Please contact us.



Internal fan — **9806421000**
24 V, 40 m^3/h
Higher power rating or 230 V units available on request



Fan mounting bracket set — **9806491000**
Set of 2 brackets for axial or radial fan, RAL 7035

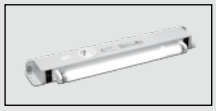


Filter fan set PF1000 — **9806492000**
230 V filter fan + outlet filter
24 m^3/h, IP54 higher power rating or 24 V units available on request



Climate control unit
230 V, 320 W, L35L35 — **9421279000**
270 x 520 x 110 mm, 13,3 kg
230 V, 400 W, L35L35 — **9421276000**
520 x 340 x 110 mm, 14,8 kg
Higher power rating or 24 V units available on request

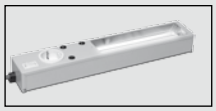
Lighting



	Art. No.	Order No.
System lamp SL	SL-4014	**9806570000**

Lamp 14 W, 230 V, 50 Hz with earthed socket outlet

	SL-027	**9806571000**



Magnetic lamp
Lamp with magnetic base for mounting in any position with 3 m cablel, 11 W, 230 V, 50 Hz

	SL-170	**9806572000**



Power cable
2 m, orange, 3-core, with plug



Switching cable with door contact switch — **9806573000**
1 m, orange, with plug matching lamps

Door arrester

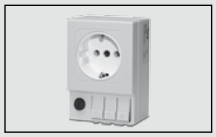


	Art. No.	Order No.
For mounting on tubular door frame	ZB-5335	**9806569000**

Socket outlets



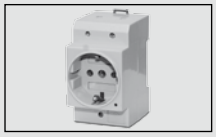
	Art. No.	Order No.
Socket strip	SD-2405	**9806576000**
5-socket „adaptus" with switch		
5-fach with overvoltage protection	SD-2405-ÜS	**9806577000**
7-socket with switch	SD-2507	**9806578000**
3-socket with switch	SD-2403	**9806575000**



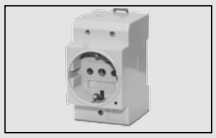
SD-3500 — **9806579000**
Socket outlet
with miniature fuse, quick-connect cable, single VDE (earthed) for TS3 25 (Germany)

Steckdose SD-3501 — **9806580000**
with miniature fuse, quick-connect cable, single CEBEC for TS 35 (Switzerland)

Socket outlet SD-3504 — **9806581000**
with miniature fuse, quick-connect cable, single for TS 35 (USA/Canada)



Earthed socket outlet SD-3600 — **9806582000**
Grey (downstream of main current) for TS 35



Earthed socket outlet SD-3601 — **9806583000**
Yellow with LED (upstream of main current) for TS 35

You will find further accessories for control enclosures on Page 82.

Notes

Checklist - Enclosure CC-3000

Customer	*Product group	*Code	*Article number
Address			Customer No.
Telephone	Telefax		Industry
Contact person		Department	

☐ Pricing enquiry

	Target price	Quantity

☐ Enquiry

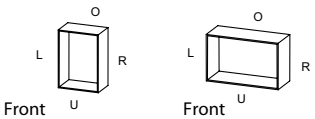
	*Enquiry No.	Annual requirement

☐ Order

Delivery date

❶ Enclosure

☐ Standard
☐ Console enclosure, upper section
☐ Console enclosure, lower section



Anticipated installation weight _____ kg

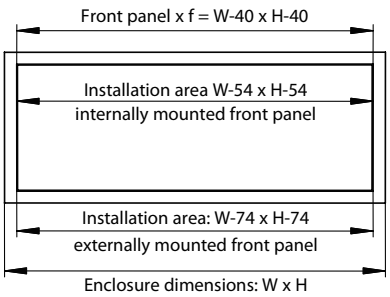
❷ Dimensions (mm) (always referred to the standard section)

External enclosure dimensions
Width x height (W x H) _____ x _____

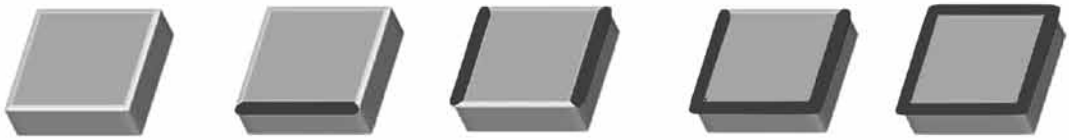
Front panel dimensions (e x f) _____ x _____
e x f = W -40 x H -40

Rear panel dimensions W x H _____ x _____

Screw-fixed rear panel: W x H = W - 7 x H - 7 Hinged rear panel: W x H = W - 9 x H - 9



❸ Front design (handle selection)



☐ None ☐ Bottom ☐ Left + right ☐ Left + right + bottom ☐ All-round

(**Important!** The external enclosure dimensions increase by 16.5 mm on the side where a handle strip is selected)

❹ Enclosure *without* door section

Enclosure depth
External depth
☐ 120 mm
☐ 200 mm

Front panel position
Installation depth
Internal ☐ 103 mm
External ☐ 111 mm
Internal ☐ 183 mm
External ☐ 191 mm

Rear panel position
*Screw-fixed **or** hinged*
☐ Screw-fixed
☐ With standard hinge
☐ With screw-mounted rear panel hinge

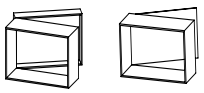
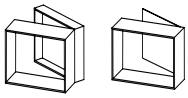
❺ Enclosure *with* door section 55 (FP = Front panel, RP = Rear panel)

Front door **or** *Rear door*	FP and RP internal	FP external and RP internal	FP and RP external
☐ 55 + 120 ☐ 120 + 55	☐ Installation depth 149 mm	☐ Installation depth 157 mm	☐ Installation depth 166 mm
☐ 55 + 200 ☐ 200 + 55	☐ Installation depth 229 mm	☐ Installation depth 237 mm	☐ Installation depth 246 mm

* Completed by BERNSTEIN AG

BERNSTEIN

❻ Door mounting

☐ **Left**  or  or ☐ **Right**

❼ Lock

Square (mm):	☐ 6	☐ 7	☐ **8 (Standard)**	☐ T-handle without lock
Triangle (mm):	☐ 7	☐ 8	☐ 6,5 (CNOMO)	☐ T-handle with lock
Two-way bit (mm):	☐ 3	☐ 5		☐ E1 (without key)
Daimler Benz:	☐	☐ Special lock/customer specification		☐ T-handle E1 (without key)

❽ Front panel

☐ None ☐ **With**

❾ Rear panel

☐ None ☐ **With**

Keyboard drawer from 175 mm depth (2HE = 89 mm, 3HE = 134 mm)

☐ Without keyboard, 0°, without lock, 2HM

☐ Without keyboard, 20°, without lock, 3HM

☐ With keyboard, 0°, without lock, German, PS2, 2HM

☐ With keyboard, 20°, without lock, German, PS2, 3HM

☐ To customer specification (description under Point 14)

19" Installation kit _____Qty.

☐ Clamping element for Simatic

❿ Partition (partition height 13 mm)

	☐ Not mounted **(standard)**		☐ unmounted (standard)
☐ **Vertical**	☐ Mounted on right	☐ **Horizontal**	☐ Bottom mounted
_____Qty.	☐ Mounted on left	_____Qty.	☐ Top mounted

⓫ Partial front panels

☐ none

1st operator panel: _____Width x _____ Height	☐ Not mounted	☐ INTERNALLY mounted	☐ EXTERNALLY mounted	_____ (Art. No. BP)
2st operator panel: _____Width x _____ Height	☐ Not mounted	☐ INTERNALLY mounted	☐ EXTERNALLY mounted	_____ (Art. No. BP)

⓬ Preparation for suspension system

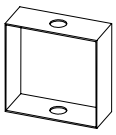
☐ **None**

☐ Standard preparation (flange SL/CS-3000)
☐ Turn/tilt coupling
☐ Tilt adapter (only section 200)
☐ Flange coupling 80 (only section 200)
☐ Console connector

☐ Automotive adapter
☐ WS couping
☐ CS-3000/48
☐ Special preparation to customer specification (see below)

☐ **Top**

Side



☐ **Bottom**

☐ TS cover, top ☐ TS cover, bottom

⓭ Surface finish

	Standard	Customer specification
Basic sections:	☐ Anodised, natural	☐ _____
Door sections:	☐ Anodised, natural	☐ _____
Corner modules/end caps:	☐ RAL 7016, powder-coated	☐ _____
Partition:	☐ Anodised, natural	☐ _____
Front panels:	☐ Anodised, natural	Article number FP: _____
Rear panels:	☐ Anodised, natural	Article number RW: _____

⓮ Accessories, Remarks (included in delivery specification: key (except E1 lock) and earthing kit)

☐ KDL 16/4 ☐ KDL 24/5 (Only with automotive dapter or without TS preparation (KDL = cable gland strip))

☐ Grommet 3-4 mm _____ Qty.

☐ Grommet 6-7 mm _____ Qty.

☐ Dummy grommet _____ Qty.

Addtionally: _____

☐ Annexes
☐ No Annexes

Vkf. _____ **TA**V _____ T**AV** _____

Checklist - Enclosure CC-4000

Customer	*Product group	*Code	*Article number
Address			Customer No.
Telephone	Telefax		Industry
Contact person		Department	

☐ Pricing enquiry

	Target price	Quantity

☐ Enquiry

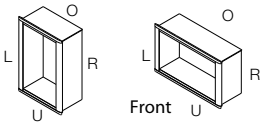
	*Enquiry No.	Annual requirement

☐ Order

Delivery date

❶ Enclosure

☐ **Standard**
☐ Console enclosure, upper section
☐ Console enclosure, lower section



Anticipated installation weight _____ kg

❷ Dimensions (mm)

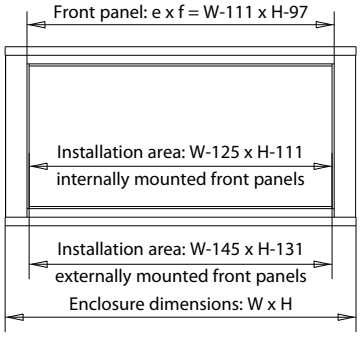
External enclosure dimensions
Width x height (W x H) _____ x _____

19" Enclosure _____ x _____

H = (n x HM) + 97 - 1 HM = 44,45 HM = _____

Front panel dimensions _____ x _____
e x f = W - 111 x H - 97

Rear panel dimensions W x H _____ x _____
W x H = W - 61 x H - 47
W x H = W - 63 x H - 47 (hinged rear panel)



❸ Type of section

☒ Section without ribbing

❹ Enclosure depth, external

Frame section with 3 mm deep FP support

_____ → ☐ 140 ☐ 200 ☐ 290

or

_____ → ☐ 52 ☐ 80

Frame section with 6.5 mm deep FP support

Extension *Internal depth for internally mounted front panel with 3 mm FP support.

☐ 68 ☐ 128 ☐ 228 ☐ 128 ☐ 68
☐ 68 ☐ 128 ☐ 228 ☐ 128 ☐ 68

The internal depth is reduced by 3.5 mm for 6.5 mm FP suport

Section	52	80	120	140	148	180	188	200	208	216	248	268	276	280	290	308	328	336	348	358	368	376	396	408	418	426	428	436	456	486	496	518	A	
	38	66	106	126	134	166	174	186	194	202	234	254	262	266	276	294	314	322	334	344	354	362	382	394	404	412	414	422	442	472	482	504	I*	
52	●		●			●	●				●			●		●			●					●										
80		●			●				◆	●			◆			◆		■				●						◆						Expansion
140				●					●			●	●					●			●		●					●			●		
200								●				◆					●	◆					◆				●		●		◆		
290															●					●					●	●				●		●	
68			●		●		●		●	●	●	◆	◆●					◆●	●	●		●	◆			●		●		●	◆			
68							●			●			●					◆								●								Frame section
128						●			◆		●	●	◆			●	●	■●					◆●	●	●			◆	●	●	●			
128																●		■					●						●					
228														●		◆			●		●	●		●			●	◆●			◆●	●		

A = External depth, I = Internal depth

Internal depth is increased by 6 mm for external mounting.

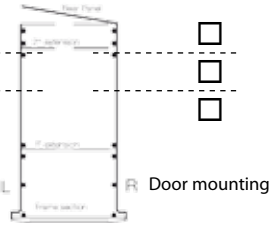
◆■ = Alternative combination

* Completed by BERNSTEIN AG

❺ Door mounting (supension system)

☐ Automotive version

☐ Rear panel ☐ ☐
☐ 2nd extension ☐ ☐
☐ 1st extension ☐ ☐
Section/fixed rear panel



☐ 2nd extension
☐ 1st extension
☐ Frame section (from 140)
Suspension system position

❻ Partition

☐ Not mounted **(standard)**

☐ **Vertical** Qty. ___
☐ Mounted on right
☐ Mounted on left

☐ **Horizontal** Qty. ___
☐ Bottom mounted
☐ Top mounted

☐ Operator panel, anodised, internally mounted
Dimensions: g x h (g = Width, h = Height)
☐ 1st operator panel ____ x ____
☐ 2st operator panel ____ x ____
☐ 3st operator panel ____ x ____

(**Important!** Partition height for frame section with 3 mm FP support = 20 mm/front panel support 6.5 mm = 25 mm)

❼ Front panel (3 mm)

☐ None
with ☐ Internally mounted
☐ Externally mounted

Rear panel (3 mm)

☐ None
☐ Externally screw-mounted
☐ Heat sink rear panel
☐ Standard hinge
☐ Screw-mounted rear panel articulated hinge

Accessories, front panel

☐ For INTERNALLY mounted panels: seal strip and mounting material
☐ For EXTERNALLY mounted panels:seal strip/washers/nuts M5
☐ 19" installation kit (9806232000): screws and captive nuts M6
☐ Set of clamping elements for SIMATIC Panel PC

Keyboard drawer from 180 mm depgth (2HM = 89 mm, 3HM = 134 mm)

☐ Without keyboard, 0°, without lock, 2HM
☐ Without keyboard, 20°, without lock, 3HM
☐ With keyboard, 0°, without lock, German, PS2, 2HM
☐ With keyboard, 20°, without lock, German, PS2, 3HM
☐ To customer specification (description under ⓭)

❽ Lock

Square (mm): ☐ 6 ☐ 7 ☐ **8 (Standard)** Triangle (mm): ☐ 7 ☐ 8
Two-way bit (mm): ☐ 3 ☐ 5

☐ Daimler Benz ☐ T-handle without lock ☐ T-handle with lock ☐ T-handle with E1 lock ☐ Customer specification

❾ Preparation for suspension system

☐ **No**

Type of coupling

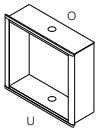
☐ Turn/tilt coupling (from section 128)
☐ Flange (see System)
☐ Tilt adapter (from section 200)
☐ Coupling head CC-4000
☐ Special preparation to customer specification

☐ Console connector
☐ Automotive adapter
☐ WS coupling
☐ CS-3000/48
TS im Profil _____

System

☐ SL (only section 80)
☐ CS-3000 (from section 128)
☐ 80 (from section 128)
☐ TS cover, top
☐ TS cover, bottom

☐ **Top**



☐ **Bottom**

☐ KDL 16/4 ☐ KDL 24/5
Only with automotive adapter without TS preparation (KDL = cable gland strip)

☐ Grommet 3-4 mm _____ Qty.
☐ Grommet 6-7 mm _____ Qty.
☐ Dummy grommet _____ Qty.

❿ Surface finish

	Standard	Customer specification
Horizontal sections:	☐ RAL 7043, painted	☐ _____
Vertical sections:	☐ Anodised, natural	☐ _____
Partition:	☐ RAL 7043, painted	☐ _____
Front panels:	☐ Anodised, natural	☐ _____
Rear panels:	☐ Anodised, natural	☐ _____

⓫ ☐ Automotive version: double GK seal, braided earthing strap, front door arrester

⓬ ☐ Climate control data for checking heat dissipation over enclosure surface

_____ (Pv) total installed power loss
_____ (°C) max. temperature, installation (e.g. PC)
_____ (°C) ambient temperature at enclsoure location
_____ (V) power supply for active cooling

⓭ Accessories, Remarks (included in delivery specification: key (except E1 lock) and earthing kit)

_____

☐ Annexes
☐ No Annexes

Vkf. _____ **TA**V_____ T**AV**_____ Enquiry_____
_____ _____ _____ Order_____

Checklist - Enclosure CC-4000 SL

Customer	*Product group	*Code	*Article number
Address			Customer No.
Telephone	Telefax		Industry
Contact person		Department	

☐ Pricing enquiry

		Target price	Quantity

☐ Enquiry

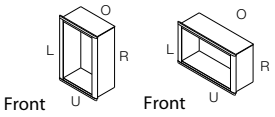
	*Enquiry No.	Annual requirement	

☐ Order

Delivery date

❶ Enclosure

☐ Standard
☐ Console enclosure, upper section
☐ Console enclosure, lower section



Anticipated installation weight _____ kg

❷ Dimensions (mm)

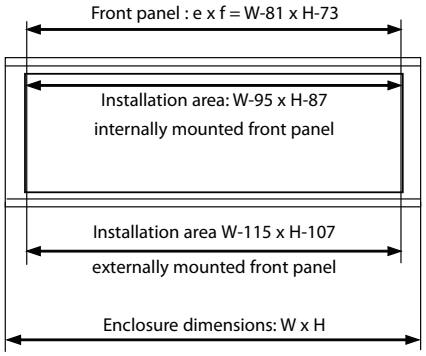
External enclosure dimensions
Width x height (w x h) _____ x _____

19" Enclosure _____ x _____

H = (n x HM) + 73 - 1 HM = 44.45 HM = _____

Front panel dimensions (e x f) _____ x _____
x f = W - 81 x H - 73

Rear panel dimensions (w x h) _____ x _____
b x h = W - 31 x H - 23
b x h = W - 33 x H - 23 (Hinged rear panel)



❸ Type of section

☒ Section without ribbing

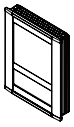
❹ Enclosure depth, external (frame section with 6.5 mm deep FP support)

☐ 55 ☐ 99

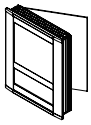
Section	**55**	**99**	**External depth (mm)**
	35	79	Internal depth (mm)

(Internal depth increased by 6 mm for external mounting)

❺ Door mounting

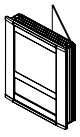


☐ Fixed rear panel



Door mounting, **left**

☐ Standard hinge
☐ Screw-mounted rear panel articulated hinge



Door mounting, **right**

☐ Standard hinge
☐ Screw-mounted rear panel articulated hinge

* Completed by BERNSTEIN AG

BERNSTEIN

❻ Partition (**Important!** Partition height for frame section = 25 mm)

☐ Not mounted **(Standard)**

☐ **Vertical**
_____ Qty.
☐ Mounted on right
☐ Mounted on left

☐ **Horizontal**
_____ Qty.
☐ Bottom mounted
☐ Top mounted

☐ Operator panel anodised, natural
(not mounted for inside) s = 3

Dimension:: g x h
(g = Width, h = Height)
1. Bedienplatte _____ x _____
2. Bedienplatte _____ x _____

❼ Front panel

☐ None
with: ☐ 3 mm, internally mounted
☐ 3 mm, externally mounted

Rear panel

☐ None
with: ☐ 3 mm, externally screw-mounted
☐ 3 mm, hinged

Accessories, front panel

☐ For INTERNALLY mounted panels: seal strip and mounting material
☐ For EXTERNALLY mounted panels: seal strip/washers/nuts M5
☐ 19“ installation kit (9806232000): screws and captive nuts M6
☐ Set of clamping elements for SIMATIC Panel PC 670/870

❽ Lock

Square (mm):	☐ 6	☐ 7	☐ **8 (Standard)**	☐ T-handle without lock
Triangle (mm):	☐ 7	☐ 8		☐ E1
Two-way bit (mm):	☐ 3	☐ 5		
Daimler Benz:	☐			☐ Special lock/customer specification

❾ Preparation for suspension system

☐ **No**

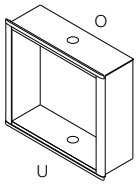
Type of coupling/system

☐ SL flange / turn/tilt coupling (only section 99)
☐ CC-3000 Adapter for narrow sections (only section 99)
☐ Coupling head CC-4000
☐ Special preparation to customer specification

☐ **Top**

Side:

☐ **Bottom**



❿ Surface finish

	Standard	**Customer specification**
Horizontal sections:	☐ RAL 7043, power-coated	☐ _____
Vertical sections:	☐ Anodised, natural	☐ _____
Partition:	☐ RAL 7043, power-coated	☐ _____
Front panels:	☐ Anodised, natural	☐ _____
Rear panels:	☐ Anodised, natural	☐ _____

⓫ EMV-Version (electromagnetic compatibility)

☐ Conductive connection between enclosure body, door, FP and RP

⓬ ☐ Automotive version; braided earthing strap

⓭ ☐ Climate control data for checking heat dissipation over enclosure surface

_____(PV) total installed power loss
_____(°C) ambient temperature at enclosure location
_____(°C) max. temperature of installation (e.g. PC)
_____(V) power supply for active cooling

⓮ Accessories, Remarks (included in delivery specification: key (except E1 lock) and earthing kit)

_____

_____

☐ Annexes
☐ No Annexes

Vkf. _____ **TA**V _____ T**AV** _____ Enquiry _____
_____ _____ _____ Order _____

Mechanical load

Different types of suspension systems can support different loads. The most important parameter when determining the right type of suspension system is the mechanical load in the respective application, which consists of the suspended enclo-sure with its built in components and the length of the extension arm.

After determining the suspended weight and the length of the extension arm in the suspension system, the overview opposite will help you select the right system.

Please note that when using a turn/tilt coupling for mounting the enclosure at the end of the suspension system, the enclosure itself should not exceed a load of 300 N.

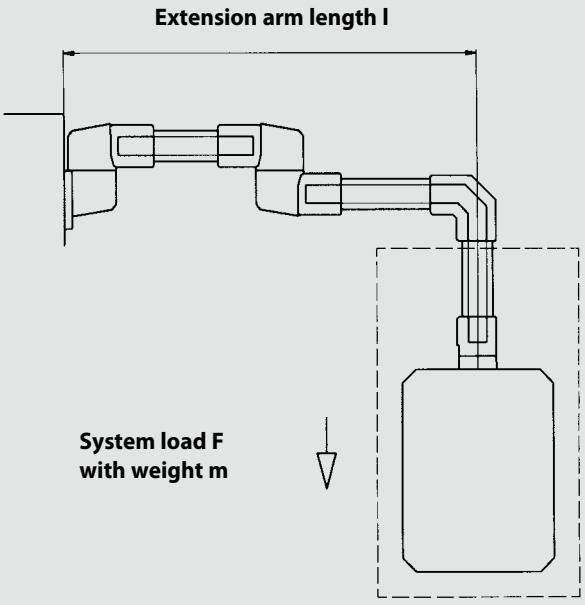
Calculation of force F (system load) as a function of enclosure weight m:

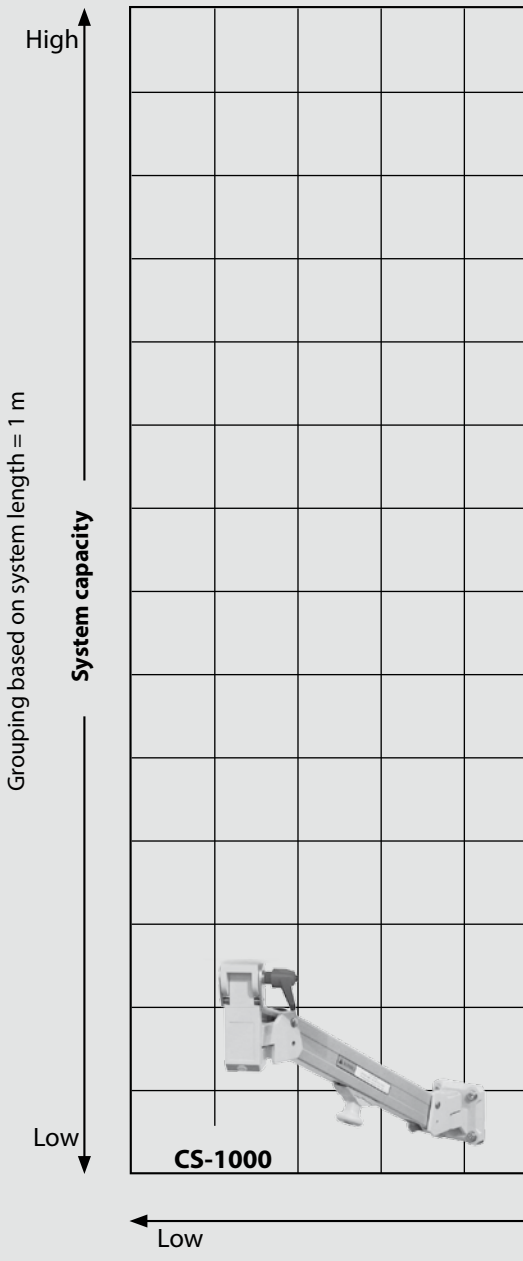
F (N) = m (kg) x g (ms-2)

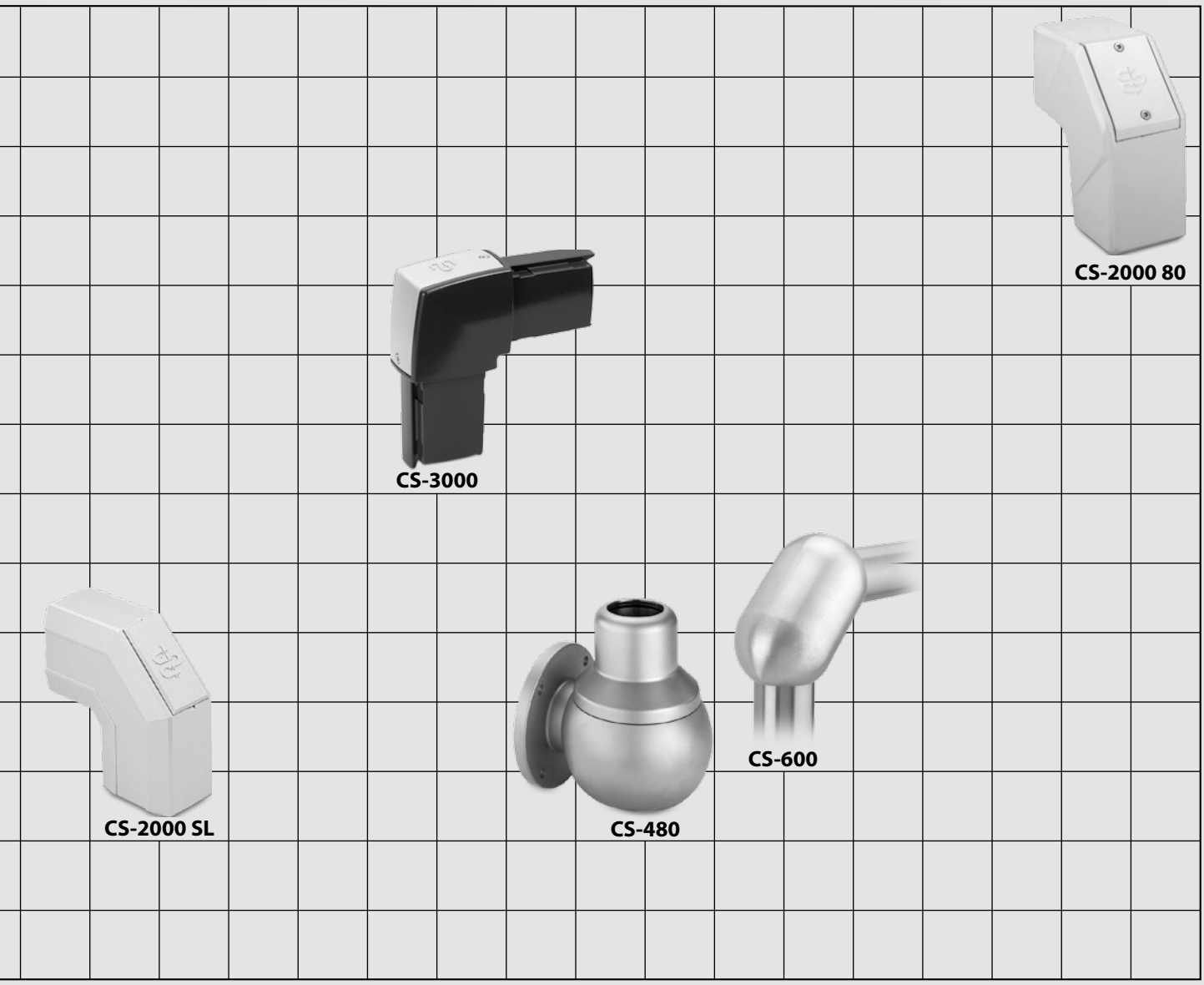
System load F = enclosure weight m multiplied by acceleration due to gravity

F (N) = m (kg) x 9,81 (ms-2)

The illustration opposite shows an overview of the various suspen-sion systems. You will find more detailed information on the exact loads of the individual systems in the following sections.







Performance → High

- Configuration options
- Mechanical stability
- Resistance

Mini-Suspension System CS-1000

Trends in the technical development of machine controllers are leading towards ever smaller operator control and display units. With the CS-1000 suspension system, devices can be simply mounted with a wide range of adjustment options.

The CS-1000 is a complete suspension system where the user does not have to select any of the individual components. The selection criteria for this system are its length and height.



System features

- Already preassembled, ready-to-use suspension system is four model variants
- Vertical adjustment range +/-45° with respect to the horizontal in two models with system length of 0.5 and 0.8 m
- Horizontal adjustment range +/-90° with respect to centre axis in all four models
- Safety locking with self-latching at the set height
- Infinitely variable rotation through 90° to either side
- Infinitely variable rotation and inclination of enclosure mounting flange
- Easy-to-open cable duct with plastic covers for cable diameters up to 10 mm

Product characteristics

A mechanism integrated in the vertically adjustable suspension system makes it possible to simply move the system upwards up to the limit stop with one hand. The system automatically locks in the required position. To lower the support arm disengage the system and, after pulling the spring-locked lever, simply move the system to the required position.

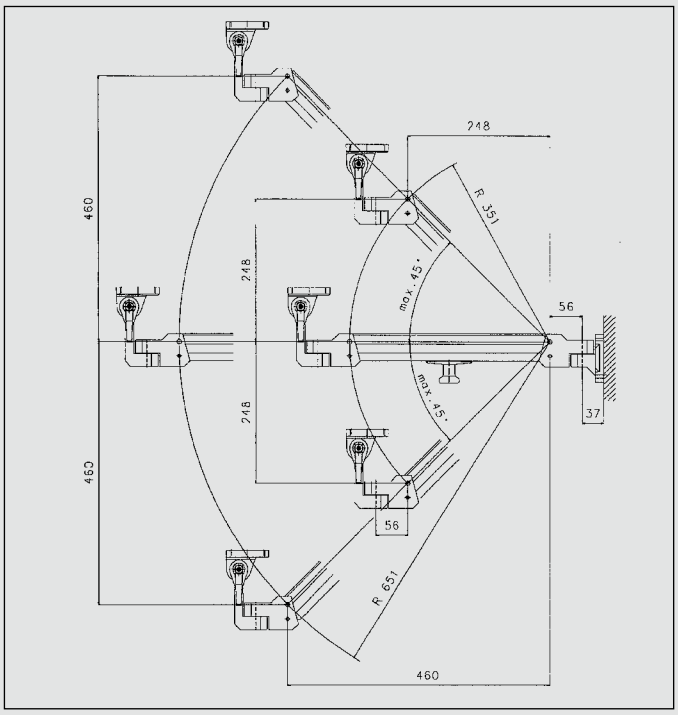
The suspension system can be mounted on a wall with the aid of a wall flange or a machine. The mounting flange for attaching the enclosure (supplied preassembled) can be fitted in two directions for suspended or top-mounted control enclosures.

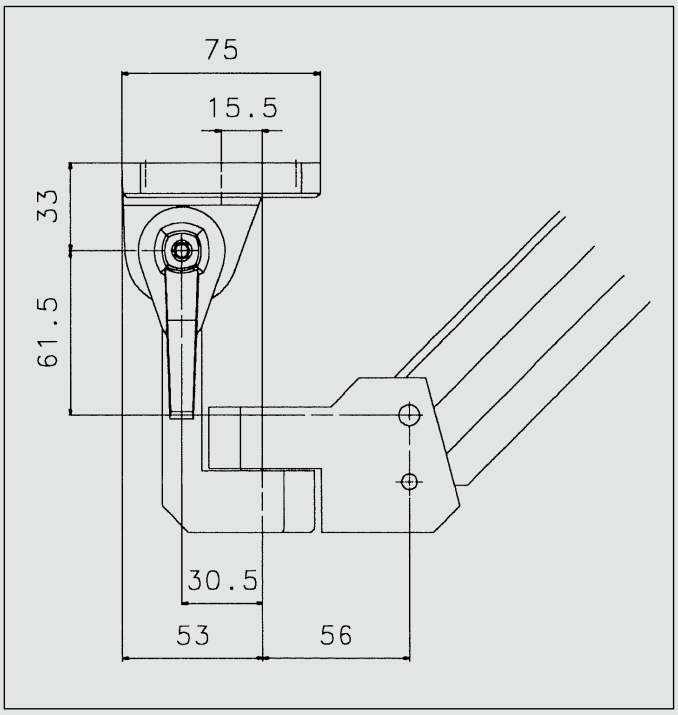
The user can subsequently adjust the ease of movement as required.

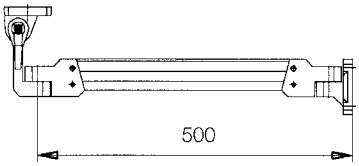
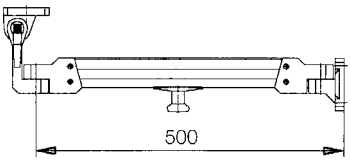
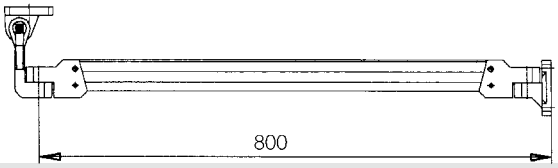
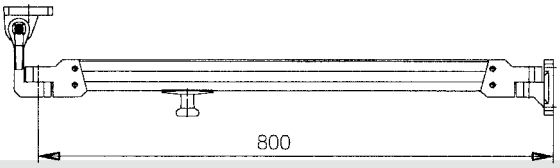
The clamping lever located on the flange carrier locks the enclosure at the required tilt angle.

Colours

All components in light grey RAL 7035 (except anodised extruded section and clamping lever in dark grey RAL 7043)





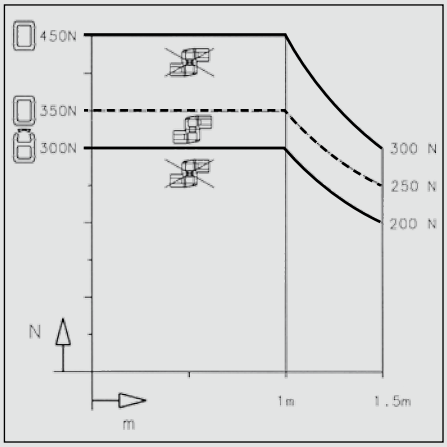
Art. No.	System length	Max. load	Possible setting angle	
			Horizontal	Vertical
				
1012000900	500 mm	13 kg	+/- 90°	
				
1012001100	500 mm	11 kg	+/- 90°	+/- 45°
				
1012001000	800 mm	9 kg	+/- 90°	
				
1012001200	800 mm	7 kg	+/- 90°	+/- 45°

Light-Duty Suspension System CS-2000 SL 45/60

The CS-2000 SL light-duty suspension system is specially designed for accepting small, lightweight control enclosures and features short extension arms. In addition to the components in light grey RAL 7035, a new version in anthracite grey RAL 7016 is now available that elegantly complements our CC-3000 and CC-4000/CC-4000 SL control enclosures (see Page 72 onwards).

System structure

Individual components of the suspension system are combined with an optionally closed or partially open aluminium connection section to achieve the required configuration in accordance with the load diagram (with the exception of panel couplings).



Load diagram

The above diagram shows the load bearing capacity of the CS-2000 SL range of suspension systems (with the exception of panel couplings).

The load bearing capacity of the system changes depending on the type of connecting section used (partially open or closed) or whether an intermediate joint is used.

The following safety factor generally applies:

With an additional load of 75 kg, the suspension system can be subjected to load for 5 seconds without plastic deformation occurring.

The overview on Pages 112/113 is designed to help you determine the load bearing capacity of all BERNSTEIN suspension systems.



CS-2000 SL Standard
RAL 7035 light grey and
RAL 7016 anthracite grey

Materials

- Components: Cast aluminium
- Installation opening: POM
- Bearing: POM
- Seals: CR
- Extruded aluminium connecting section
- Connecting section covers on open section: EPDM

Colours

- Suspension system components:
  Light grey RAL 7035
  alternatively: anthracite grey RAL 7016
- Connecting section:
  silver (natural) anodised

System features

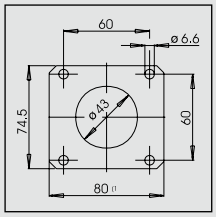
Installation opening at all joints

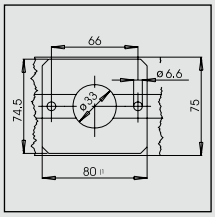
- Optionally closed or open connecting section can be used
- Clear passage opening in closed system:
  ø 40 mm = 12.5 cm^2 at narrowest point (bearing opening)
- Clear passage opening in partially open system:
  – 2.76 cm^2 at narrowest point (entry of section in components)
  – 7.40 cm^2 in closed tube
- Easily retrofitable swivel angle limitation on couplings and joints
- Couplings have a small narrow flange for mounting on very narrow enclosures
- Overhead installation of all components possible
- Modern industrial design

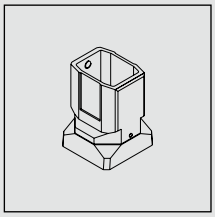
Enclosure preparation for mounting couplings

The geometry of the flange on the straight coupling and on the elbow coupling makes it possible to mount even extremely narrow enclosures. Two centrally arranged threads, with which the coupling is secured to narrow enclosures, are additionally provided for this purpose.

However, the coupling is mounted as standard by means of the four outer flange mounting threads, compatible and interchangeable with the flange mounting pattern of the CS-3000 suspension system. With a diameter of 43 mm, the hole for the cable leadthrough is adapted to the narrowest point in the suspension system (a minimum diameter of 40 mm is available in the bearing opening in the components).

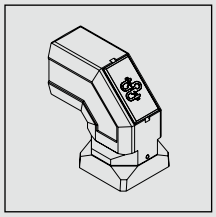






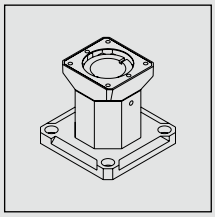
Straight coupling

Article number
1015163000
1015328000



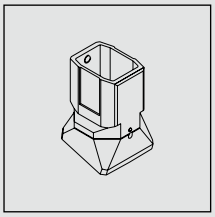
Elbow coupling

Article number
1015165000
1015329000



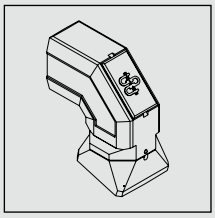
Base coupling

Article number
1015167000
1015343000



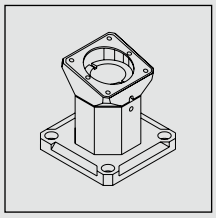
Tilt coupling

Article number
1015164000
1015330000



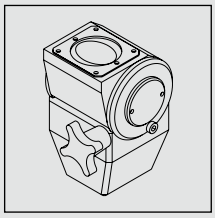
Tilt elbow coupling

Article number
1015166000
1015331000



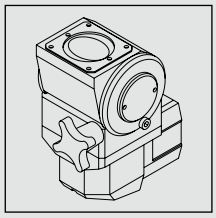
Tilt base coupling

Article number
1015168000
1015344000



Turn/tilt coupling

Article number
1015169000
1015332000

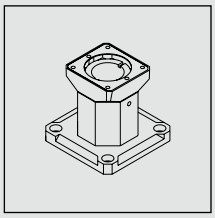


Turn/tilt elbow coupling

Article number
1015170000
1015333000

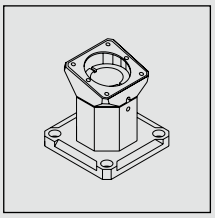
Machining mounting surfaces for suspension systems

The various elements of the suspension systems can be mounted on walls or floors as well as on or at machines and systems. The corresponding machining drawings for the individual components of the suspension system are shown here.



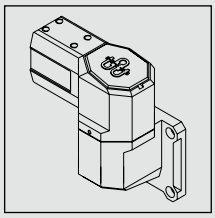
Base coupling

Article number1015167000
1015343000



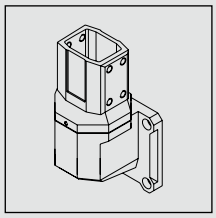
Tilt base coupling

Article number
1015168000
1015344000



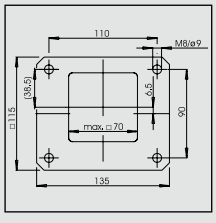
Wall joint, horizontal outlet

Article number
1015176000
1015339000

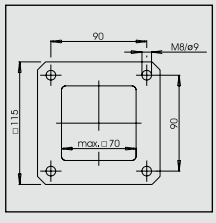


Wall joint, vertical outlet

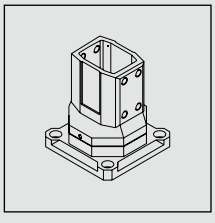
Article number
1015177000
1015338000



Wall joints

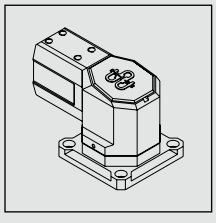


Base and top joint components



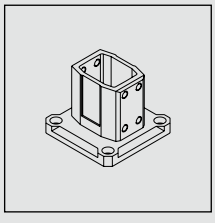
Rotary base

Article number
1015178000
1015341000



Top joint

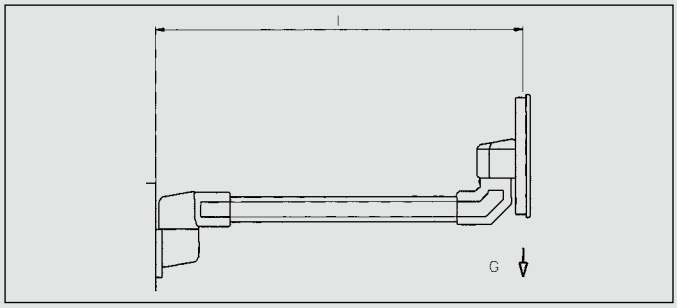
Article number
1015175000
1015340000



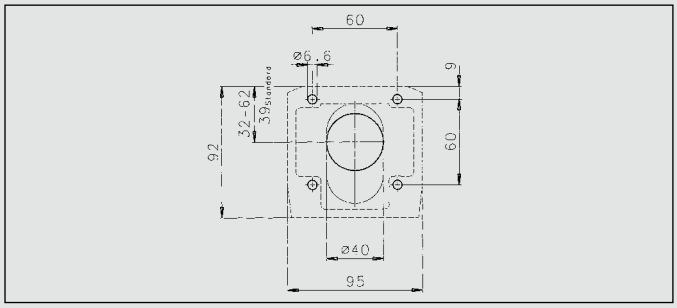
Base/ wall flange

Article number
1015179000
1015342000

Light-Duty Suspension System CS-2000 SL 45/60



Load, panel components



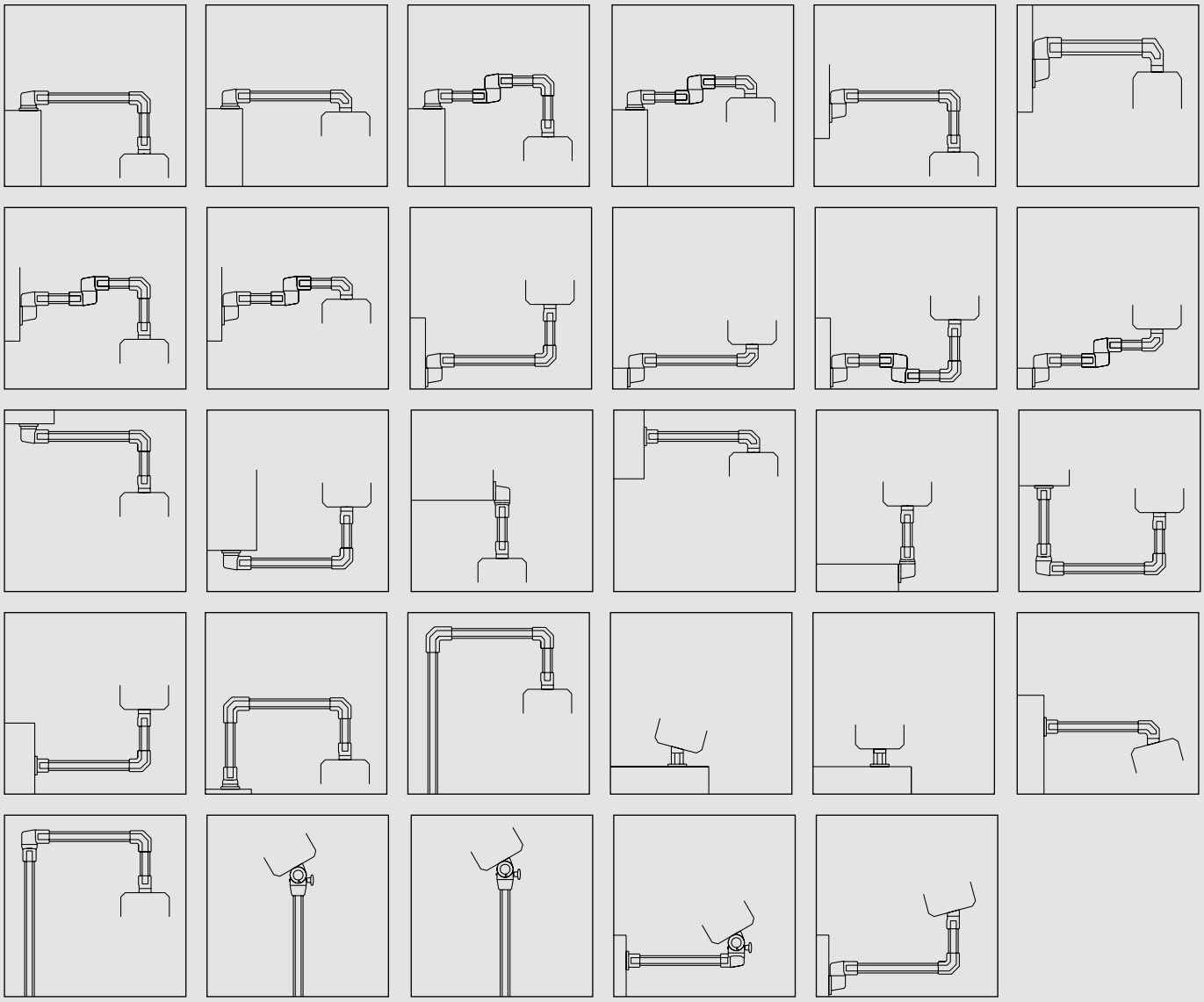
Drawing for preparing enclosure rear panel for attaching panel couplings

Mechanical properties

Max. load G	250 N
Max. System length L	1500 mm

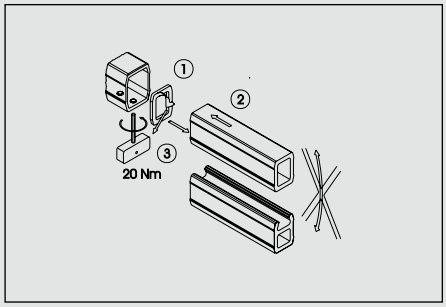
System combinations

The large number of components and different versions of the connecting sections enable many different combinations. A selection of the possible configuration is shown below.



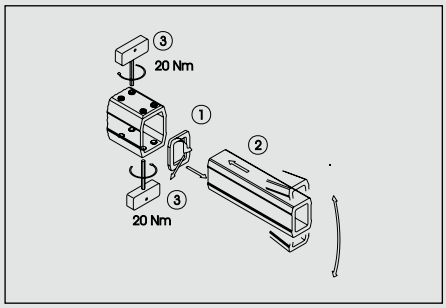
BERNSTEIN

Assembling the connecting sections



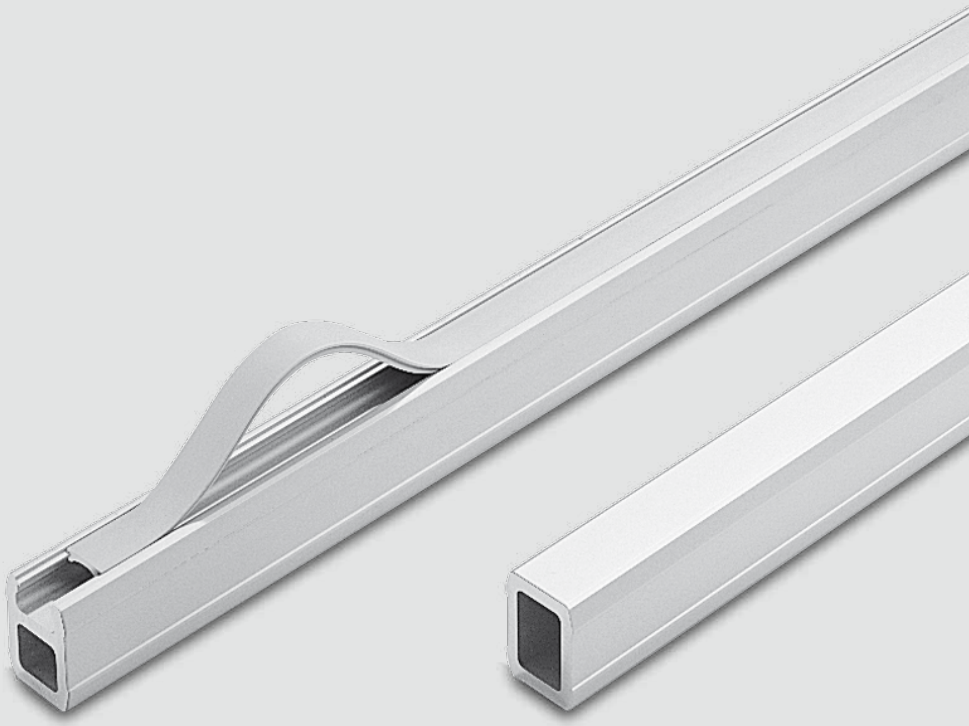
[A] Open or closed section in straight coupling and elbow coupling:

Adhere seal to connecting section (1), fit connecting section in suspension system component (2, 3).



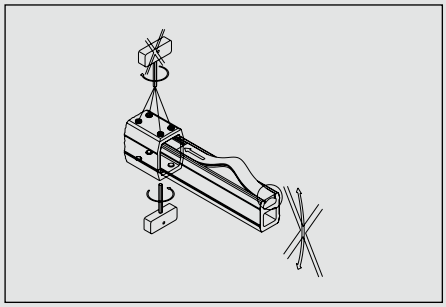
[B] Closed section in suspension system components with eight mounting screws:

Adhere seal to connecting section (1), fit connecting section in suspension system component (2, 3) while adjusting the section.



Connecting sections

The connecting section is a drawn aluminium AlMgSi 0.5 bar.
The surface is anodised and therefore corresponds to a colour similar to RAL 9006.
The connecting section can be used both in open as well as in completely closed cable ducts. The partly open section has an EPDM cover, coloured similar to RAL 7042.
This flexible plastic cover can be easily withdrawn and reinserted.

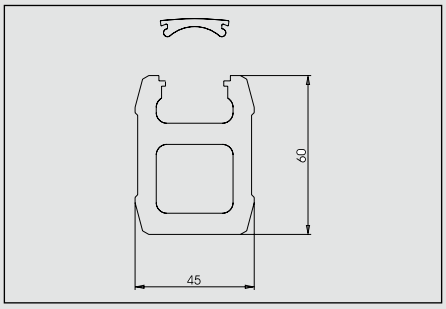


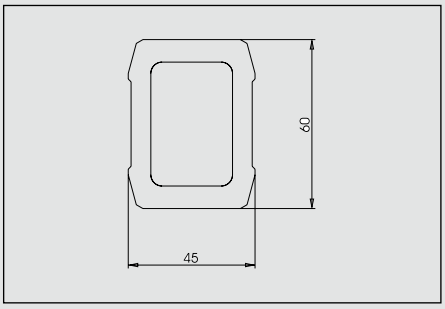
[C] Open section in suspension system components with eight mounting screws:

Adhere seal to connecting section, fit connecting section in suspension system component, only fit the four mounting screws on the closed part of the tubing, install cover seal.

Open section	
Dimensions (mm)	**Article number**
45 x 60 x 250	**9524001000**
45 x 60 x 500	**9524002000**
45 x 60 x 750	**9524003000**
45 x 60 x 1000	**9524004000**
45 x 60 x 1250	**9524005000**
45 x 60 x 1500	**9524006000**
45 x 60 x 2000	**9524008000**

Closed section	
Dimensions (mm)	**Article number**
45 x 60 x 250	**9524301000**
45 x 60 x 500	**9524302000**
45 x 60 x 750	**9524303000**
45 x 60 x 1000	**9524304000**
45 x 60 x 1250	**9524305000**
45 x 60 x 1500	**9524306000**
45 x 60 x 2000	**9524308000**





You will find an aid for selecting the load bearing capacity on Pages 112/113.

Light-Duty Suspension System CS-2000 SL 45/60

Article		**Straight coupling CS-2000 SL**		**Elbow coupling CS-2000 SL**	
Article number	(colour)	**1015163000** **1015328000**	RAL 7035 light grey RAL 7016 anthracite grey	**1015165000** **1015329000**	RAL 7035 light grey RAL 7016 anthracite grey

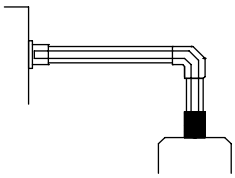


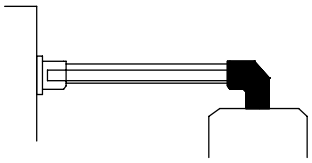


Details	Angle of rotation 300° with stop. Complete with installation material and seals	Installation opening with snap-on plastic cover. Angle of rotation 300° with stop. Complete with installation material and seals
Weight in g	740	960
Material	Aluminium	Aluminium

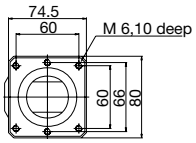
Accessories (retrofitable)	**Swivel angle limiter** **9805129000**	**Swivel angle limiter** **9805129000**

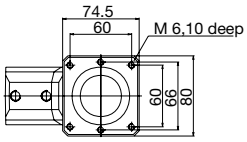
Application example

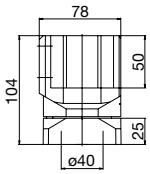


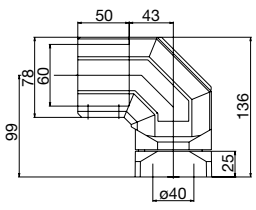


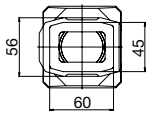
Dimensions in mm

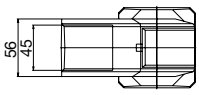












Turn/tilt coupling CS-2000 SL		Turn/tilt elbow coupling CS-2000 SL		Tilt coupling CS-2000 SL	
1015169000	RAL 7035 light grey	**1015170000**	RAL 7035 light grey	**1015164000**	RAL 7035 light grey
1015332000	RAL 7016 anthracite grey	**1015333000**	RAL 7016 anthracite grey	**1015330000**	RAL 7016 anthracite grey

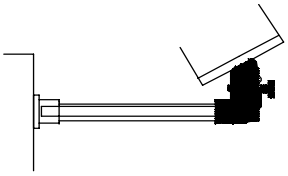


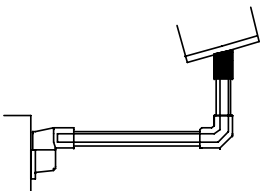


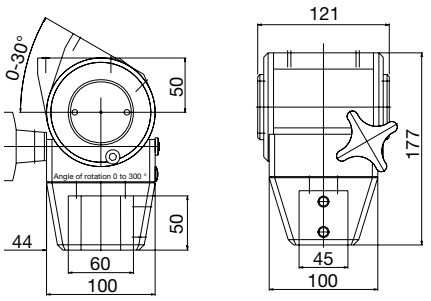


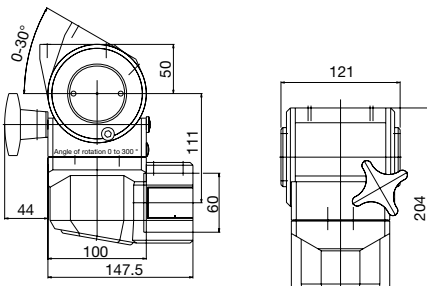
Angle of rotation 300° with stop. Infinitely variable inclination from 0 to 30°. Complete with installation material and seals. Enclosure max. 300 N	Angle of rotation 300° with stop. Infinitely variable inclination from 0 to 30°. Complete with installation material and seals. Enclosure max. 300 N	Tilt angle 15°. Angle of rotation 300° with stop. Complete with installation material and seals
3000	3300	1100
Aluminium	Aluminium	Aluminium
Swivel angle limiter 9805130000	**Swivel angle limiter 9805130000**	**Swivel angle limiter 9805129000**

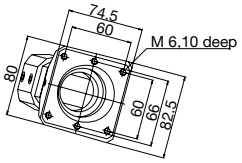


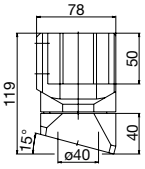


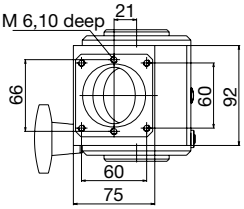


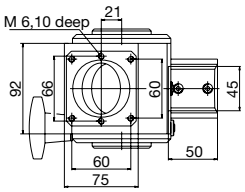


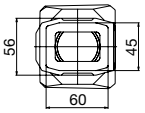




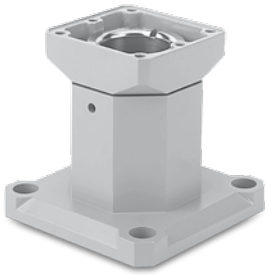
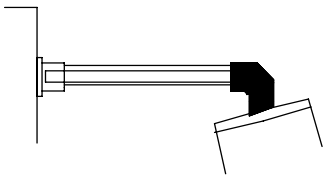
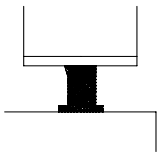
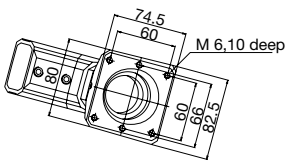
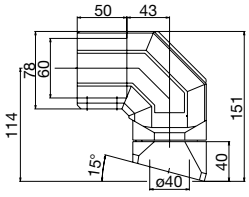
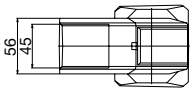
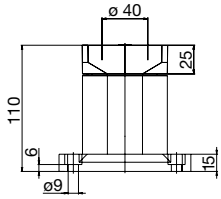
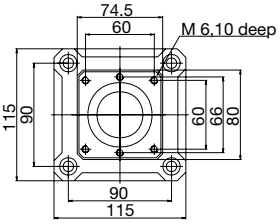








Light-Duty Suspension System CS-2000 SL 45/60

Article	**Tilt elbow coupling CS-2000 SL**	**Base coupling CS-2000 SL**
Article number (colour)		
	1015166000 RAL 7035 light grey	**1015167000** RAL 7035 light grey
	1015331000 RAL 7016 anthracite grey	**1015343000** RAL 7016 anthracite grey
		
Details	Tilt angle 15°. Installation opening with snap-on plastic cover. Angle of rotation 300° with stop. Complete with installation material and seals	Integrated component. Angle of rotation 300° with stop. Complete with installation material for enclosure and seals
Weight in g	1400	1180
Material	Aluminium	Aluminium
Accessories (retrofitable)	**Swivel angle limiter 9805129000**	**Swivel angle limiter 9805129000**
Application example		
Dimensions in mm	  	 

Tilt base coupling CS-2000 SL		Panel coupling		Panel turn/tilt coupling S	
1015168000	RAL 7035 light grey	**1015232000**	RAL 7035 light grey	**1015235000**	RAL 7035 light grey
1015344000	RAL 7016 anthracite grey	**1015346000**	RAL 7016 anthracite grey	**1015347000**	RAL 7016 anthracite grey

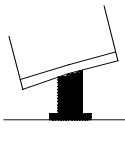


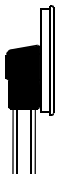


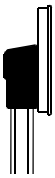


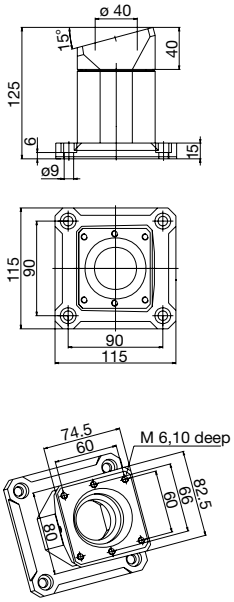
Integrated component. Angle of rotation 300° with stop. Fixed inclination of 15°. Complete with installation material for enclosure and seals	For rear connection of narrow and lightweight controller panels to the CS-2000 SL light-duty suspension system; the maximum load of this component is 250 N at a maximum system length of 1500 mm	For rear connection of narrow and lightweight controller panels to the CS-2000 SL light-duty suspension system; the maximum load of this component is 250 N at a maximum system length of 1500 mm
1200	3000	3400
Aluminium	Aluminium	Aluminium

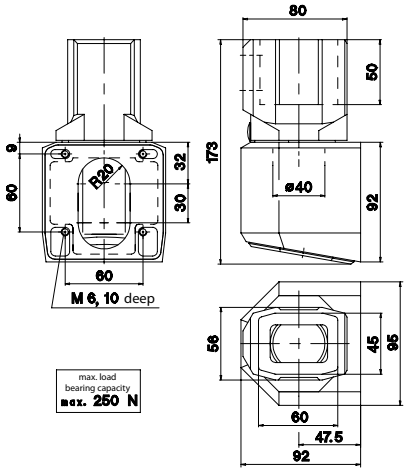
Swivel angle limiter	9805129000

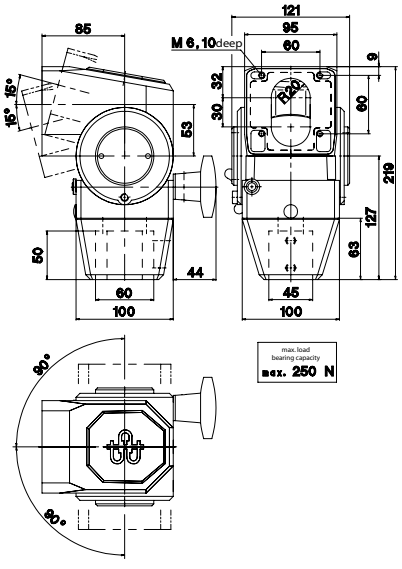








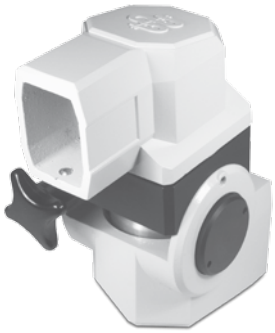




Light-Duty Suspension System CS-2000 SL 45/60

Article		Panel elbow coupling		Panel tilt/turn elbow coupling W	
Article number	(colour)	**1015233000** **1015348000**	RAL 7035 light grey RAL 7016 anthracite grey	**1015236000** **1015349000**	RAL 7035 light grey RAL 7016 anthracite grey

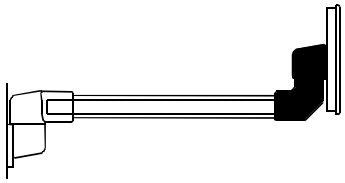


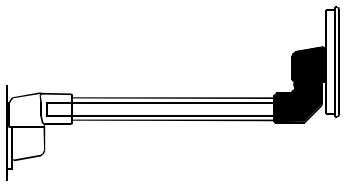


Details	For rear connection of narrow and lightweight controller panels to the CS-2000 SL light-duty suspension system; the maximum load of this component is 250 N at a maximum system length of 1500 mm	For rear connection of narrow and lightweight controller panels to the CS-2000 SL light-duty suspension system; the maximum load of this component is 250 N at a maximum system length of 1500 mm
Weight in g	3000	3460
Material	Aluminium	Aluminium

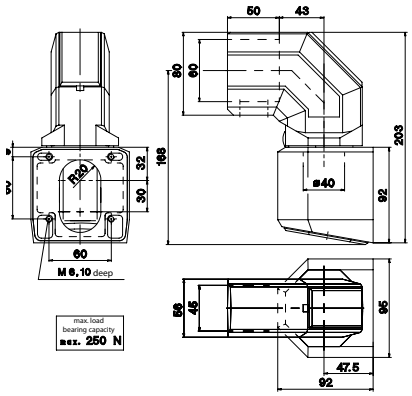
Accessories (retrofitable)

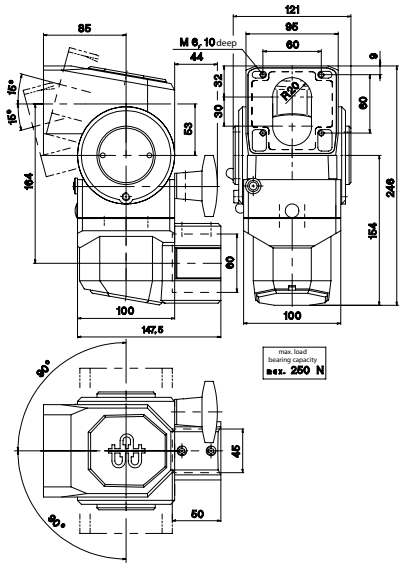
Application example





Dimensions in mm





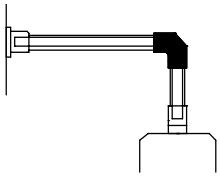
Elbow CS-2000 SL		Elbow for torque load CS-2000 SL		Plug-on joint CS-2000 SL	
1015171000	RAL 7035 light grey	**1015172000**	RAL 7035 light grey	**1015173000**	RAL 7035 light grey
1015334000	RAL 7016 anthrazit-grau	**1015335000**	RAL 7016 anthracite grey	**1015337000**	RAL 7016 anthracite grey

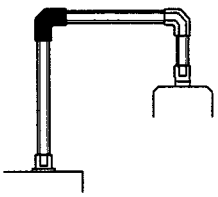


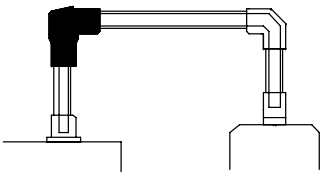


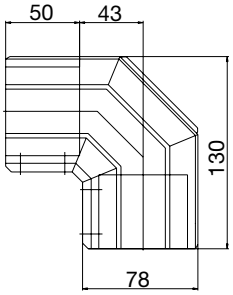


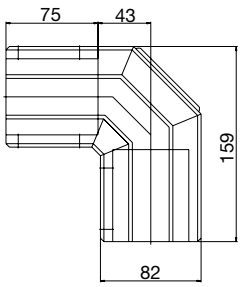
Installation opening with snap-on plastic cover. Complete with seals	Increased wall strength. Adjustment facility. Installation opening with snap-on plastic cover. Complete with seals	Swivel angle 300° with stop. Installation opening with snap-on plastic cover. Complete with seals
590	1000	1850
Aluminium	Aluminium	Aluminium
		Swivel angle limiter **9805132000**

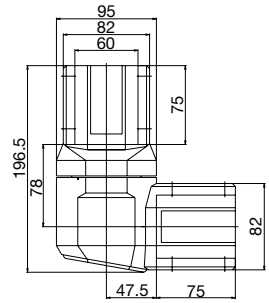


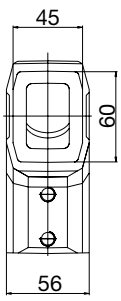


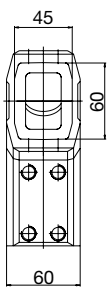


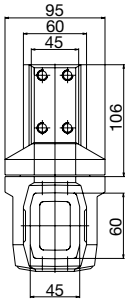












Light-Duty Suspension System CS-2000 SL 45/60

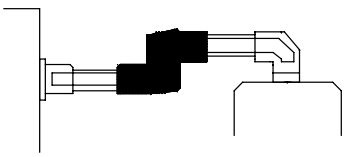
Article		**Intermediate joint CS-2000 SL**		**Top joint CS-2000 SL**	
Article number	(colour)	**1015174000** **1015336000**	RAL 7035 light grey RAL 7016 anthracite grey	**1015175000** **1015340000**	RAL 7035 light grey RAL 7016 anthracite grey

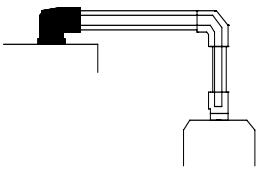




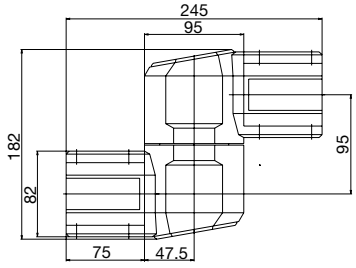
Details	Swivel angle 360° with limit stop. Installation openings both ends. Adjustment facility. Complete with seals	Swivel angle 300° with stop. Adjustment facility. Installation opening with snap-on plastic cover. Complete with seals
Weight in g	2130	1720
Material	Aluminium	Aluminium
Accessories (retrofitable)	**Swivel angle limiter** **9805132000**	**Swivel angle limiter** **9805132000**

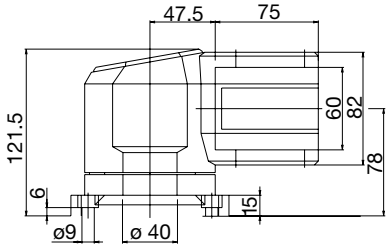
Application example

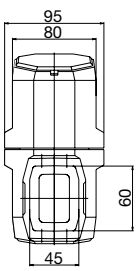


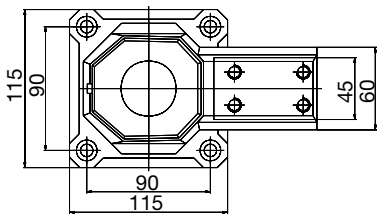


Dimensions in mm









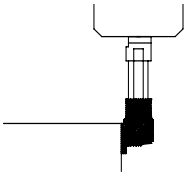
Wall joint, vertical outlet CS-2000 SL		Wall joint, horizontal outlet CS-2000 SL		Base, rotary CS-2000 SL	
1015177000	RAL 7035 light grey	**1015176000**	RAL 7035 light grey	**1015178000**	RAL 7035 light grey
1015338000	RAL 7016 anthracite grey	**1015339000**	RAL 7016 anthracite grey	**1015341000**	RAL 7016 anthracite grey

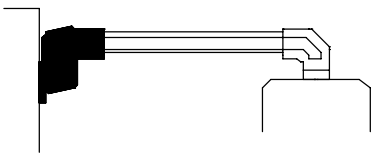


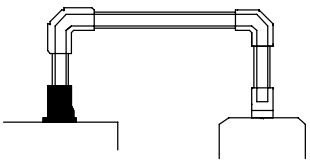


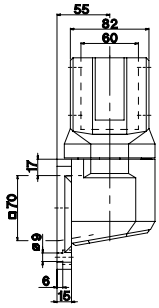


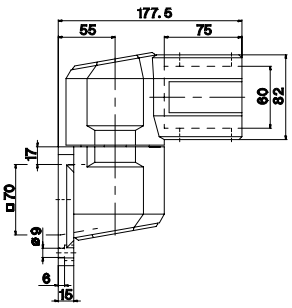
Swivel angle 300° with stop. Adjustment facility. Installation opening with snap-on plastic cover. Complete with seals	Swivel angle 300° with stop. Adjustment facility. Installation opening with snap-on plastic cover. Complete with seals	Angle of rotation 300° with stop Adjustment facility. Complete with seals
1840	2090	1460
Aluminium	Aluminium	Aluminium
Swivel angle limiter 9805132000	**Swivel angle limiter 9805132000**	**Swivel angle limiter 9805132000**

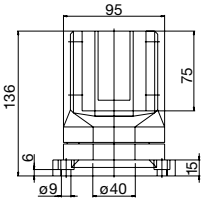


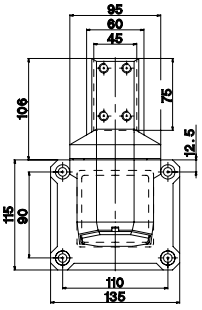


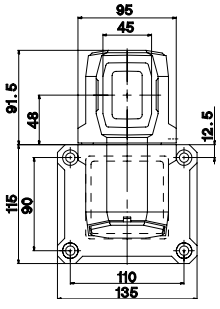


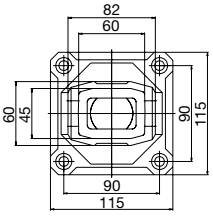












Light-Duty Suspension System CS-2000 SL 45/60

Article		**Base, wall flange CS-2000 SL**		**Free-standing base CS-2000 SL**	
Article number	(colour)	**1015179000** **1015342000**	RAL 7035 light grey RAL 7016 anthracite grey	**1015180000** **1015345000**	RAL 7035 light grey RAL 7016 anthracite grey

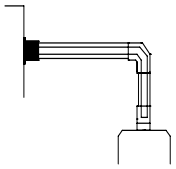


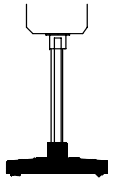


Details	Adjustment facility. Complete with seals	Base for free-standing applications
Weight in g	690	11820
Material	Aluminium	Aluminium

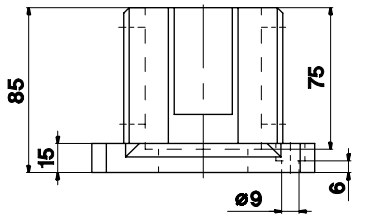
Accessories (retrofitable)

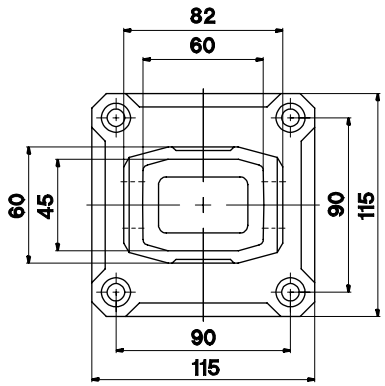
Application example

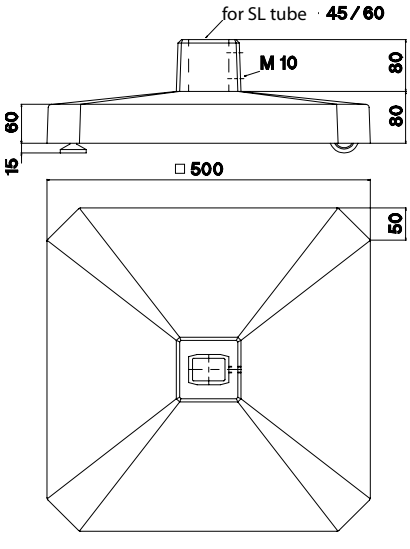




Dimensions in mm







Notes

Suspension System CS-3000

Flexible and efficient:
The BERNSTEIN CS-3000

In the main, system constructors expect modern suspension systems to feature variable configuration, progressive design and complete ease installation.

BERNSTEIN sets standards with the CS-3000: Modern industrial design, well-conceived ergonomics and host of combinable components create an innovative system solution based on modular principles for attaching enclosures, especially the BERNSTEIN CC-3000, CC-4000 and CC04000 SL enclosures (see Page 72 onwards), to machines and systems.

The particular ease of assembly and installation of the CS-3000 is reflected in substantial time savings and cost efficiency.

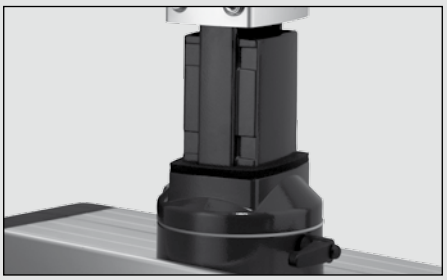


In addition to the positively locking tube mounting screws other features include:

- **Six-fold form-fit** thanks to component contour in tube attachment area (the otherwise optional safety hole additionally required for overhead installation is rendered unnecessary)
- **One-man installation** of complete system possible
- **Infinitely variable system alignment** by means of tube mounting screws
- **Subsequent alignment** possible at any time without dismantling complete system
- Cable and installation openings at all joints in the system
- Different tube lengths for variable configuration
- Tube machined at one end can be cut to required length (machining templates supplied)
- **Adjustable torque** (firmness) of all rotary components (coarse adjustment), fine adjustment by means of clamping lever or screw



Intelligent design with smooth flowing transition lines for ease of cleaning



Six-fold form-fit thanks to component contour in tube attachment area

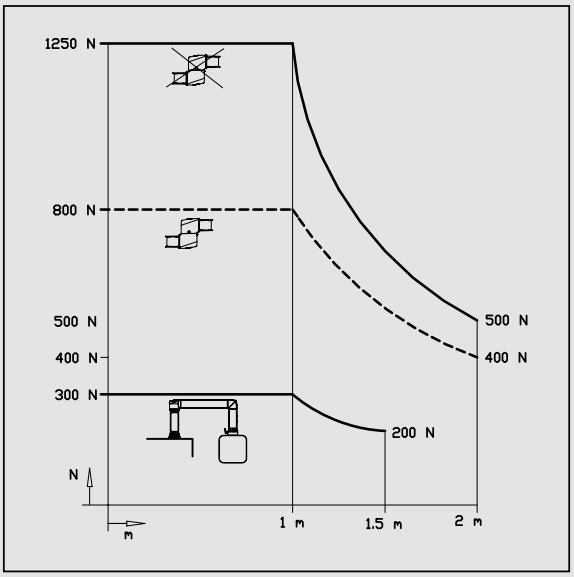


Effortless readjustment possible at any time without the need to dismantle the complete system

Other system features:

- Anodises aluminium tubes for long service life and reliable operation
- Smooth flowing transition lines from the tube to other components prevent dirt built-up (easy to clean)
- Coated tube mounting screws for sealing threaded holes and secure screw connections
- Elegant appearance with narrow sections connected by adapting the cross section from square to round tube
- Modular coupling configurations possible (also subsequently), e.g. with adapter for narrow enclosures or tilt adapter
- Well-conceived ergonomics for easy and virtually fatigue-free operation
- An ideal single-source solution for BERNSTEIN control enclosures
- Protection class IP65

Load diagram



The overview on Pages 112/113 is designed to help you determine the load bearing capacity of all BERNSTEIN suspension systems.

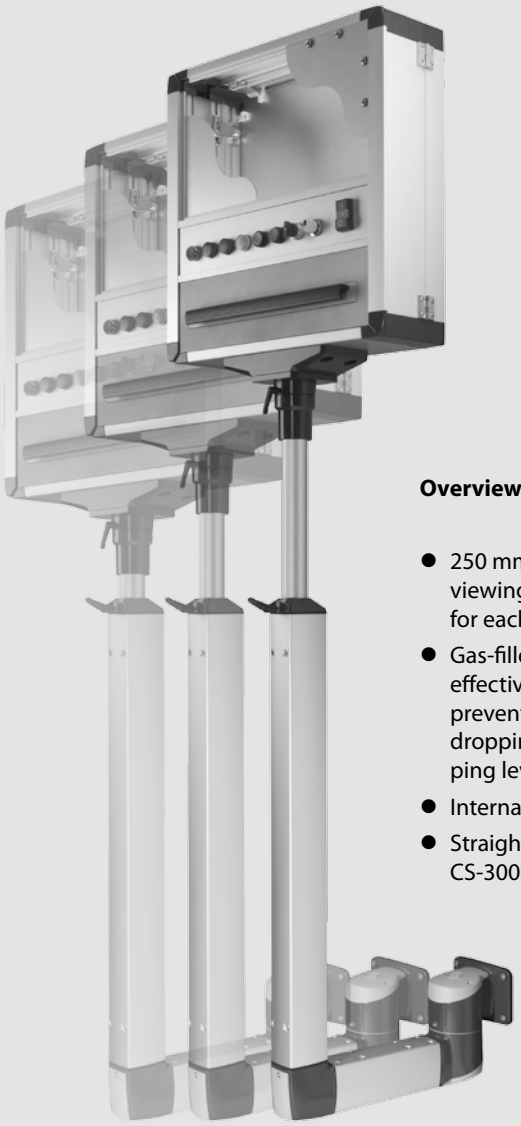
Suspension System CS-3000

CS-3000 HV – Vertically adjustable modules for optimum ergonomics

With the vertically adjustable CS-3000 HV, BERNSTEIN offers an innovative expansion to the CS-3000 suspension system. Flexible height adjustment and internal cable routing make the HV version even easier to install and operate.

With a variable lift range of 250 mm, the support system can be adjusted infinitely variable to the required working height. The integrated gas-filled damper system ensures the enclosure can be raised with minimum effort while preventing it from dropping suddenly after the clamping lever is released. This means added convenience but above all greater safety.

The CS-3000 HV is available as an optionally mobile stand base or wall-mounted version and can be easily integrated in an existing CS-3000 system.

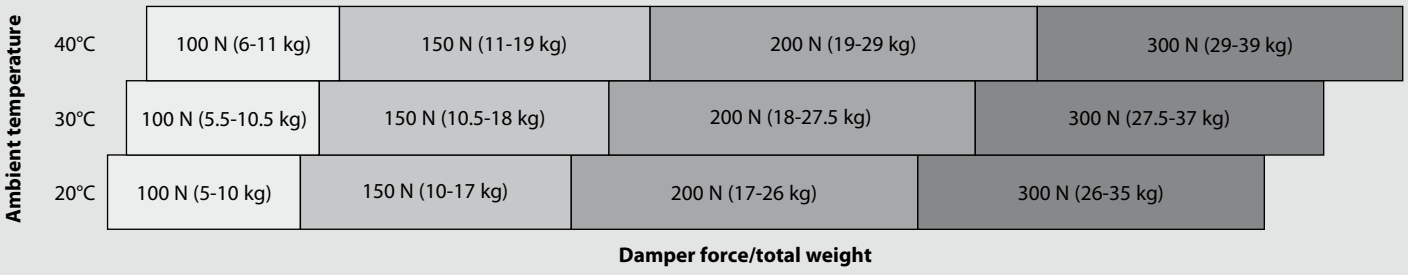


Overview of advantages:

- 250 mm variable lift; the ideal viewing height can be adjusted for each operator
- Gas-filled damper system provides effective support during lifting and prevents the supported enclosure dropping suddenly after the clamping lever is released
- Internal cable routing
- Straightforward integration in CS-3000 suspension system

Selection criteria

- Selection of the size of gas-pressurised damper depends on the total weight and the ambient temperature
- The total weight is calculated from: Enclosure + installed equipment + coupling components



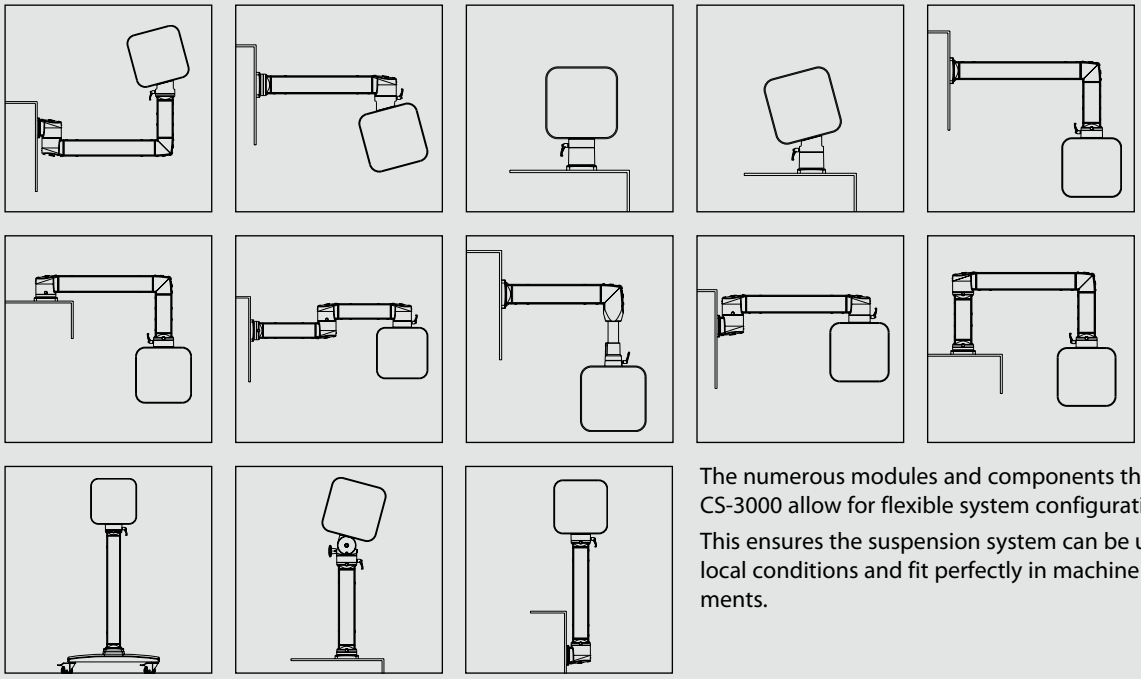
Materials

- Anodised aluminium tubing
- Pressure die-cast aluminium components
- Polyamide covers for installation openings
- POM bearing
- Neoprene seals

Colours

- Suspension system components: anthracite grey RAL 7016
- Connecting tubes: silver (natural) anodised

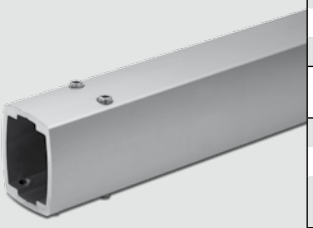
Application examples for CS-3000 suspension system – Versatile configuration options



The numerous modules and components that make up the CS-3000 allow for flexible system configuration.

This ensures the suspension system can be uniquely adapted to local conditions and fit perfectly in machine and system environments.

Square aluminium tubing



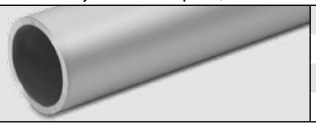
Standard lengths (available from stock)	**Article number**
Length 70 x 90 x 250 mm	**9524500001**
Length 70 x 90 x 500 mm	**9524500002**
Length 70 x 90 x 750 mm	**9524500003**
Length 70 x 90 x 1000 mm	**9524500004**
Length 70 x 90 x 1250 mm	**9524500005**
Length 70 x 90 x 1500 mm	**9524500006**
Length 70 x 90 x 1750 mm	**9524500007**
Length 70 x 90 x 2000 mm	**9524500008**
Tubes machined at one end (machining templates supplied, available from stock	
Length 70 x 90 x 1000 mm	**9524500009**
Length 70 x 90 x 2000 mm	**9524500010**

If one of our standard lengths does not suit your requirements, we can also supply tubes machined at one end. Simply shorten to the required length and use the supplied template to machine the shortened end.

Machined tubes to required lengths
We can also supply completely machined tubes to the length you require (price and delivery time on request). Or use our Express Service.

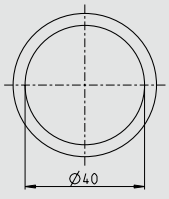
Express Service:
Order by 12 noon for next-day delivery!
Prices on request

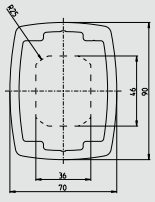
Round aluminium tubing
Round aluminium tubes in different lengths. We can also supply completely machined tubes to the length you require. (prices and delivery time on request)



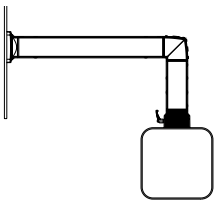
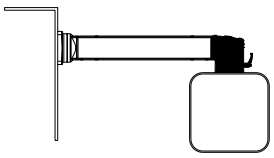
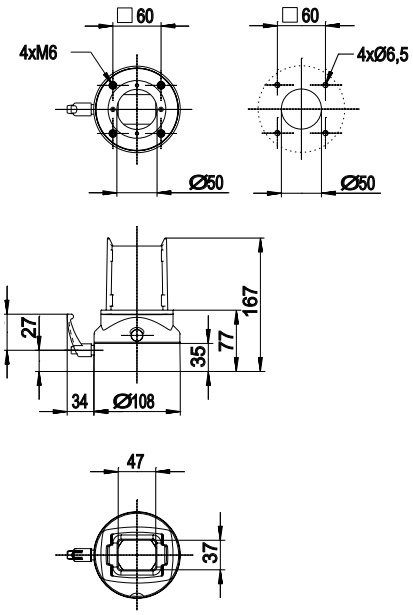
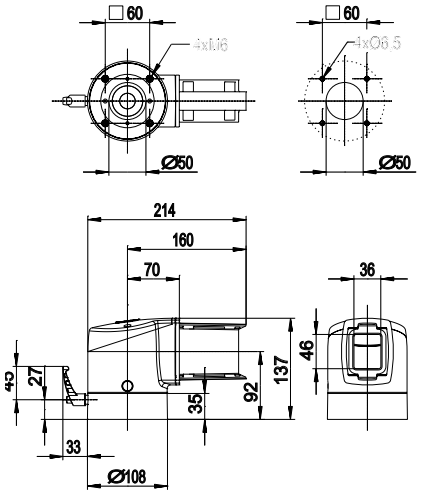
Length 48 x 4 x 250 mm	**9521400000**
Length 48 x 4 x 500 mm	**9521401000**
Length 48 x 4 x 750 mm	**9521402000**
Length 48 x 4 x 1000 mm	**9521403000**

Tube cross sections





Suspension System CS-3000

Article	**Straight coupling**	**Elbow coupling**
Article number (colour)	**1015300001** RAL 7016 anthracite grey	**1015300002** RAL 7016 anthracite grey
		
Details	Angle of rotation 300° with stop (**Adapter 101.5300.011** is required for attachment to sections < 120 mm)	Angle of rotation 300° with stop, installation opening including screw-fit plastic cover
Weight in g	1450	2070
Material	Aluminium	Aluminium
Accessories (retrofitable)	**Swivel angle limiter** **9805296000**	**Swivel angle limiter** **9805296000**
Application example		
Dimensions in mm		

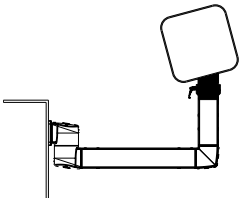
Tilt coupling 15° A		Tilt coupling 15° B		Tilt elbow coupling 15° A	
1015300013	RAL 7016 anthracite grey	**1015300014**	RAL 7016 anthracite grey	**1015300015**	RAL 7016 anthracite grey

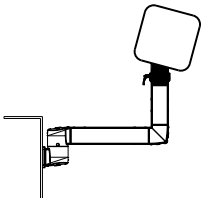


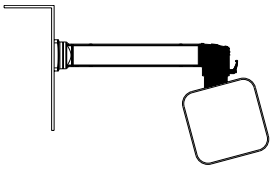


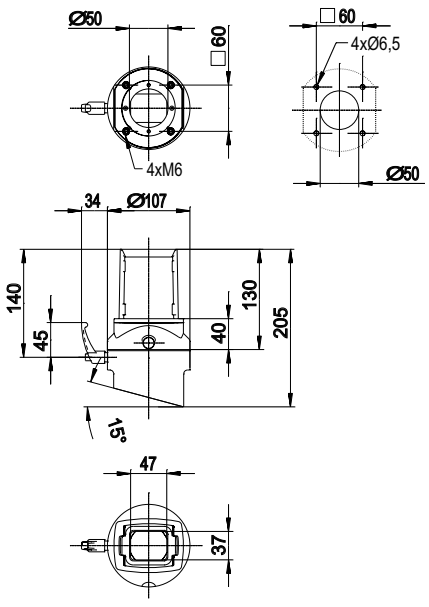


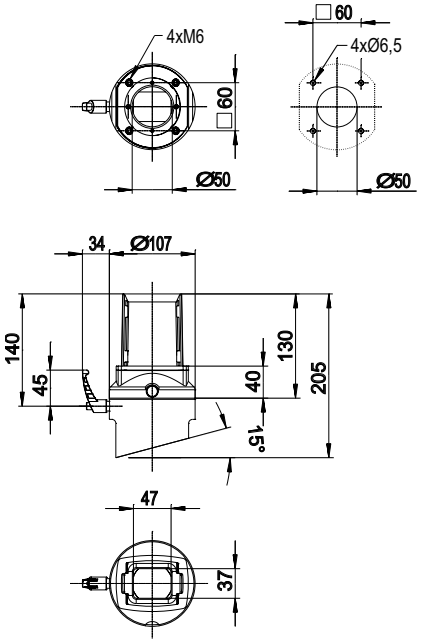
Angle of rotation 300° with stop, fixed tilt of 15° (variant A tilted back)	Angle of rotation 300° with stop, fixed tilt of 15° (variant B tilted forward)	Angle of rotation 300° with stop, fixed tilt of 15°, installation opening including screw-fit plastic cover (variant A tilted back)
1680	1680	2160
Aluminium	Aluminium	Aluminium
Swivel angle limiter 9805296000	**Swivel angle limiter 9805296000**	**Swivel angle limiter 9805296000**

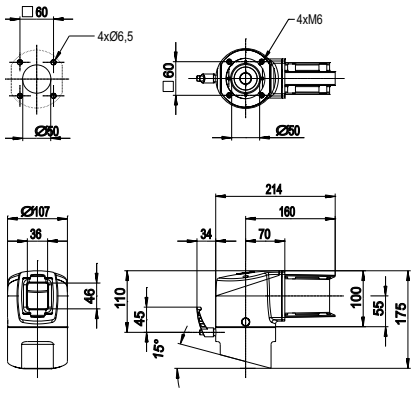




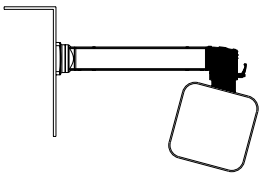
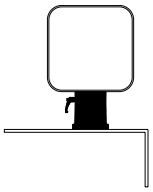
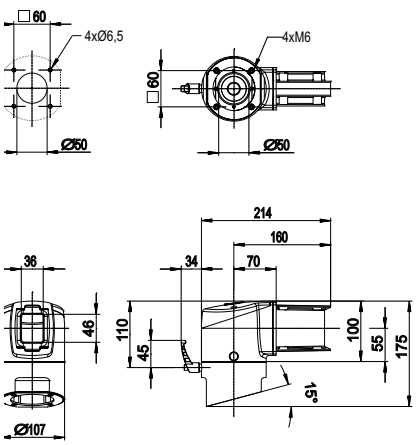
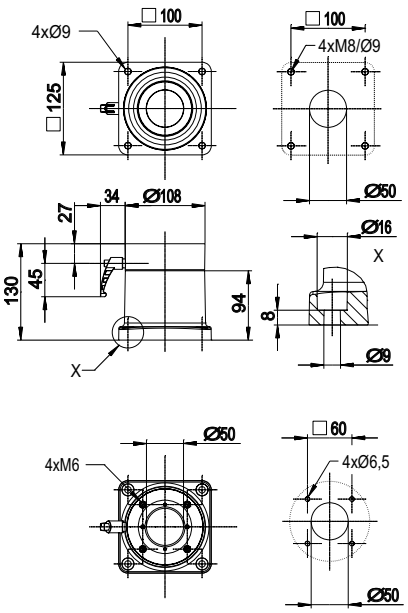








Suspension System CS-3000

Article	Tilt elbow coupling 15° B	Base coupling
Article number (colour)	**1015300016** RAL 7016 anthracite grey	**1015300017** RAL 7016 anthracite grey
		
Details	Angle of rotation 300° with stop, fixed tilt of 15°, installation opening including screw-fit plastic cover (variant B tilted forward)	Angle of rotation 300° with stop
Weight in g	2160	2120
Material	Aluminium	Aluminium
Accessories (retrofitable)	**Swivel angle limiter** **9805296000**	**Swivel angle limiter** **9805296000**
Application example		
Dimensions in mm		

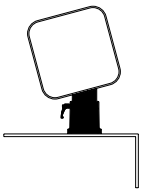
Tilt base coupling 15° A		Tilt base coupling 15° B		Straight coupling 48	
1015300018	RAL 7016 anthracite grey	**1015300019**	RAL 7016 anthracite grey	**1013050000**	RAL 7016 anthracite grey

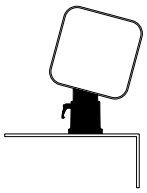


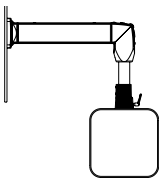


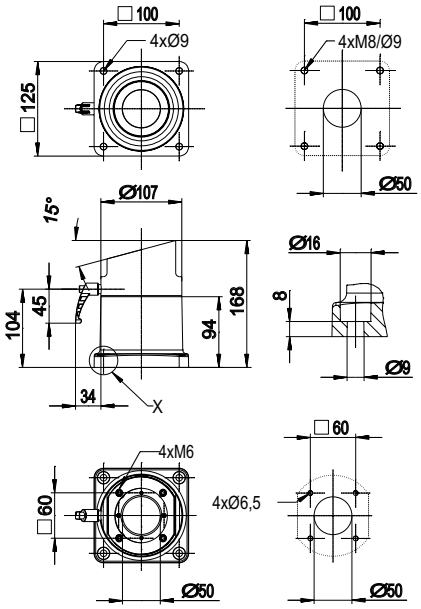


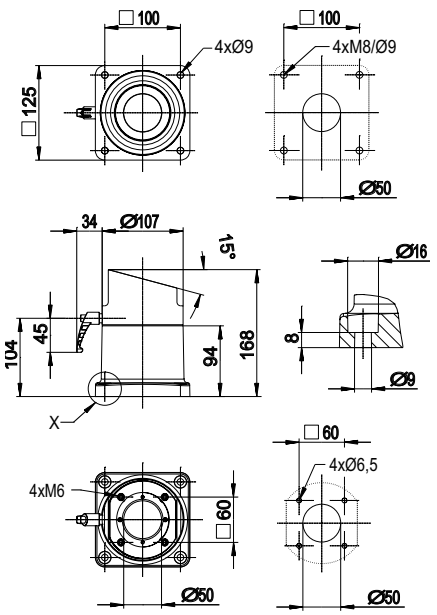
Angle of rotation 300° with stop, fixed tilt of 15° (variant A tilted back)	Angle of rotation 300° with stop, fixed tilt of 15° (variant B tilted forward)	Angle of rotation 300° with stop, only compatible with 48 mm round tube, **adapter 9806520000** is required for attachment to 80 mm section
2340	2340	1760
Aluminium	Aluminium	Aluminium
Swivel angle limiter 9805296000	**Swivel angle limiter 9805296000**	

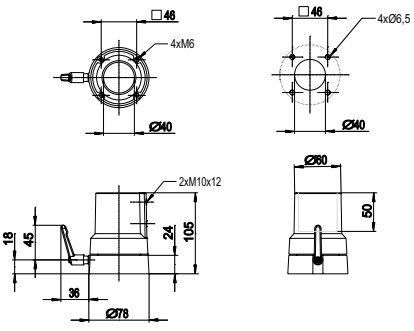




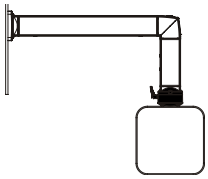
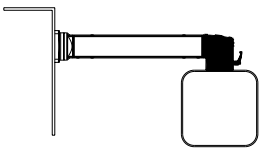
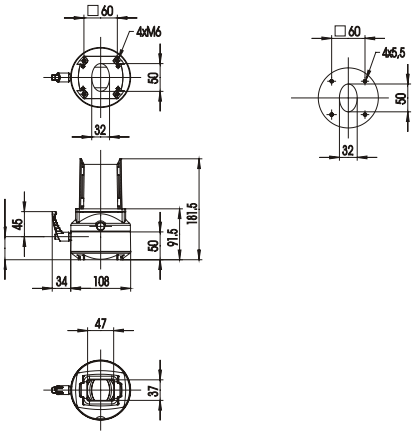
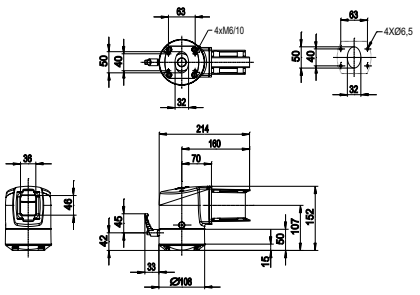








Suspension System CS-3000

Article	**Coupling for Siemens SIMATIC Pro®**	**Elbow coupling for Siemens SIMATIC Pro®**
Article number (colour)	**1015300043** RAL 7016 anthracite grey	**1015300074** RAL 7016 anthracite grey
		
Details	Customised coupling for Siemens SIMATIC Pro®, angle of rotation 300° with stop.	Customised coupling for Siemens SIMATIC Pro®, angle of rotation 300° with stop, installation opening including screw-fit plastic cover
Weight in g	1580	2200
Material	Aluminium	Aluminium
Accessories (retrofitable)	**Swivel angle limiter 9805296000**	**Swivel angle limiter 9805296000**
Application example		
Dimensions in mm		

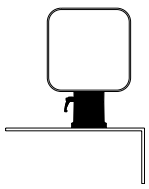
Base coupling for Siemens SIMATIC Pro®		Tilt coupling 15° for Siemens SIMATIC Pro®		Tilt elbow coupling 15° for Siemens SIMATIC Pro®	
1015300075	RAL 7016 anthracite grey	**See Details**	RAL 7016 anthracite grey	**See Details**	RAL 7016 anthracite grey

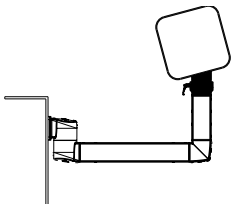


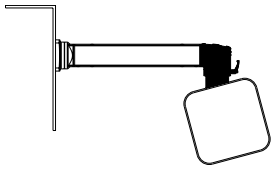


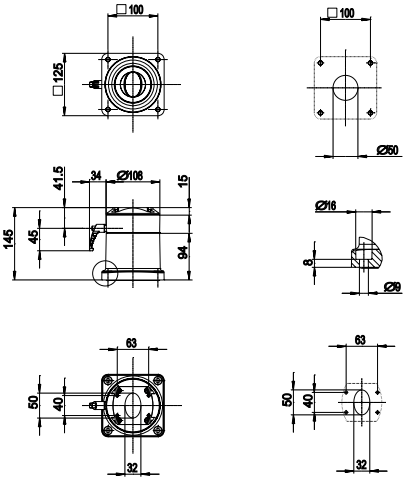


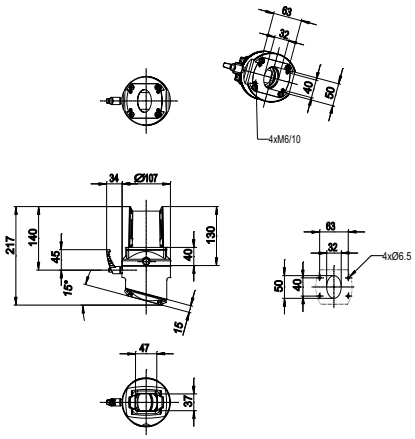
Customised coupling for Siemens SIMATIC Pro®, angle of rotation 300° with stop.	Customised coupling for Siemens SIMATIC Pro®, angle of rotation 300° with stop, fixed tilt of 15° (variant A tilted back, variant B tilted forward)	Customised coupling for Siemens SIMATIC Pro®, angle of rotation 300° with stop, fixed tilt of 15°, installation opening including screw-fit plastic cover (variant A tilted back, variant B tilted forward)
	1015300076 Tilt elbow coupling 15° A **1015300077 Tilt elbow coupling 15° B**	**1015300078 Tilt elbow coupling 15° A** **1015300079 Tilt elbow coupling 15° B**
2250	1810	2290
Aluminium	Aluminium	Aluminium
Swivel angle limiter 9805296000	**Swivel angle limiter 9805296000**	**Swivel angle limiter 9805296000**

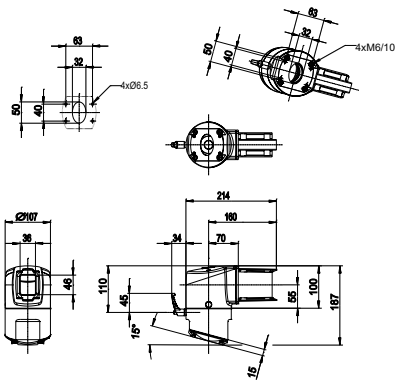




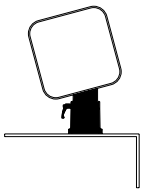
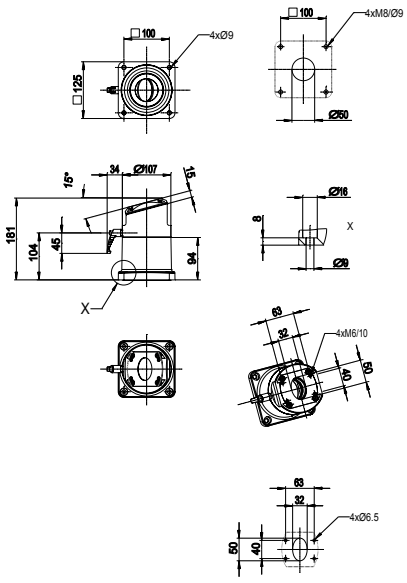
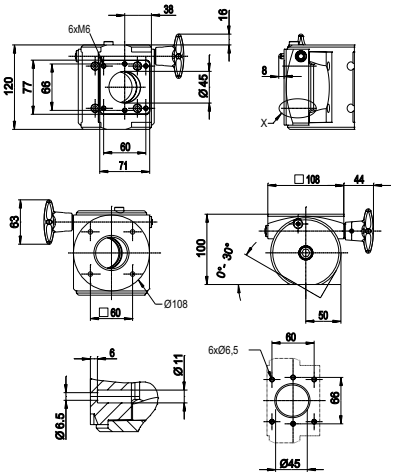








Suspension System CS-3000

Article	**Tilt base coupling 15° for Siemens SIMATIC Pro®**	**Tilt adapter (30° infinitely variable)**
Article number (colour)	**See Details** RAL 7016 anthracite grey	**1015300012** RAL 7016 anthracite grey
		
Details	Customised coupling for Siemens SIMATIC Pro®, angle of rotation 300° with stop, fixed tilt of 15° (variant A tilted back, variant B tilted forward) **1015300080 Tilt base coupling 15° A** **1015300081 Tilt base coupling 15° B**	Used only together with couplings, infinitely variable tilt up to 30°, maximum load max. 300 N, **not compatible** with **1013050000**, as well as Siemens SIMATIC Pro® couplings
Weight in g	2470	1840
Material	Aluminium	Aluminium
Accessories (retrofitable)	**Swivel angle limiter 9805296000**	
Application example		
Dimensions in mm		

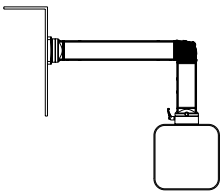
Elbow		Elbo, rotary		Elbow, reduced RD 48	
1015300008	RAL 7016 anthracite grey	**1015300009**	RAL 7016 anthracite grey	**1015300020**	RAL 7016 anthracite grey

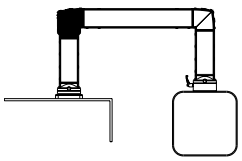


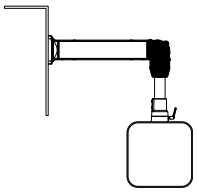


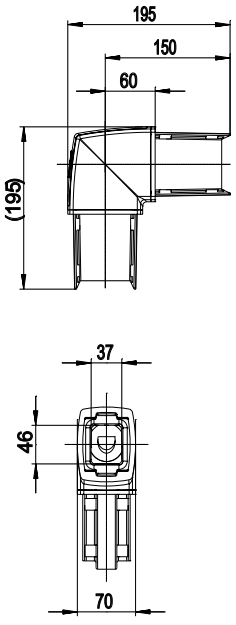


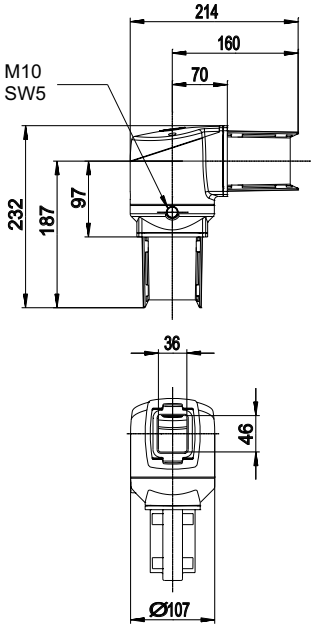
With installation opening including screw-fit plastic cover	Angle of rotation 300° with stop, installation opening including screw-fit plastic cover	Reducer elbow from the square tube to 48 mm round tube
1680	2460	1920
Aluminium	Aluminium	Aluminium
	Swivel angle limiter **9805296000**	

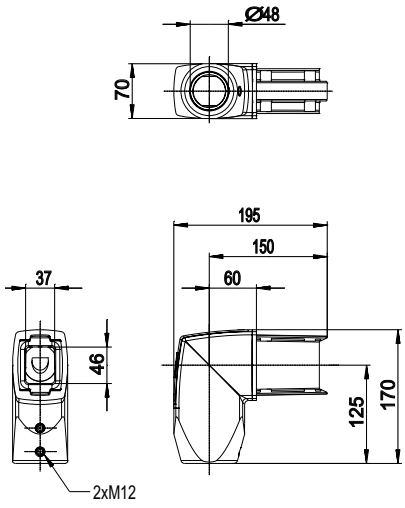




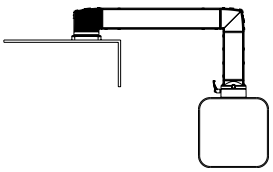
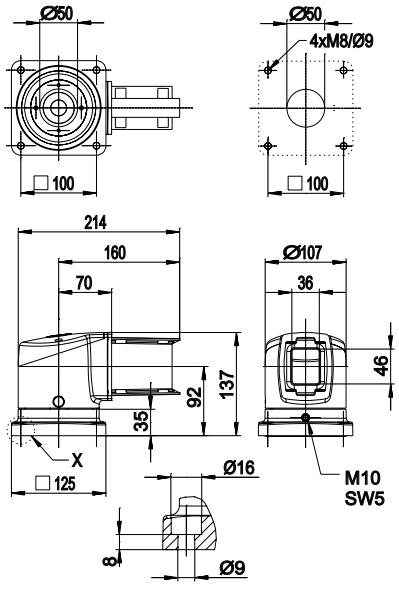
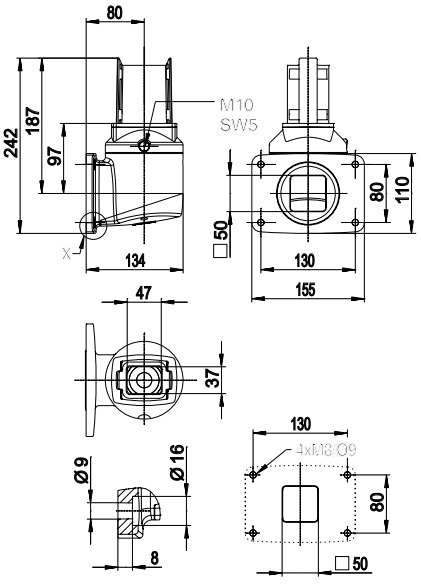








Suspension System CS-3000

Article	**Top joint**	**Wall joint S**
Article number (colour)	**1015300003** RAL 7016 anthracite grey	**1015300006** RAL 7016 anthracite grey
		
Details	Angle of rotation 300° with stop, installation opening including screw-fit plastic cover	Angle of rotation 300° with stop, installation opening including screw-fit plastic cover
Weight in g	2250	2450
Material	Aluminium	Aluminium
Accessories (retrofitable)	**Swivel angle limiter** **9805296000**	**Swivel angle limiter** **9805296000**
Application example		
Dimensions in mm		

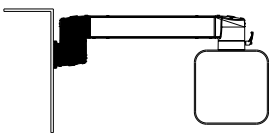
Wall joint W		Intermediate joint		CS-3000 HV module, vertically adjustable	
1015300007	RAL 7016 anthracite grey	**1015300004**	RAL 7016 anthracite grey	**See Details**	RAL 7016/anodised aluminium

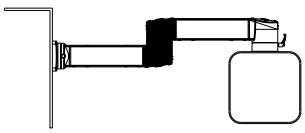


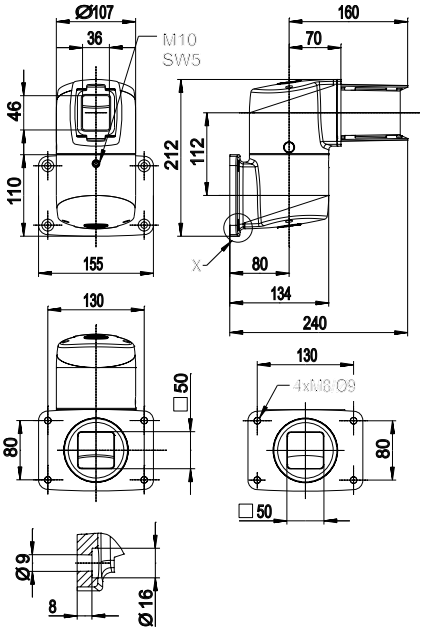


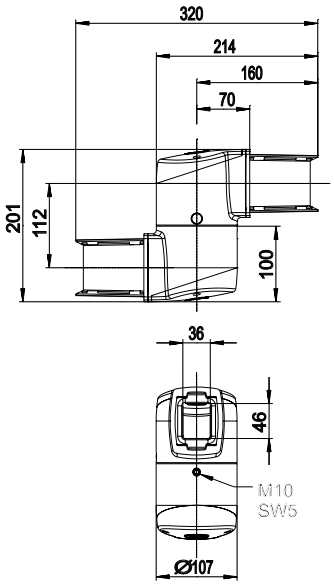


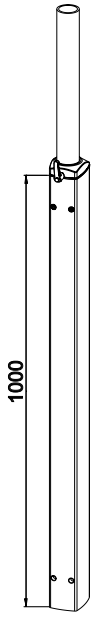
Angle of rotation 300° with stop, 2 installation openings including screw-fit plastic covers	Angle of rotation 300° with stop, 2 installation openings including screw-fit plastic covers	**1015300022 CS-3000 HV 1000/100** **1015300029 CS-3000 HV 1000/150** **1015300031 CS-3000 HV 1000/200** **1015300033 CS-3000 HV 1000/300** Modular height 1000 mm; see Page 132 for detailed information on selection of suitable damper force.
2930	2940	7030
Aluminium	Aluminium	Aluminium
Swivel angle limiter 9805296000	**Swivel angle limiter 9805296000**	











Suspension System CS-3000

Article	**CS-3000 HV module, vertically adjustable**	**Base/wall flange**
Article number (colour)	**See Details** RAL 7016/anodised aluminium	**1015300010** RAL 7016 anthracite grey

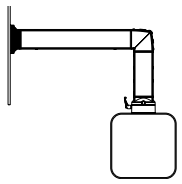




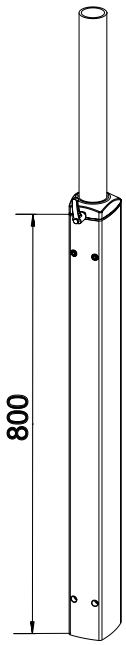
Details	**1015300023 CS-3000 HV 800/100** **1015300030 CS-3000 HV 800/150** **1015300032 CS-3000 HV 800/200** **1015300034 CS-3000 HV 800/300** Modular height 800 mm; see Page 132 for detailed information on selection of suitable damper force.	
Weight in g	6020	1300
Material	Aluminium	Aluminium

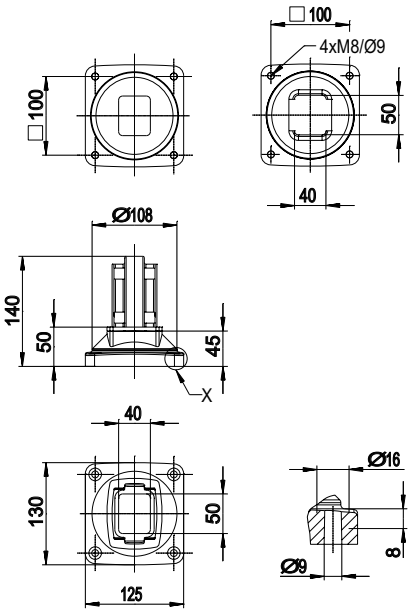
Accessories (retrofitable)

Application example



Dimensions in mm

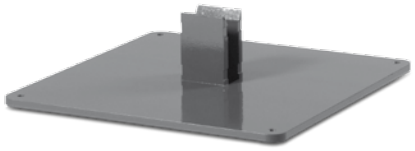




Base, rotary		Large free-standing base		Small free-standing base	
1015300005	RAL 7016 anthracite grey	**1015300027**	RAL 7016 anthracite grey	**1015300028**	RAL 7016 anthracite grey

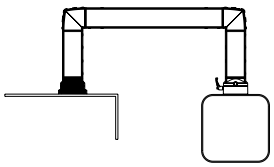


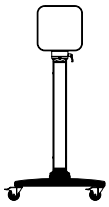


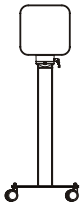


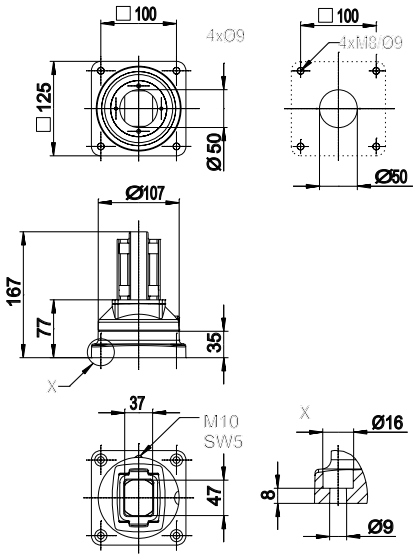
Angle of rotation 300° with stop		
1780	11660	13220
Aluminium	Aluminium	Aluminium

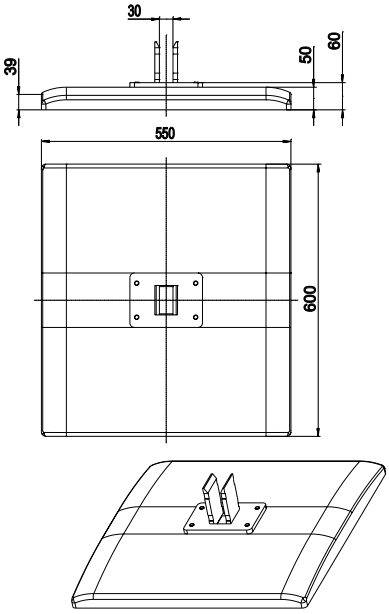
Swivel angle limiter	**9805296000**		

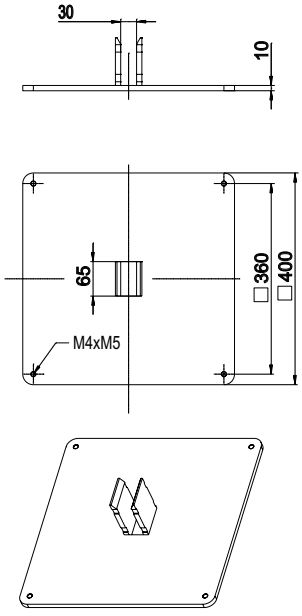




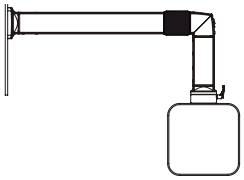
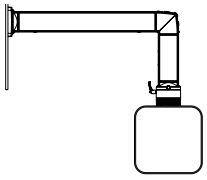
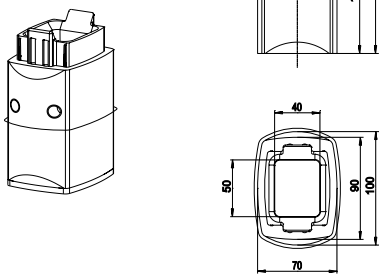
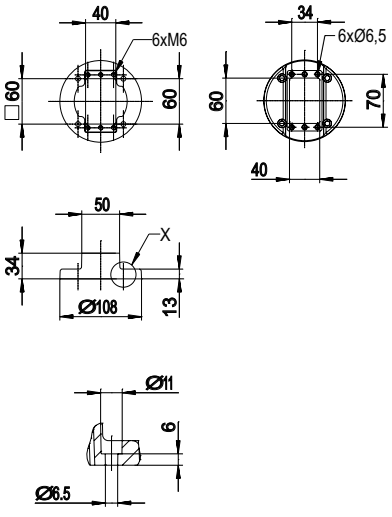








Suspension System CS-3000

Article		Tube adapter		Adapter (narrow section)	
Article number	(colour)	**1015300039**	RAL 7016 anthracite grey	**1015300011**	RAL 7016 anthracite grey
					
Details		Required for connecting tubes shortened directly at place of installation: Tubes machined at one end and of unspecified lengths can be cut to size and connected to the system with the tube adapter.		Only to be used together with couplings (for attachment to BERNSTEIN enclosures with depths <120 mm)	
Weight in g		720		300	
Material		Aluminium		Aluminium	
Accessories (retrofitable)					
Application example					
Dimensions in mm					

Notes

Accessories for Suspension System CS-3000

Article	Adapter flange	Adapter plate
Article number	9806649000	9806678000
		
Design	For enclosure with door section and/or keyboard.	For connecting adapter flange to coupling 48

Article	Set of caps	Industrial castors
Article number	9806590000	9808012800
		
Design	Plastic caps similar to RAL 9006 for closing off the hexagon sockets on tube mounting screws. Set of 50	Set of castors, consisting of 4 swivel castors with brake.Load-bearing capacity of each castor 50 kg

CS-3000 Signal lamp adapter

See specification



For connecting commercially available 25 mm diameter signal lamps to CS-3000 suspension system components
9805317000 joint components
9805318000 elbow components

Adapter plate

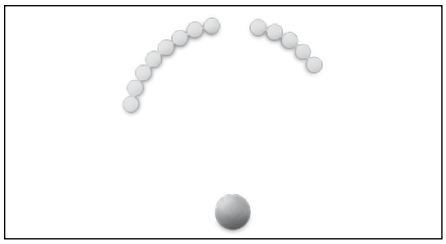
9806520000



Required together with coupling RD 48 for attachment to CC-4000 section 80

Swivel angle limiter

9805296000



Retrofit swivel angle limiter for coupling and joint components for CS-3000 system.
Adjustable in steps of 13.7°.
Contains ten ø 10 mm steel balls

Equipment castors

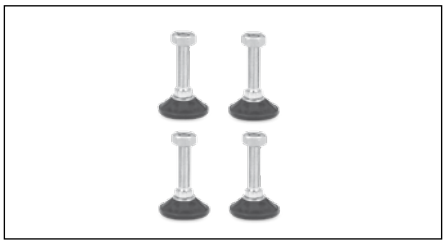
9808015300



Set of castors, consisting of 2 swivel castors and 2 swivel castors with brake for free-standing bases.
Load-bearing capacity of each castor 70 kg

Support feet

9808012900



Vertically adjustable feet (4x) for free-standing bases.

Floor anchoring brackets

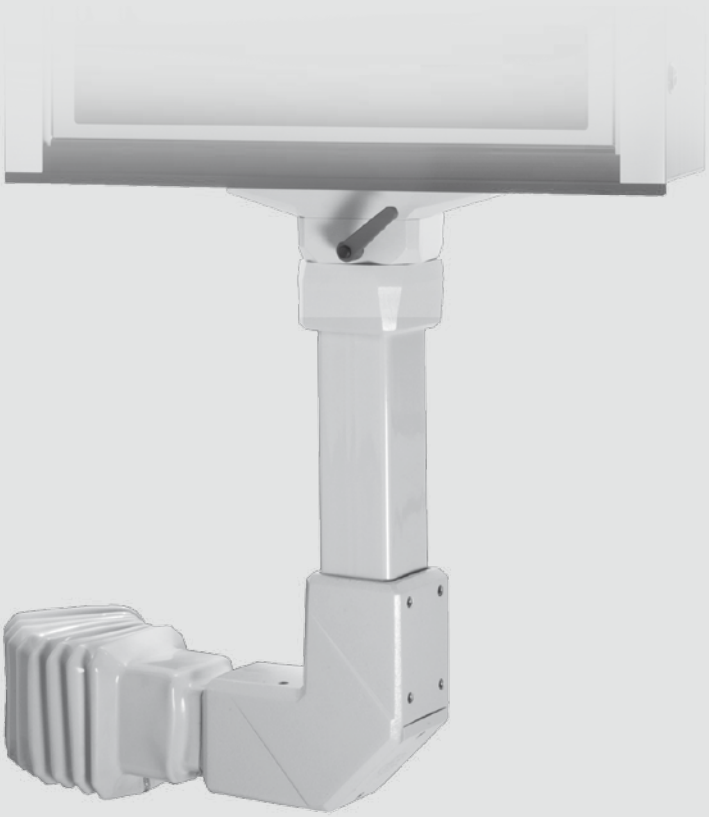
9808014100



Set of floor anchoring brackets for large base

Heavy-Duty Suspension System CS-2000 System 80

With its large number of components, the BERNSTEIN CS-2000 System 80 suspension system offers technically perfected solutions for a wide range of applications.

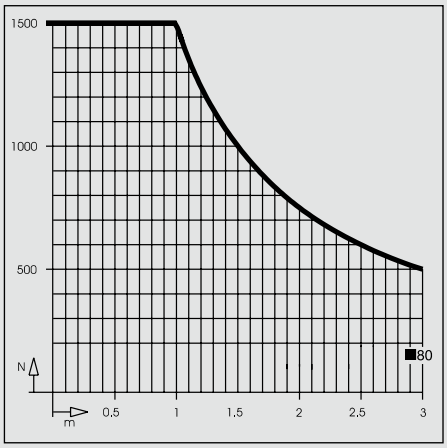


System structure

The following conditions are decisive for selecting the right system:

- Load of overall system
- Clear cable leadthrough if necessary
- Design
- System constellation

After determining the correct size of suspension system, the corresponding components and tubes are selected to build up the required system constellation.



Load diagram

The overview on Pages 112/113 is designed to help you determine the load bearing capacity of all BERNSTEIN suspension systems.

Materials

- Aluminium components: Cast aluminium
- Cast steel components: GGG 40
- Welded steel structures: St 37
- Support tubes: St 37
- Bearings: St/PTFE or POM
- Seals: CR
- Installation openings: Cast aluminium
- Gaiters: PVC

Colours

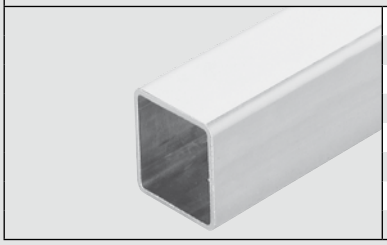
- Suspension system components: Light grey, RAL 7035
- Gaiters: Light grey, RAL 7035
- Tubing: Light grey, RAL 7035

System features

- Installation openings at all joints for easy cable installation
- Integrated strain relief for griping cables
- Wide range of available components for variable configurations
- Maintenance-free no-play bearings in all joints and couplings
- Adjustment facilities for precisely aligning support tubes
- Wall and intermediate joints with adjustable torque and retrofitable swivel angle limiter (available as accessory)
- Flange couplings with adjustable firmness and retrofitable rotation angle limiter
- Overhead installation of all components possible

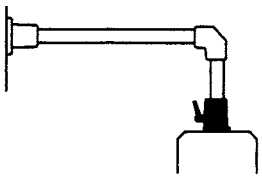
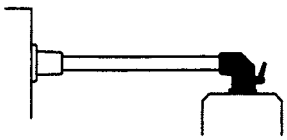
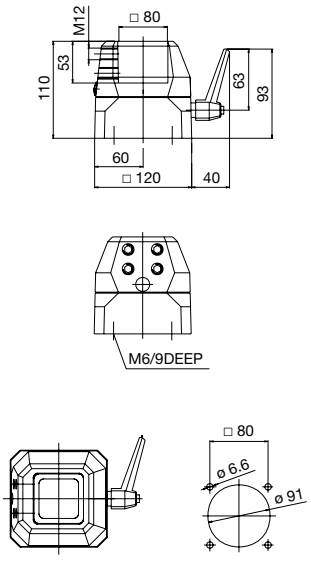
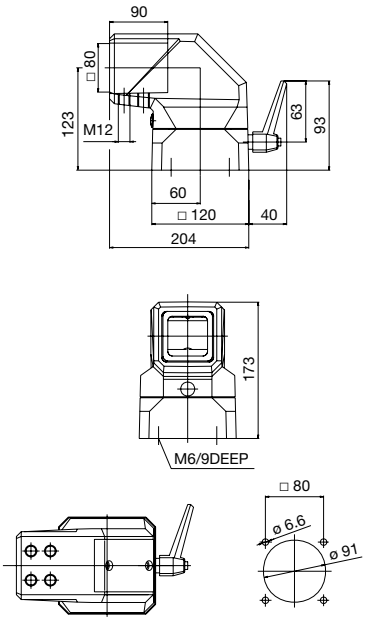
Connecting Tube CS-2000 System 80

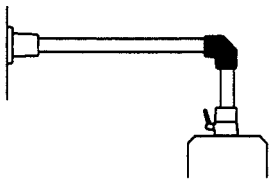
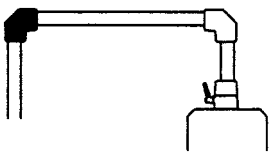
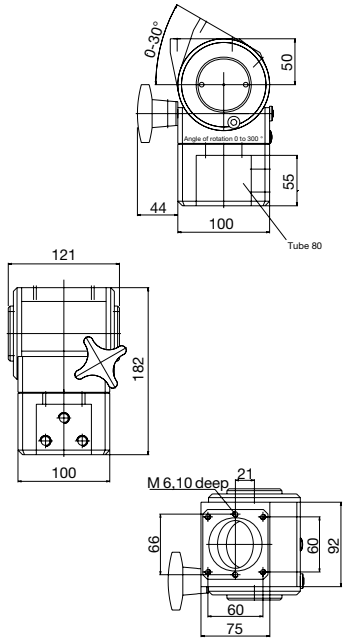
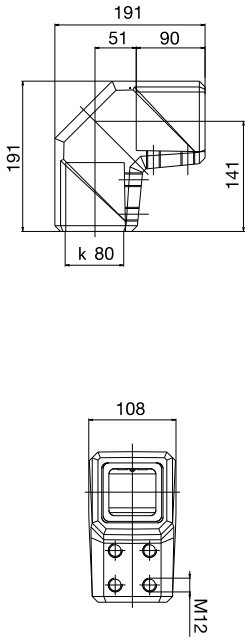
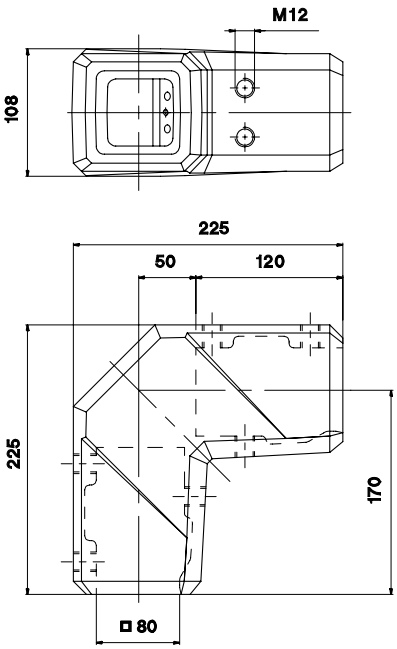
Tubing
The steel tubes for the CS-2000 System 80 suspension system are available in different lengths (tube lengths in accordance with DIN 7168).
The steel tubes are supplied powder-coated in RAL 7035 (light grey).
Weight: 11.0 kg/m

Available tube lengths		
	Length mm	**Article number**
	250	**9527114000**
	500	**9527115000**
	750	**9527116000**
	1000	**9527117000**
	1250	**9527118000**
	1500	**9527119000**
	2000	**9527121000**
	3000	**9527123000**

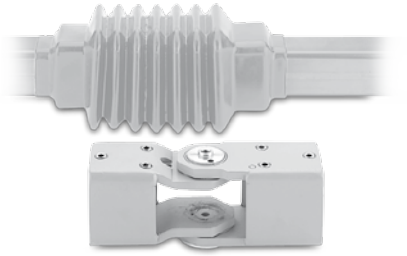
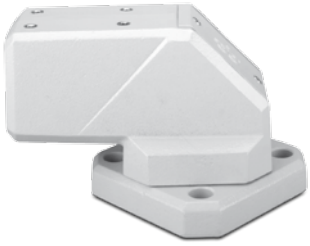
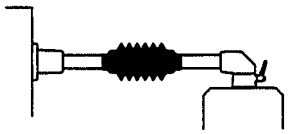
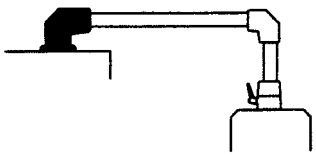
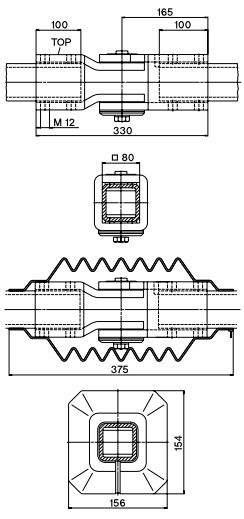
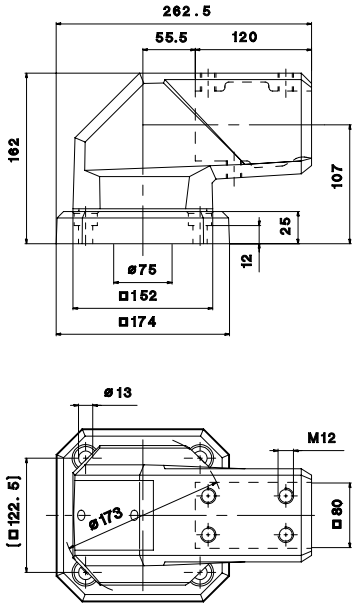
Notes

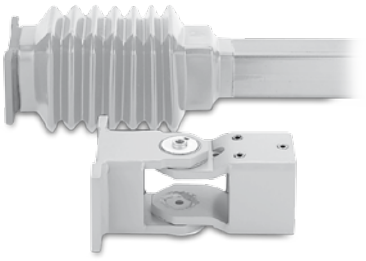
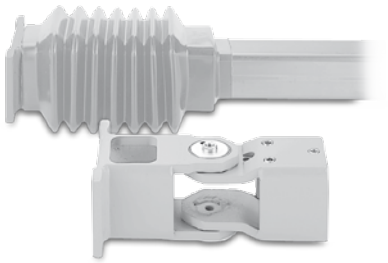
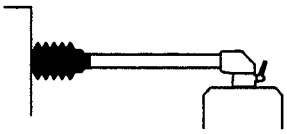
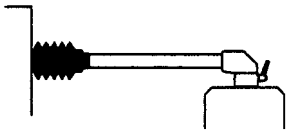
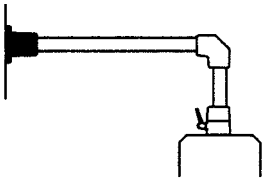
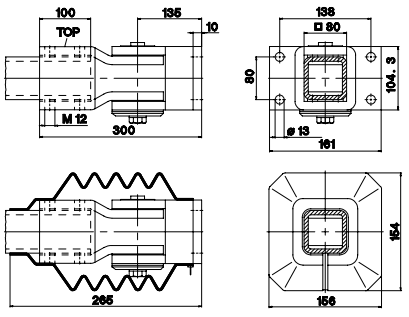
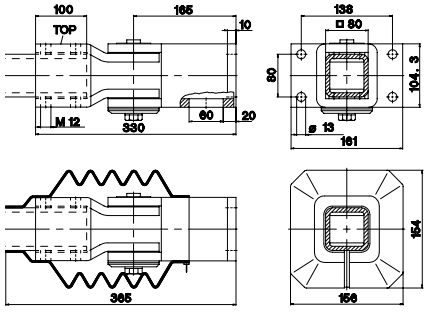
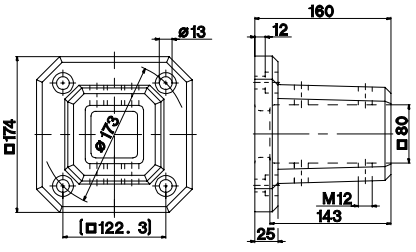
Heavy-Duty Suspension System CS-2000 System 80

Article	**Standard coupling, flange CS-2000**	**Elbow coupling, flange CS-2000**
Article number (colour)	**1016702000** RAL 7035 light grey	**1016705000** RAL 7035 light grey
		
Details	Angle of rotation 300° with stop. Complete with seals and mounting screws. Adjustable torque.	Angle of rotation 300° with stop. Complete with seals and mounting screws. Adjustable torque. Installation opening.
Weight in g	3270	4100
Material	Aluminium	Aluminium
Accessories (retrofitable)	**Swivel angle limiter 9805176000**	**Swivel angle limiter 9805176000** **Signal lamp adapter 9805189000**
Application example		
Dimensions in mm		

Turn/tilt coupling CS-2000		Elbow CS-2000		Elbow for torque load CS-2000	
1016321000	RAL 7035 light grey	**1016708000**	RAL 7035 light grey	**1016711000**	RAL 7035 light grey
					
Angle of rotation 300° with stop. Infinitely variable inclination from 0 to 30°. Complete with seals and mounting screws.		Installation opening. Complete with seals		Increased load bearing capacity. Complete with seals. Installation opening.	
2900		2900		8500	
Aluminium and PA		Aluminium		GGG	
Swivel angle limiter	**9805130000**	**Signal lamp adapter**	**9805189000**	**Signal lamp adapter**	**9805189000**
					
					

Heavy-Duty Suspension System CS-2000 System 80

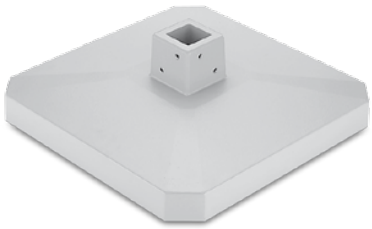
Article	**Intermediate joint CS-2000**	**Top joint CS-2000**
Article number (colour)	**1016471000** RAL 7035 light grey	**1016714000** RAL 7035 light grey
		
Details	With gaiter attached with zip fastener. Swivel angle 180° with stop on both sides. Torque adjustment	Angle of rotation 306° with stop. Complete with seals and mounting screws.
Weight in g	9700	20620
Material	Steel	GGG
Accessories (retrofitable)	**Swivel angle limiter 9805062000**	**Swivel angle limiter 9805177000** **Signal lamp adapter 9805188000**
Application example		
Dimensions in mm		

Wall joint CS-2000		Wall joint for cable leadthrough CS-2000		Wall flange CS-2000	
1016473000	RAL 7035 light grey	**1016474000**	RAL 7035 light grey	**1016472000**	RAL 7035 light grey
					
With gaiter attached with zip fastener. Swivel angle 180° with stop on both sides. Torque adjustment		With gaiter attached with zip fastener. Swivel angle 180° with stop on both sides. Torque adjustment		Complete with seals	
9250		9500		9100	
Steel		Steel		GGG	
Swivel angle limiter	**9805062000**	**Swivel angle limiter**	**9805062000**		
					
					

Heavy-Duty Suspension System CS-2000 System 80

Article	**Base CS-2000**	**Free-standing base CS-2000**
Article number (colour)	**1016475000** RAL 7035 light grey	**1016323000** RAL 7035 light grey

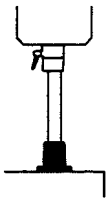


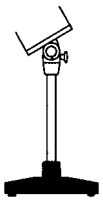


Details	Complete with seals	For free-standing applications
Weight in g	9240	14300
Material	GGG	Aluminium

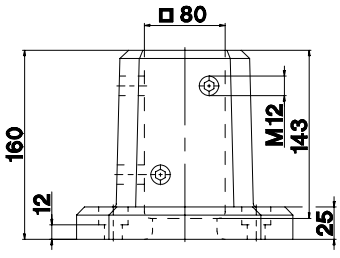
Accessories (retrofitable)

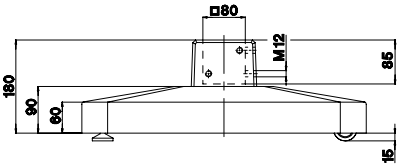
Application example

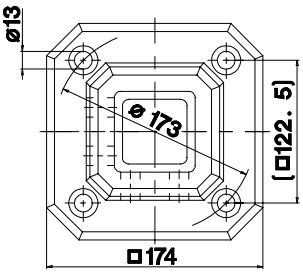


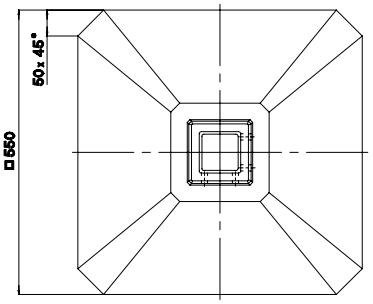


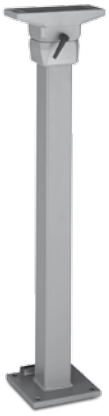
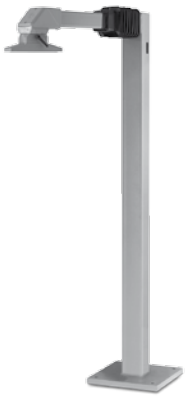
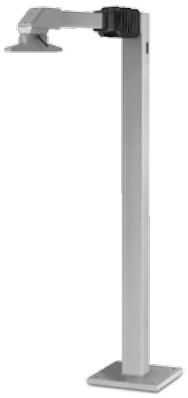
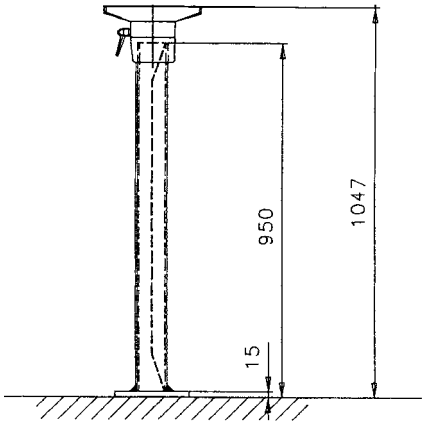
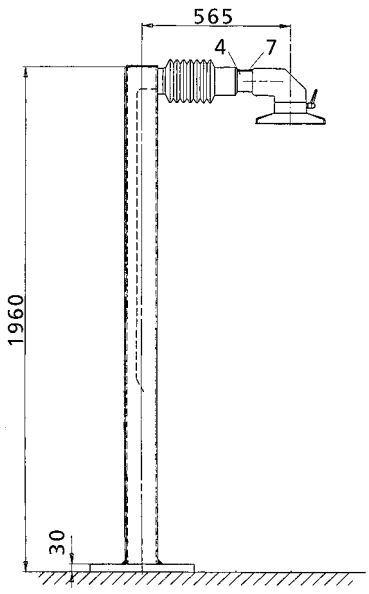
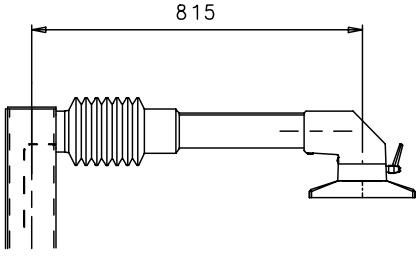
Dimensions in mm





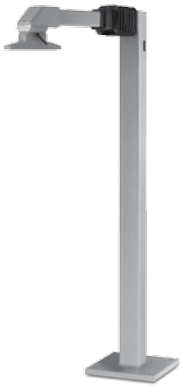




Support column, upright version	Support column, suspended version, 250 mm tube	Support column, suspended version, 500 mm tube
1016558000 RAL 7035 light grey	**1016555000** RAL 7035 light grey	**1016556000** RAL 7035 light grey
		
27220	102000	105000
Steel / Aluminium	Steel / Aluminium	Steel / Aluminium
		

Heavy-Duty Suspension System CS-2000 System 80

Article	**Support column, suspended version, 750 mm tube**	**Adapter flange CS-2000**
Article number (colour)	**1016557000** RAL 7035 light grey	**9806213000** RAL 7035 light grey

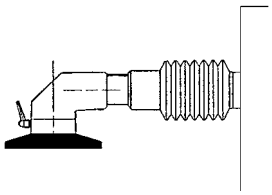




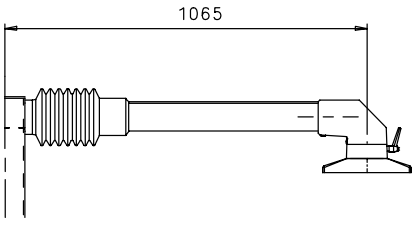
Details		
Weight in g	41000	1100
Material	Steel / Aluminium	Aluminium

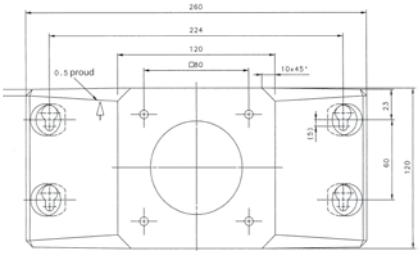
Accessories (retrofitable)

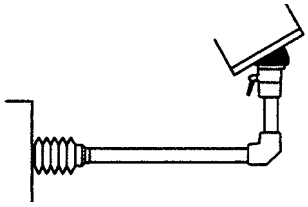
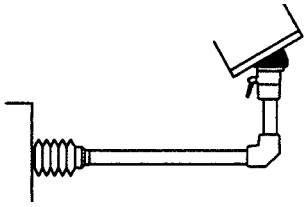
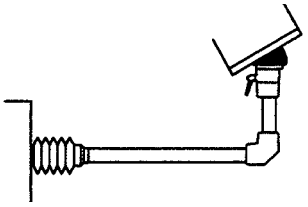
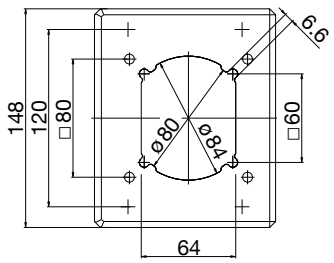
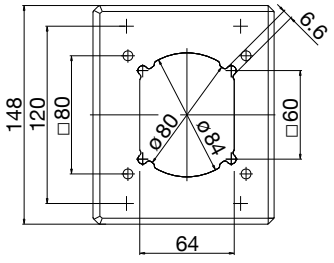
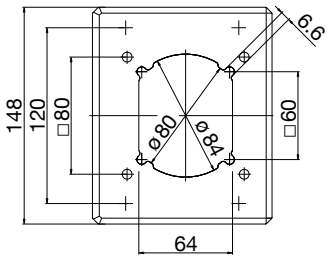
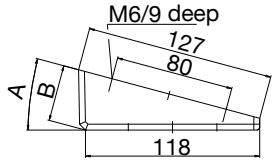
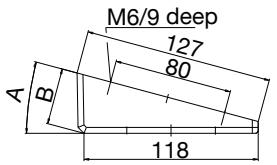
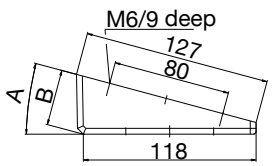
Application example



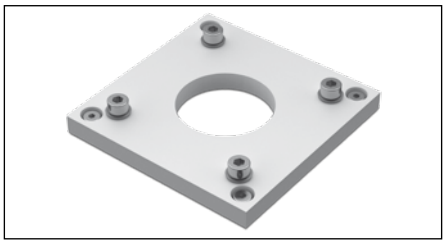
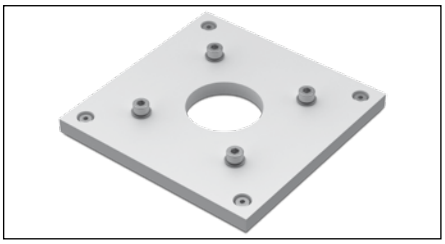
Dimensions in mm

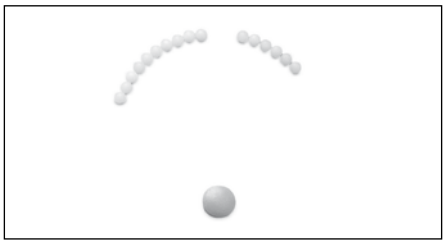
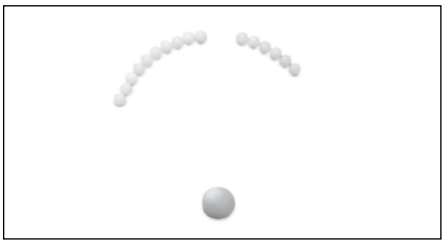


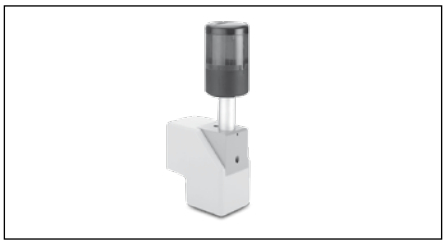


Tilt adapter CS-2000 15° = 460	Tilt adapter CS-2000 30° = 600	Tilt adapter CS-2000 60° = 800
1016459000 RAL 7035 light grey	**1016460000** RAL 7035 light grey	**1016461000** RAL 7035 light grey
		
A = 15°, B = 39	A = 30°, B = 66	A = 60°, B = 111
460	600	800
Aluminium	Aluminium	Aluminium
		
		
		

Accessories for Suspension Systems CS-2000 SL and System 80

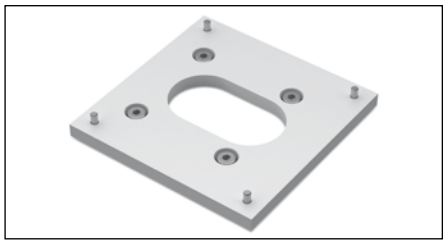
Article	**CS-1000 VESA 75/M4**	**CS-1000 VESA 100/M4**
Article number	**9806675000**	**9806676000**
		
Design	For rear attachment of monitors or similar with VESA 75 flange on CS-1000 suspension arm system	For rear attachment of monitors or similar with VESA 100 flange on CS-1000 suspension arm system

Article	**Swivel angle limiter for coupling components, CS-2000 SL system**	**Swivel angle limiter for coupling components, CS-2000 System 80**
Article number	**9805129000**	**9805176000**
		
Design	Easy-to-retrofit swivel angle limiter. After installation, the balls limit the swivel angle. Adjustable in steps of 8.5°. Material PA.	Easy-to-retrofit swivel angle limiter. After installation, the balls limit the swivel angle. Adjustable in steps of 9°. Material PA.

Article	**Signal lamp adapter CS-2000 System 80**	**Fixed castors for large free-standing bases CS-2000 SL and CS-2000 System 80**
Article number	**9805189000**	**9806043000**
		
Design	Easy-to-retrofit signal lamp adapter. Installation opening for signal lamp tubes with outside diameter of 25 mm, secured on side with setscrews. Colour: RAL 7035 light grey Material aluminium.	Complete with installation material and instructions for large free-standing bases. Set of 2.

CS-2000 SL Panel VESA 100/M4

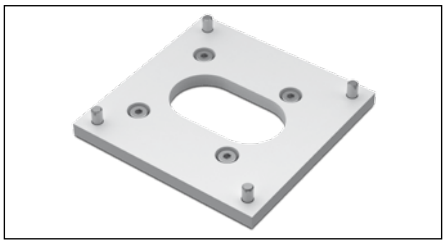
9806677000



For rear attachment of monitors or similar with VESA 100 flange by means of CS-2000-SL panel couplings (with M4 thread for monitors)

CS-2000 SL Panel VESA 100/M6

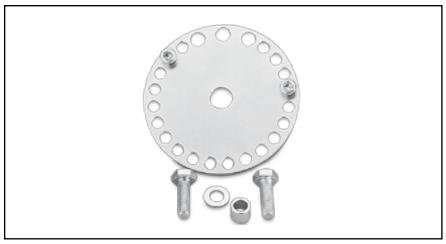
9806698000



For rear attachment of monitors or similar with VESA 100 flange by means of CS-2000-SL panel couplings (with M4 thread for monitors)

Swivel angle limiter for wall and intermediate joints CS-2000 System 80

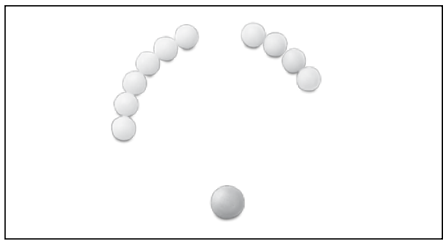
9805062000



Swivel angle limiter as retrofitable accessory kit for wall and intermediate joints. Swivel angle range adjustable and fixed in steps of 15°. Material steel.

Swivel angle limiter for joint components System CS-2000 SL

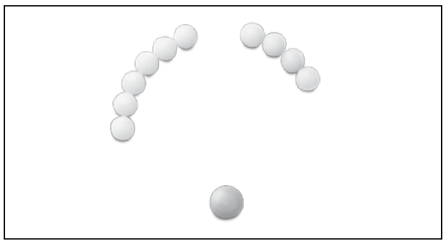
9805132000



Easy-to-retrofit swivel angle limiter.
After installation, the balls limit the swivel angle.
Adjustable in steps of 14°. Material PA.

Swivel angle limiter for joint components CS-2000 System 80

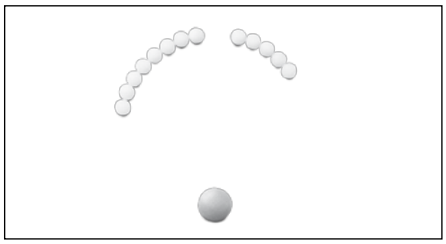
9805177000



Easy-to-retrofit swivel angle limiter.
After installation, the balls limit the swivel angle.
Adjustable in steps of 8.5°. Material PA.

Swivel angle limiter for turn/tilt couplings System CS-2000 SL and CS-2000 System 80

9805130000



Easy-to-retrofit swivel angle limiter.
After installation, the balls limit the swivel angle.
Adjustable in steps of 8.5°. Material PA.

Swivel castors for large free-standing bases CS-2000 SL and CS-2000 System 80

9806044000



Complete with installation material and instructions for large free-standing bases. Set of 2.

Adjustment feet for large free-standing bases CS-2000 SL and CS-2000 System 80

9806045000



Complete with installation material and instructions for large free-standing bases. Set of 2.

Stainless steel technology to the highest standards

An enclosure created to protect

Thanks to its specific, individual concept, the redesigned CC-800 range of stainless steel control enclosures provides maximum security for your applications.

It is ideally suited for use in applications where the use of stainless steel is a legal requirement.



Features such as high-quality workmanship, modern design and high-grade, durable material makes the CC-800 the first choice over enclosures made from other materials.

With BERNSTEIN customer service you can be sure that our CC-800 will provide the perfect solution to your specific application: We make your application requirements reality. And we can do a lot more for you: The combination of customer technology and BERNSTEIN stainless steel enclosures is the foundation for complete system integration. Special sizes, different surface finishes and suspension systems are only a few of the additional options that BERNSTEIN can realise for you.

Product features

- Various standard sizes
- Modern design
- Foam seals
- Including earthing material and mounting plates
- Protection class IP65
- Lock and hinges mounted laterally outside the protected area
- Reinforced seal frame for improved stability

Material

- Enclosure, including mounting plate and lock, stainless steel 1.4301, copper earthing strap

Surface finish

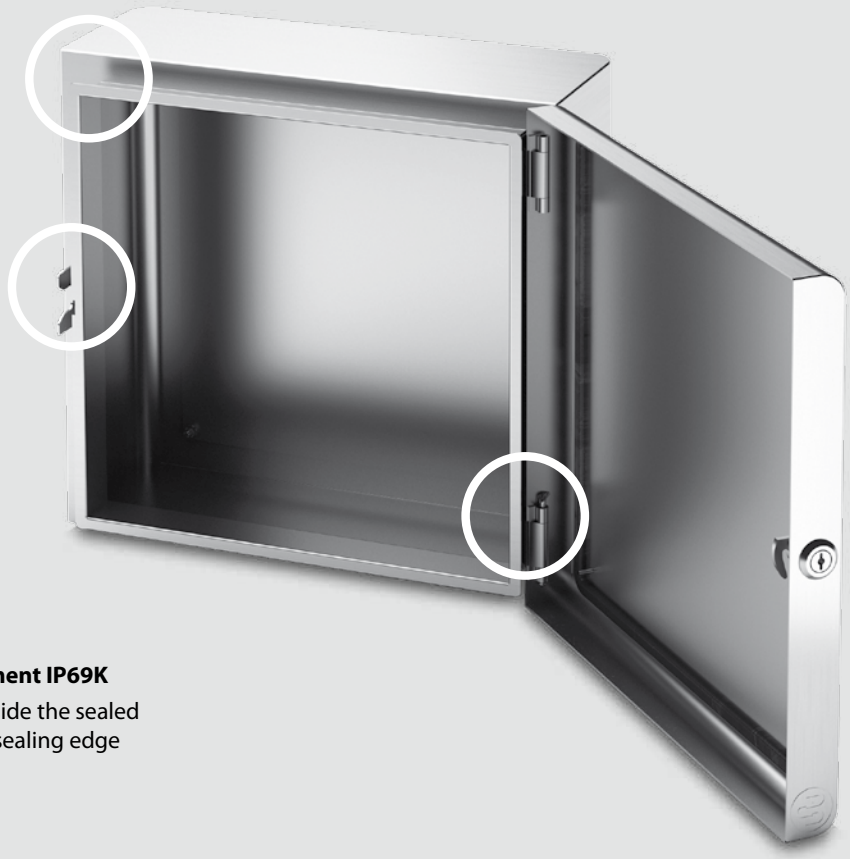
- Enclosure and front door, brushed finish, grain size 320

Available on request

- Special sizes
- Protection class IP66/IP69K
- Different surface finishes
- Wall mounting (e.g. with brackets)
- Special handles
- Additional components such as suspension systems, handles and keyboard shelf
- Alternative materials

Overview of IP classes (also refer to Page 17)

	1st digit		2nd digit
Protection class	Contact protection	Foreign body protection	Moisture protection
IP65	Complete contact protection	Protection against dust penetration, dustproof	Protection against hose water
IP66	Complete contact protection	Protection against dust penetration, dustproof	Protection against strong hose water
IP67	Complete contact protection	Protection against dust penetration, dustproof	Protection against the effect when temporarily submerged in water
IP69K	Complete contact protection	Protection against dust penetration, dustproof	Protection against water during high pressure/steam jet cleaning (as per DIN EN 40050, Part 9)



Minimum requirement IP69K

Lock and hinge outside the sealed area with all-round sealing edge

	Article	Size in mm	Mounting plate dimensions (included in delivery specification)	Article number	Design
1	**CC-800 control enclosure prepared for suspension system CS-480 NR**	310 x 300 x 180	245 x 245 x 2	**1801121000**	Standard front door – attached on right, at top for suspension system
		410 x 350 x 180	345 x 295 x 2	**1801122000**	
		410 x 400 x 180	345 x 345 x 2	**1801123000**	
		510 x 400 x 180	445 x 345 x 2	**1801124000**	
		610 x 550 x 250	545 x 495 x 2	**1801125000**	
2	**CC-800 control enclosure prepared for suspension system CS-600 NR**	310 x 300 x 180	245 x 245 x 2	**1801421000**	
		410 x 350 x 180	345 x 295 x 2	**1801422000**	
		410 x 400 x 180	345 x 345 x 2	**1801423000**	
		510 x 400 x 180	445 x 345 x 2	**1801424000**	
		610 x 550 x 250	545 x 495 x 2	**1801425000**	

Stainless Steel Suspension System CS-480 NR

Product features

The CS-480 NR suspension system was specifically developed for mounting control enclosures in hygienic areas in the food and pharmaceuticals industries.

Thanks to the variety of different models, the CS-480 NR ensures absolute flexibility. You have the choice between a combination of tubes shaped to customer specifications and suspension system components or, if time is pressing, you can combine the pre-shaped tubes and coupling sleeves available from stock with the suspension system components.

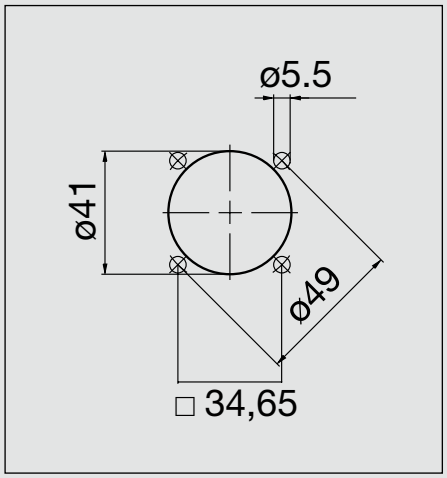


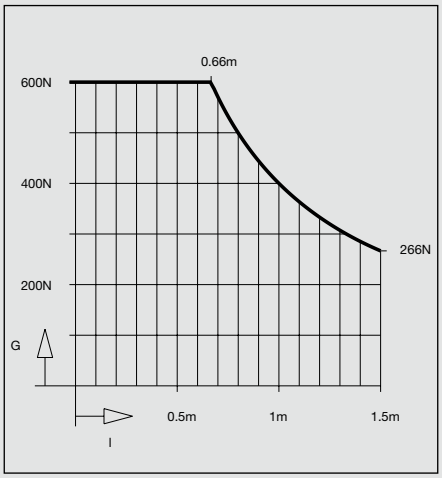
System features

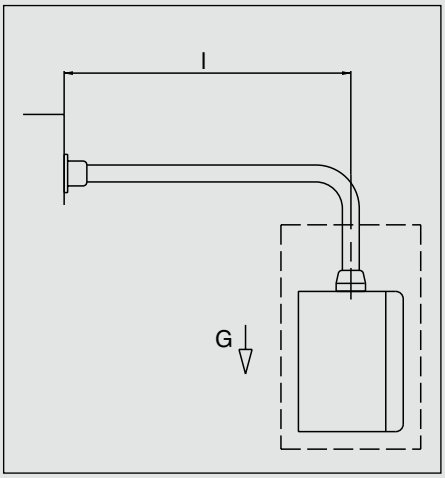
- Installation openings at bearing components with horizontal outlet
- Easy mounting by clamping the support tubes
- Load bearing capacity 400 N at 1 m
- Protection class IP66/NEMA 4X
- Material 1.4305
- Torque preset at factory

Enclosure preparation for mounting couplings

The dimensions of the coupling hole pattern for preparing the enclosure are shown in the following drawing.







Materials and surfaces

Stainless steel support tubes	1.4301
Stainless steel components	1.4305
Bearings	POM
O-rings	NBR

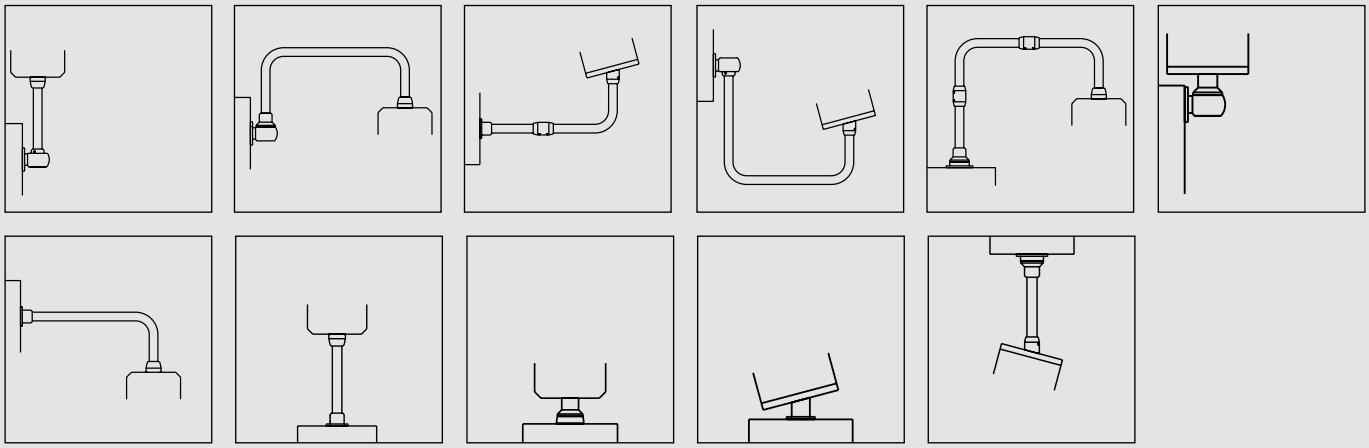
Load diagram

Refer to the diagram for the load bearing capacity of the CS-480 NR suspension system. Approval for higher loads is to be obtained separately. The system length l refers to the length specification in the diagram.

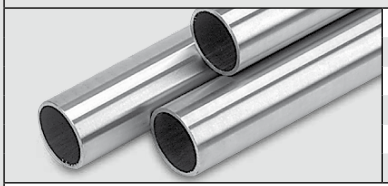
The overview on Pages 112/113 is designed to help you determine the load bearing capacity of all BERNSTEIN suspension systems.

System combinations

The following selection illustrates the high degree of flexibility that can be achieved in configuring the suspension system:



Support tubes
Support tubes with 48.3 mm outside diameter; wall thickness 3.6 mm, straight tubes



Length mm	Article number
250	**9523501000**
500	**9523502000**
750	**9523503000**
1000	**9523504000**
1250	**9523505000**
1500	**9523506000**

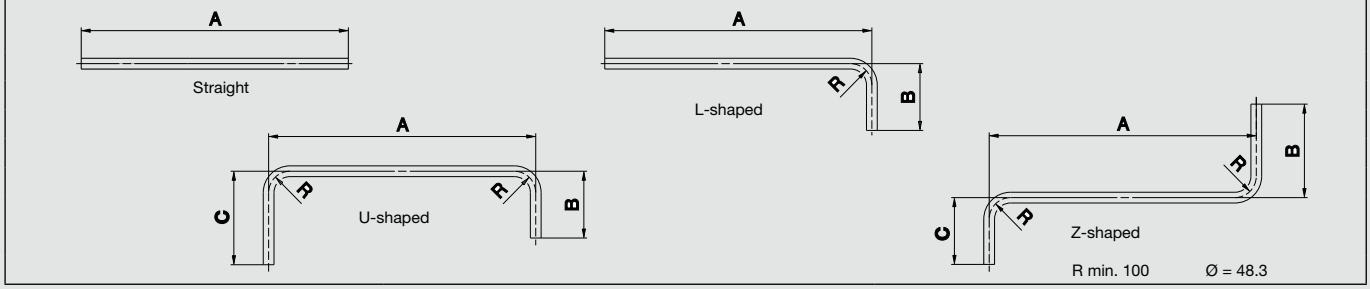
Increased flexibility with L-shaped tubes and coupling sleeves
The use of L-shaped tubes and coupling sleeves together with straight support tubes can render unnecessary time-consuming manufacture of support tubes to customer specifications, L-shaped tubes



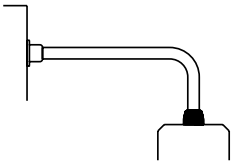
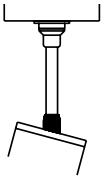
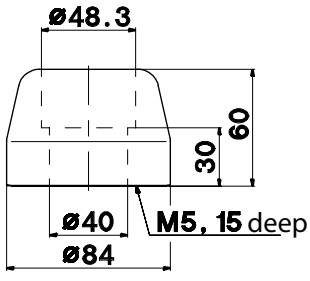
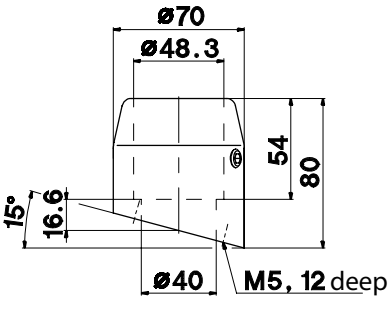
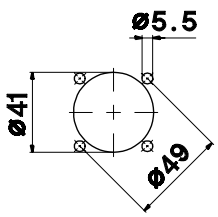
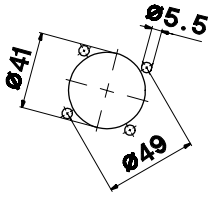
250 x 250	**9523500001**
500 x 500	**9523500011**
Coupling sleeve	**1013051200**

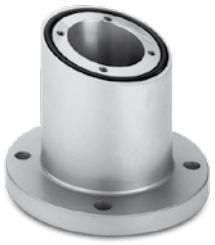
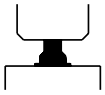
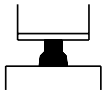
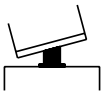
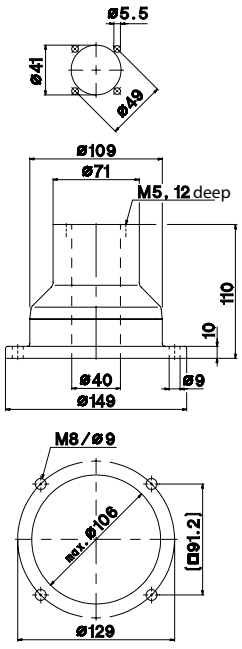
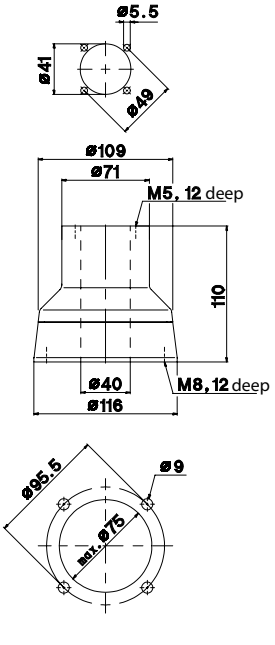
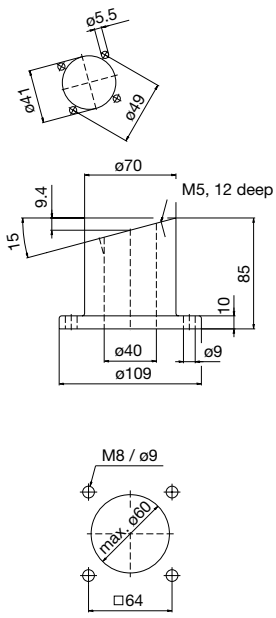
Support tubes to customer specifications
Different versions of formed support tubes for the BERNSTEIN CS-480 NR suspension system are available on request.
To order customised tubes simply quote the shape (e.g. straight, L-, U- or Z-shaped) and the dimensions.

Note:
Dimension B and C min. 220 mm; dimension A in U and Z version min. 320 mm

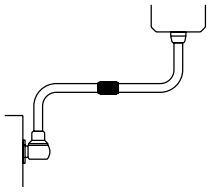
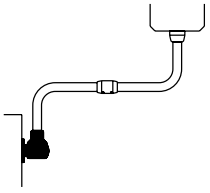
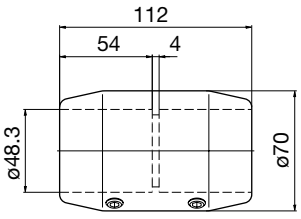
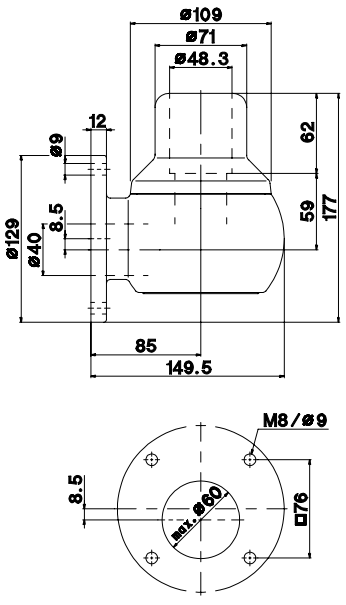


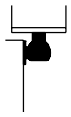
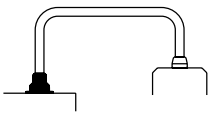
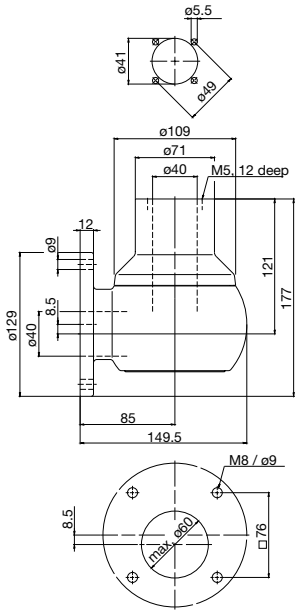
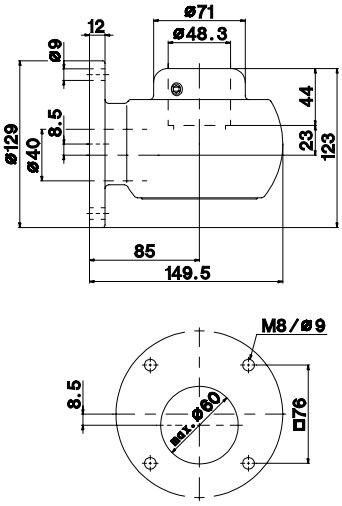
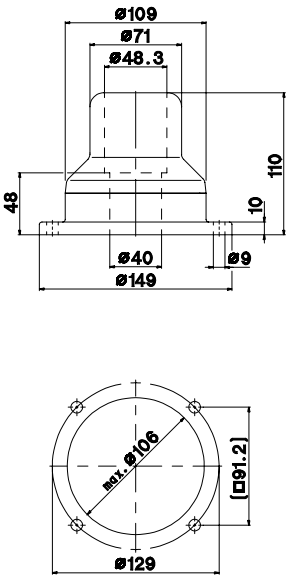
Stainless Steel Suspension System CS-480 NR

Article	Straight coupling (for attaching enclosure)	Tilt coupling (for attaching enclosure)
Article number	1013050100	1013050300
		
Details	Flange coupling for mounting enclosures. Angle of rotation 340° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals and mounting material.	Rigid flange coupling with 15° tilt for mounting enclosures. Complete with seals and mounting material.
Weight in g	1400	1000
Material	Stainless steel	Stainless steel
Accessories (retrofitable)		
Application example		
Dimensions in mm		
		

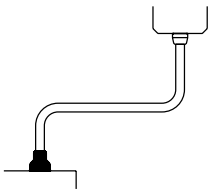
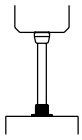
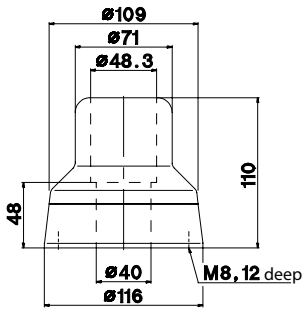
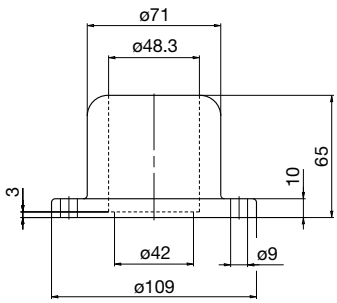
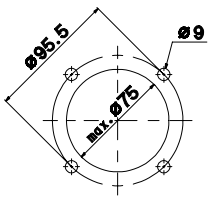
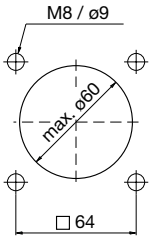
Rotary base coupling, external mounting	Rotary base coupling, internal mounting	Base tilt coupling
1013050700	**1013050800**	**1013050400**
		
Rotary base coupling (external mounting) for directly mounting enclosures on machines or floors. Angle of rotation 340° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals and mounting material.	Rotary base coupling (internal mounting) for directly mounting enclosures on machines or floors. Angle of rotation 340° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals and mounting material.	Rigid tilt coupling with 15° tilt for directly mounting enclosures on horizontal surfaces. Complete with seals and mounting material.
4500	4100	1900
Stainless steel	Stainless steel	Stainless steel
		
		

Stainless Steel Suspension System CS-480 NR

Article	Coupling sleeve	Wall joint S
Article number	1013051200	1013050900
		
Details	Coupling sleeve for easy assembly and disassembly of tube configurations. Complete with seals.	Wall joint with vertical outlet for mounting on vertical surfaces. Cover for easy cable installation. Angle of rotation 340° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals.
Weight in g	1500	7300
Material	Stainless steel	Stainless steel
Accessories (retrofitable)		
Application example		
Dimensions in mm		

Wall coupling S	Wall bracket S	Rotary base socket, external mounting
1013051000	**1013051100**	**1013050500**
		
otary wall coupling for directly mounting on vertical machine surfaces. Angle of rotation 340° with limit stop. Cover for easy cable installation. Preset torque. Maintenance-free bearings. Complete with seals and mounting material.	Wall bracket with vertical outlet for mounting on vertical surfaces. Cover for easy cable installation. Complete with seals.	Rotary base for mounting on machines or floors. Angle of rotation 340° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals.
7300	7700	4200
Stainless steel	Stainless steel	Stainless steel
		
		

Stainless Steel Suspension System CS-480 NR

Article	Rotary base socket, internal mounting	Base/wall flange
Article number	**1013050600**	**1013050200**
		
Details	Rotary base for mounting on machines or floors. Angle of rotation 340° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals.	Base or wall flange for mounting on horizontal and vertical surfaces. Complete with seals.
Weight in g	3800	1400
Material	Stainless steel	Stainless steel
Accessories (retrofitable)		
Application example		
Dimensions in mm		
		

Notes

Stainless Steel Suspension System CS-600 NR

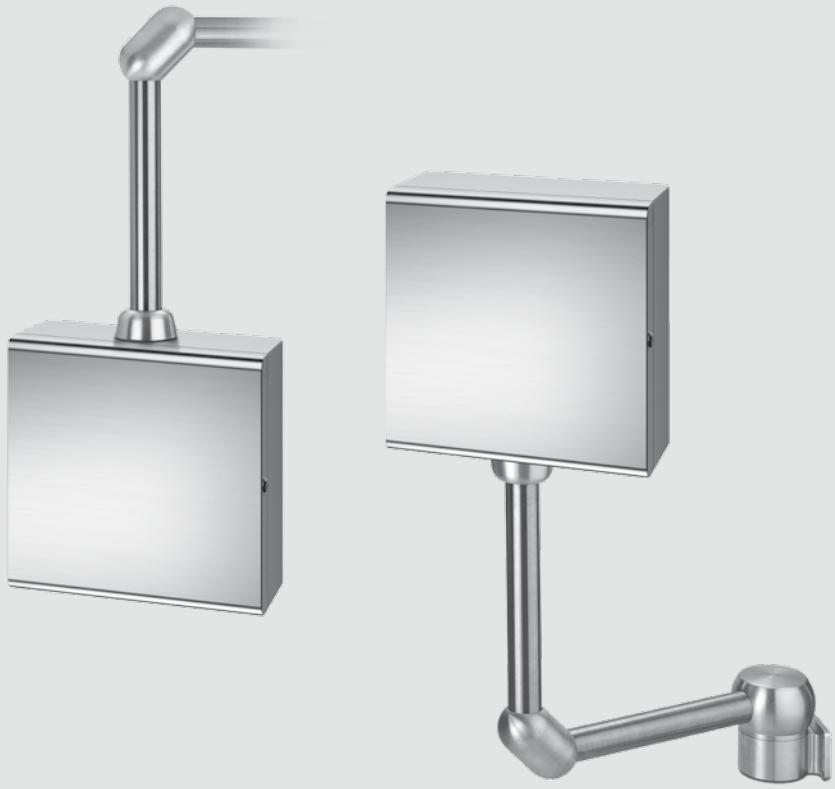
Product features

The CS-600 NR suspension system was specifically designed for mounting control enclosures in hygienic areas in the food and pharmaceuticals industries.

Compared to the conventional suspension systems, the CS-600 NR is characterised by its outstanding suitability for hygiene applications and its flexible modular concept.

The CS-600 NR makes it possible to mount units at an angle without the need for formed tubes, thus rendering time-consuming procurement of specially formed support tubes unnecessary.

The user can build up the modular suspension system easily, flexibly and variably from individual components available from stock.

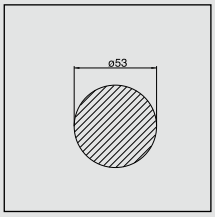


System advantages

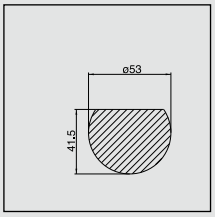
- Installation openings at bearing components with horizontal outlet
- No external screws or dirt-collecting edges – ideal for cleaning
- Easy mounting by clamping the support tubes
- All components vibration-protected
- Load bearing capacity 600 N at 1 m
- Protection class IP66/NEMA 4X
- Torque preset at factory
- Modern design
- Diverse range of components for unlimited combination options
- Choice of component materials: stainless steel 1.4305 or anodised aluminium

Cable leadthrough

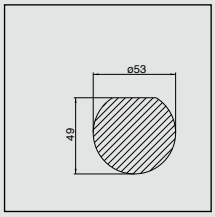
Due to different cross sections, the various suspension system components have available varying degrees of space. The dimensioned openings at the narrowest point within the components are specified below.



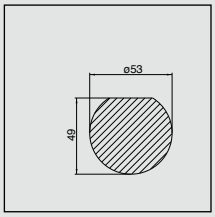
Coupling 2206 mm²



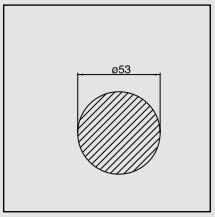
Elbow coupling 1853 mm²



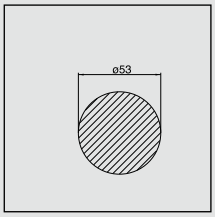
Wall joint 2130 mm²



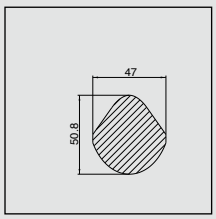
Top joint 2130 mm²



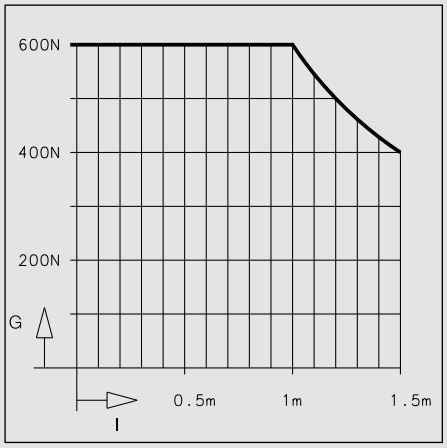
Wall flange/base 2206 mm²



Rotary base 2206 2206 mm²



Elbow 1649 mm²



Load diagram

The diagram shows the load bearing capacity of the CS-600 NR suspension system

The system length (l) refers to the length specification in the diagram.

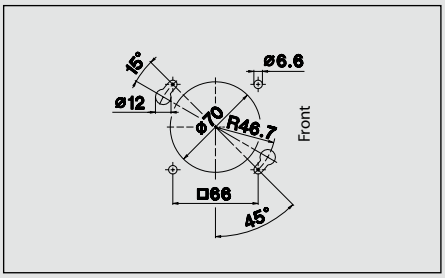
The overview on Pages 112/113 is designed to help you determine the load bearing capacity of all BERNSTEIN suspension systems.

Materials and surfaces

Stainless steel support tubes	1.4301
Aluminium components	AlMgSi 1
Stainless steel components	1.4305
Bearings	POM
O-rings	NBR

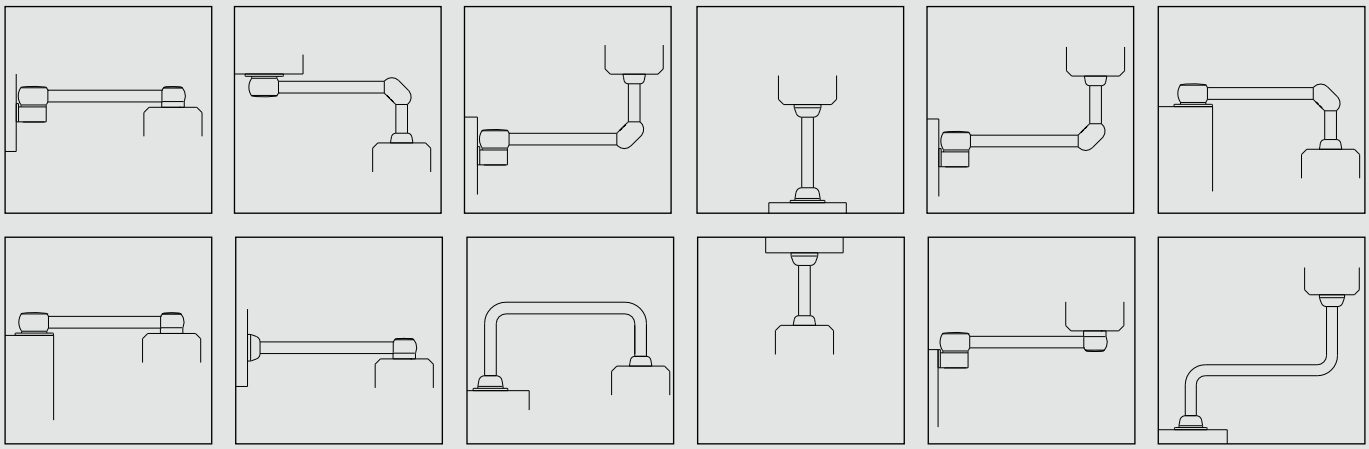
Enclosure preparation for mounting couplings

The dimensions of the coupling hole pattern for preparing the enclosure are shown in the drawing opposite.



System combinations

The following selection illustrates the high degree of flexibility that can be achieved in configuring the suspension system:



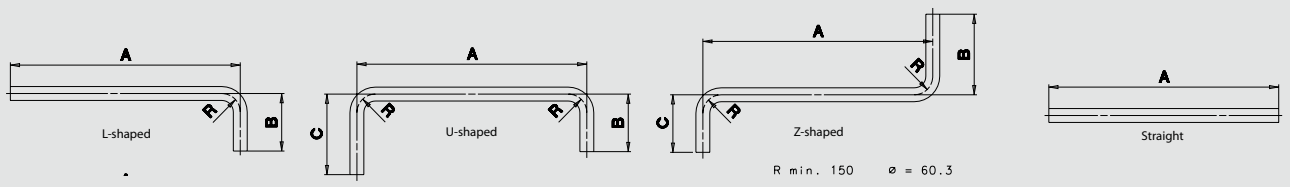
Support tubes
Stainless steel support tubes, 60.3mm outside diameter, wall thickness 3.6mm



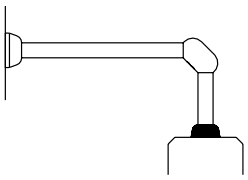
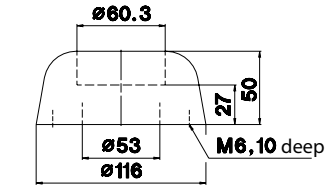
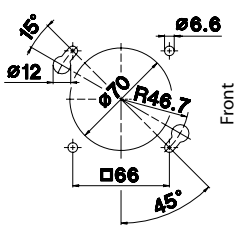
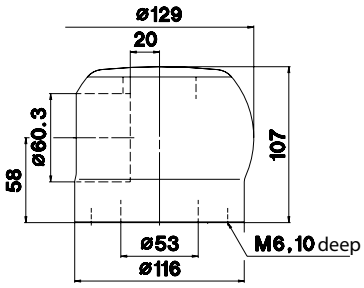
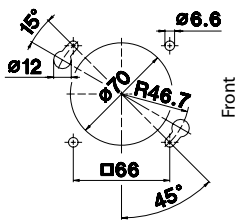
Length mm	Article number
250	**9523001000**
500	**9523002000**
750	**9523003000**
1000	**9523004000**
1250	**9523005000**
1500	**9523006000**

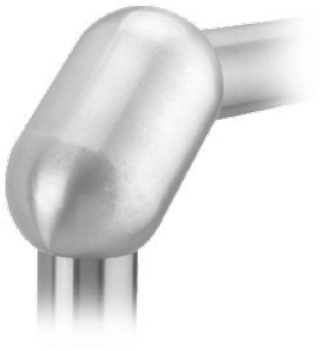
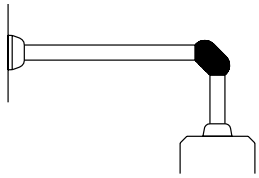
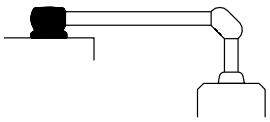
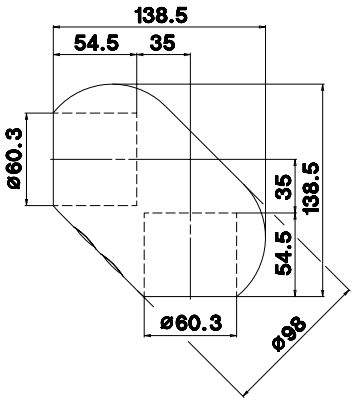
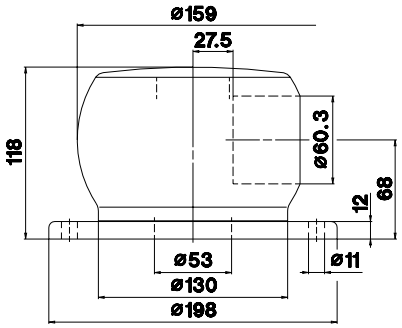
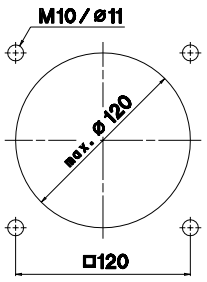
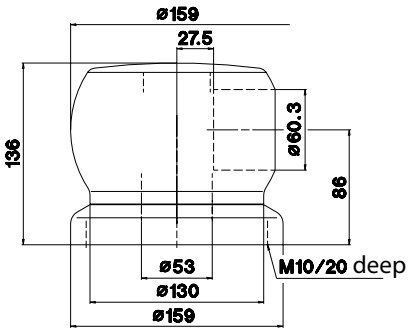
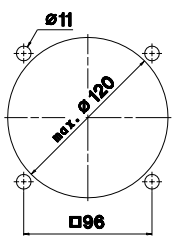
Support tubes to customer specifications
Different versions of formed support tubes for the BERNSTEIN CS-600 NR suspension system are available on request.
To order customised tubes simply quote the shape (e.g. straight, L-, U- or Z-shaped) and the dimensions.

Note:
Dimension B and C min. 300 mm; dimension A in U and Z version min. 450mm

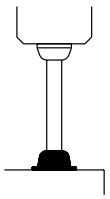
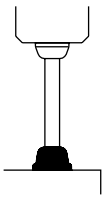
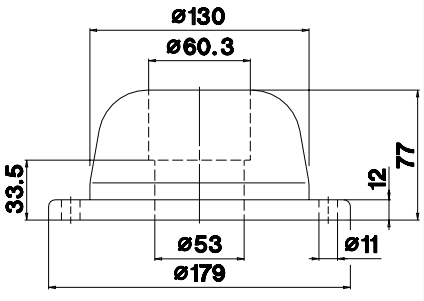
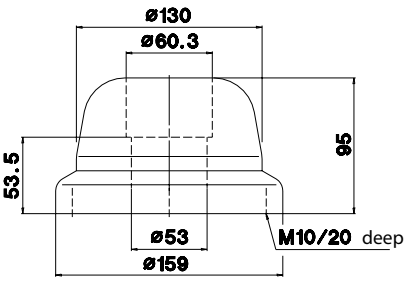
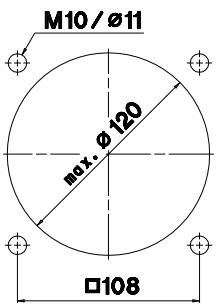
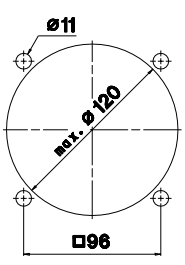


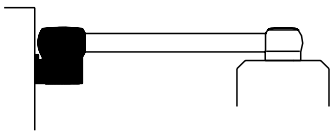
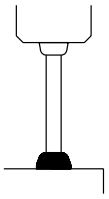
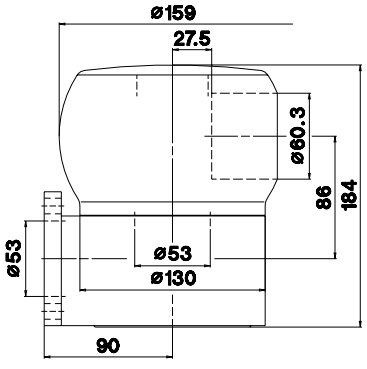
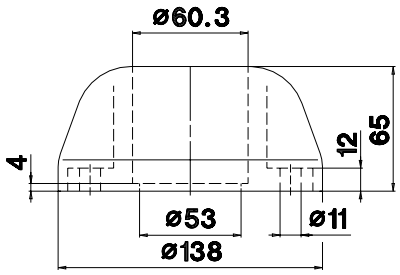
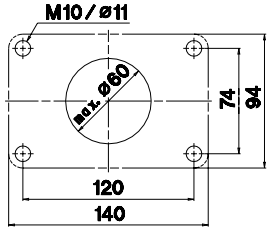
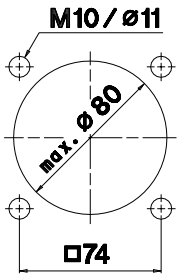
Stainless Steel Suspension System CS-600 NR

Article	Straight coupling (for attaching enclosure)	Elbow coupling (for attaching enclosure)
Article number	**1014050100**	**1014050200**
		
Details	Flange coupling for mounting enclosures. Angle of rotation 300° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals and mounting material.	Flange elbow coupling for mounting enclosures. Installation opening cover seals off the screws hygiene-safe. Angle of rotation 300° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals and mounting material.
Weight in g	2180	6520
Material	Stainless steel	Stainless steel
Accessories (retrofitable)		
Application example		
Dimensions in mm	 	 

Elbow	Top joint, external mounting	Top joint, internal mounting
1014050700	**1014050600**	**1014051600**
		
Elbow for 90° connection of two support tubes. Including screw cover and seals.	Top joint for mounting on horizontal surfaces. Installation opening cover seals off the screws hygiene-safe. Angle of rotation 300° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals.	Top joint for mounting on horizontal surfaces. Installation opening cover seals off the screws hygiene-safe. Angle of rotation 300° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals.
4430	13590	12980
Stainless steel	Stainless steel	Stainless steel
		
	 	 

Stainless Steel Suspension System CS-600 NR

Article	Rotary base socket, external mounting	Rotary base socket, internal mounting
Article number	**1014050400**	**1014051500**
		
Details	Rotary base for mounting on machines or floors. Angle of rotation 300° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals.	Rotary base for mounting on machines or floors. Angle of rotation 300° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals.
Weight in g	5720	6020
Material	Stainless steel	Stainless steel
Accessories (retrofitable)		
Application example		
Dimensions in mm		
		

Wall joint	Wall flange/base
1014050500	**1014050300**
	
Wall joint for mounting on horizontal surfaces. Installation opening cover seals off the screws hygiene-safe. Angle of rotation 300° with limit stop. Preset torque. Maintenance-free bearings. Complete with seals.	Wall flange or base for mounting on horizontal and vertical surfaces. Complete with seals.
15990	3700
Stainless steel	Stainless steel
	
	
	

BERNSTEIN



Switch systems –
Economy meets safety



Sensor systems –
Compact intelligence



Enclosure systems –
Function and design

www.bernstein.eu

700 0000 899 . 02.2010 . We reserve the right to make changes

Contact

International Headquarters
BERNSTEIN AG
Tieloser Weg 6
32457 Porta Westfalica
Tel. +49 571 793-0
Fax +49 571 793-555
info@de.bernstein.eu
www.bernstein.eu

Denmark
BERNSTEIN A/S
Tel. +45 7020 0522
Fax +45 7020 0177
info@dk.bernstein.eu

France
BERNSTEIN S.A.R.L.
Tel. +33 1 64 66 32 50
Fax +33 1 64 66 10 02
info@fr.bernstein.eu

Netherlands
BERNSTEIN BV
Tel. +31 314 366088
Fax +31 314 361256
info@nl.bernstein.eu

Italy
BERNSTEIN S.r.l.
Tel. +39 035 4549037
Fax +39 035 4549647
info@it.bernstein.eu

United Kingdom
BERNSTEIN Ltd.
Tel. +44 1922 744999
Fax +44 1922 457555
info@uk.bernstein.eu

Austria
BERNSTEIN GmbH
Tel. +43 2256 62070-0
Fax +43 2256 62618
info@at.bernstein.eu

Switzerland
BERNSTEIN (Schweiz) AG
Tel. +41 44 775 71-71
Fax +41 44 775 71-72
info@ch.bernstein.eu

China
BERNSTEIN Safe Solutions
(Taicang) Co., Ltd.
Tel. +86 512 81608180
Fax +86 512 81608181
info@bernstein-safesolutions.cn

Hungary
BERNSTEIN Kft.
Tel. +36 1 4342295
Fax +36 1 4342299
info@hu.bernstein.eu

Service Hotlines:
For products: +49 571 793-3000
For orders: +49 571 793-3010